Policy Making Session 1
29 August 2017 10:45 - 12:15
Tampere Hall - Big Auditorium
Special Session
How to Educate

Educational Science and Policy-Making

Keywords: Educational policy, Higher education, Researcher education, Social aspects of learning and teaching
Interest group:
Organizer: Eero Ropo, University of Tampere, Finland

Educational Science and Policy-Making

Presenting Author: Manfred Pranzl, Technische Universität Muenchen, Germany

Education is one of the core issues of policy in every country. Policy provides the environment and the legal basis for the growth and development of educational systems, and educational science provides necessary arguments and solid evidence. This may guide policy-making decision-making processes. The interplay between policy and educational science requires considerable joint efforts to build a common understanding of the most prevalent educational problems and their solutions. Supranational organisations, both on a political level and on a scientific level, provide the adequate basis for an appropriate broad elaboration of those problems and solutions. In this EARLI panel, the following leading questions are discussed by outstanding representatives of policy-makers and educational scientists:

How is EARLI-based research perceived by policy? How relevant is the scientific quality of research for political decisions? Does current research meet the demands of policy-makers?

What is the relevance of empirical evidence to a policy-making perspective? What guides the formation of opinion – with regard to educational evidence – of policy-making and administration?

Are national and European instruments of funding research adequate? Is there a need for more policy-driven research programs? How important is basic research in educational science?

Session A 2
29 August 2017 13:15 - 14:45
Main Building D - D14
Symposium
Instructional Design, Learning and Social Interaction, Teaching and Teacher Education

Exploring the Adoption and Sustainability of an Informal STEM Education Innovation

Keywords: Case studies, Communities of learners, Design-based research, Ethnography, Informal learning, Instructional design, Peer interaction, Qualitative methods, Quantitative methods, Social Interaction, Student learning, Teacher Professional Development, Teaching / instruction
Interest group: SIG 10 - Social Interaction in Learning and Instruction
Discussant: Thomas Hillman, University of Gothenburg, Sweden

Adaptation begins adoption: How an educational innovation became part of the regular school day

Presenting Author: Reed Stevens, Northwestern University, United States
Co-Author: Helen Hui, Northwestern University, United States
Co-Author: Kemi Jona, Northeastern University, United States

This paper presents an analysis of the first phases of adoption of FUSE, an innovative educational program. The paper conceptualizes this adoption process from an actor network theory (ANT, e.g., Latour, 2005) perspective which calls attention to its socio-material. More specifically, the research question our case study addresses is how a new actant (i.e. the FUSE Studio) was incorporated into a standing and relatively stable actor-network (i.e. the traditional public school day)? By analyzing open-ended interviews ( Patton, 2002) conducted with key personnel working on both sides of the FUSE research-practice (the design of FUSE and the district adopting it), the findings highlight mutual appropriation (e.g., Downey, Wilson, & Cole, 2011) taking place during the adoption and spread of FUSE as well as the surprising importance of 3D objects printed by the students and their circulation. In all, the paper contributes to understandings of how educational innovations, as acts, spread and become stable actors in different networks.

Organizing for interest discovery and peer support in a free-choice environment

Presenting Author: Daniela DiBiase, University of Colorado at Boulder, United States
Co-Author: William Penuel, University of Colorado Boulder, United States
Co-Author: Kate Van Home, University of Colorado Boulder, United States

Designed by learning scientists, FUSE Studios is an interest-driven learning experience that is offered to in and out-of-school educational settings throughout the United States and abroad. Offering young people a chance to engage in in- and off-line STEM-related ‘challenge’ sequences. FUSE is a free-choice learning environment that has been widely lauded by teachers and educators since its inception in 2014, in particular for its ability to engage and sustain students' interest and participation. In this paper, we make use of two years of evaluation data to analyze youth experiences and outcomes of FUSE as related to their patterns of participation. Employing the framework of Connected Learning to make sense of the results, we find that 1) FUSE Studios promoted a high degree of support for youth interest discovery and peer support, regardless of mode of participation; and 2) positive attitudes toward science and engineering were predicted by high reported experiences of interest-discovery. We discuss these findings in an attempt to offer implications for those interested in designing learning environments that are open-ended, rigorous, and have the potential to strengthen current and future attitudes toward STEM-related fields.

How do teachers make sense of a new infrastructure for learning? 

Presenting Author: Kristina Kumpulainen, University of Helsinki, Finland
Co-Author: Anna Mikkola, University of Helsinki, Finland
Co-Author: Artti Rajala, University of Helsinki, Finland

In this paper, we investigate how Finnish teachers make sense of a new FUSE Studio infrastructure for learning. Infrastructure for learning refers to socio-materially mediated arrangements on which the school activity relies (Stevens, et al., 2016). Finnish schools represent an interesting site for researching the uptake of FUSE due to the nature of Finnish educational policy that centers on teachers’ autonomy (Sallberg, 2011; Simola, 2015). Our study asks: How do Finnish teachers make sense of the FUSE infrastructure for learning? Which possibilities and tensions do teachers identify in the uptake of FUSE in their schools? Informed by cultural-historical theorizing our study stresses teachers’ agency in educational reforms. This involves regarding teachers as valued participants in co-constructing educational reforms to address local needs. The empirical data derive from two public schools situated in culturally and socioeconomically heterogeneous suburbs of Helsinki. The data comprise 23 teachers’ and four principals’ accounts derived from semi-structured interviews conducted after a two-day in-service FUSE training program. The interviews were analysed using qualitative content analysis and thematic analysis (Braun & Clarke, 2006). Using thematic analysis, we identified four key themes unpacking the teachers’ sensemaking of FUSE. Namely, 1) FUSE as a possibility 2) FUSE as a tension, 3) FUSE within the operating culture and leadership of the school, and 4) FUSE and teacher agency and empowerment. In conclusion, the study highlights the complexity involved in the task of reforming school instruction and suggests that reforms can only succeed by involving the teachers as contributors to the process.

Productive developments: students’ agency and adaptations of FUSE

Presenting Author: Reed Stevens, Northwestern University, United States
Co-Author: Jaakko Hippiö, University of Helsinki, Finland

This study focuses on analyzing the adaptations students make to an innovative educational program when it is implemented as part of their regular school day. More specifically, the study highlights how these adaptations are managed locally by the teachers and the students and the learning that ensues from them: Building on socio-cultural and activity theory perspectives (e.g., Engeström, 2009; Rajala, 2016), the study conceptualizes these adaptations as productive deviations, and argues that they represent pivotal cases for understanding the management of the tension between the students agency and the pedagogical design of the learning environment.

The data for the study comes from an ethnographic data corpus of seven different FUSE Studios during 2014-2015 in a large midwestern school district in the United States. The conducted interactional analyses (e.g., Jordan & Henderson, 1995) has shown the deviations were sparked by the challenges offered by FUSE, but importantly extended and expanded them in unexpected ways. More specifically, the deviations were centered around the creation of new artifacts, like computer games or emoji pillows and this creation process required relatively complex design or production problems on part of the students and not present in the challenges. Furthermore, in order to solve these kind of problems, the students brought new tools and resources to FUSE step-by-step used to them. In all, the study contributes to current investigations into the connection between agency and learning in formal educational settings (e.g., Siny et al., 2016; Rajala, 2016)

Session A 3
29 August 2017 17:15 - 18:45
Vita - 120
Symposium
Cognitive Science, Learning and Instructional Technology, Motivational, Social and Affective Processes

Analyzing and visualizing the dynamic aspects of affect and cognition across contexts

Keywords: Artificial intelligence, Emotion and affect, Interdisciplinary, Learning analytics, Learning Technologies, Metacognition, Multimedia learning, Self-regulation, Social aspects of learning and teaching
Interest group: SIG 27 - Online Measures of Learning Processes
Discussant: Reinhard Pakrun, Ludwig Maximilians-Universität (LMU), Germany

Cognitive Metacognitive and Affective Processes during Learning with an Intelligent Virtual Human

Presenting Author: Roger Azvedo, North Carolina State University, United States
Co-Author: Nicholas Mudrick, North Carolina State University, United States
Co-Author: Michelle Taub, North Carolina State University, United States
The evolution of learning technologies has led to the use of intelligent virtual humans (iVHs) to facilitate problem solving, reasoning, and learning across domains. Despite results in rapport building, cultural training, and informal science learning, iVHs have not been used to support learners' cognitive, affective, and metacognitive (iCAM) self-regulation during multimedia learning. The objective of this study was to investigate how an iVH, capable of facially expressing emotions (e.g., confusion, joy, neutral), can trigger learners' ability to monitor and regulate their iCAM self-regulatory processes and therefore enhance their science learning with multimedia. Evidence from multichannel data (e.g., log files, eye tracking, facial expressions of emotion, physiological data, and screen capture of learner-system interactions) analyses indicates that the iVH's facial expressions triggered monitoring of students' iCAM SRL processes during complex science learning with multimedia materials.

**How physiological data visualizations can be used to track socially shared regulation of learning**

**Presenting Author:** Jenna Mainmberg, University of Oulu, Finland

**Co-Author:** Sanna Jarvelä, University of Oulu, Finland

**Co-Author:** Tapio Siipilänen, University of Oulu, Finland

**Co-Author:** Ilmi Alhakani, University of Oulu, Finland

**Co-Author:** Miika Jussis, University of Oulu, Finland

A core of collaboration is a construction of shared understanding through interaction with others, where the participants are committed to or engaged in shared goals and problem solving. Learners also need to be involved in socially shared regulation of learning (SSRL) to progress in their collaboration. What triggers socially shared regulation to occur is a result of individual monitoring, which is often invisible, but can be shared with the group members in a social plane. As a result of individual monitoring, learners have increased possibilities to change the course of their learning by engaging in regulation of cognition, motivation, emotions or behavior as a shared activity. New technological solutions on data collection and visualizations has opened up new ways to characterize the core mechanisms of 50%, which are often invisible, and therefore difficult to capture. In this study we explore how physiological data visualizations of one case group, that combines videodata coding on individual learners metacognitive monitoring and their physiological signals of affective reactions can be used to track socially shared regulation of learning in in authentic and challenging collaborative learning situation.

**Visualizations to support Self Regulated Learning based on data from Adaptive Education Technologies**

**Presenting Author:** Inge Molenaar, Radboud University Nijmegen, Netherlands

Many students in primary education regularly learn using adaptive educational technologies (AET) on tablets. Driven by developments in the emerging field of learning analytics, these technologies successfully adjust instructional events (Instructional texts, assignments, tools) to learners' performance. Hence AETs support learning efficiency, but it is unclear how AETs influence learner effort, emotion and related learning effectiveness. An important concern is that AETs eliminate the need for learners to regulate their own learning. Research showed that learners' control and monitoring activities are an important driver for learner effort, which is essential for retention and transfer of knowledge (learning effectiveness). Thus adaptive learning technologies enable efficient learning, but are likely to be demotivational to learner effort, and consequently effectiveness. At the same time AETs gather vast amounts of data that can be used to support learners. In this contribution, I discuss how visualizations can be established using data from AETs and how this supports learners' self-regulated learning. The visualizations are specifically designed to adjust learner effort and to support learners to effectively regulate their own learning.

**Conceptual & methodological challenges in studying the interplay of affect and cognition in learning**

**Presenting Author:** Julien Mercier, University of Quebec in Montreal, Canada

**Co-Author:** Pierre Charbonneau, User Research Lab – Ubisoft Montreal, Canada

**Co-Author:** Babak Khooravifar, University of Quebec in Montreal, Canada

**Co-Author:** Kamran Shawki, University of Quebec in Montreal, Canada

Learning involves cognitive and affective processes unfolding moment by moment over the entire activity. However, traditional data such as observations and self-report measures are not sufficient to accurately model how cognition and affect unfold in time. Self-report measures cannot be administered according to the rate of change of constructs of interest, while concurrent verbalizations are incomplete and can impede learning performance. To more fully explain the emotional process of a successful learning episode, ways to measure and link those processes over time are needed, accompanied by an appropriate modeling of the learning context, which can also be seen as dynamic. The goal of this presentation is to illustrate an innovative cross-disciplinary methodology to measure aspects of affect and cognition as they unfold in time during an initial episode of play with a video game, which aims specifically at developing a minimal level of mastery of the game's various mechanics (combat, economy, etc.) while keeping the learner engaged in the activity at hand. The suggested methodology can inform the selection of appropriate constructs, provide adequate definitions and operationalisations, and enable the empirical study of how affect and cognition fluctuate over time and how they interact dynamically during learning efforts. Appropriate formalism for pertinent fixed and dynamic features of the context are also needed. The characterization of learning as the dynamic interplay of affect and cognition in a changing context that this approach should make possible could inform the design of multiple contexts of learning, including entertainment and education.

**Session A 4**

29 August 2017 13:15 - 14:45

Livna - K103

Symposium

Culture, Morality, Religion and Education

**Mortality is not enough – Dimensions and factors contributing to teacher ethos**

**Keywords:** Morality, Social development, Teacher Professional Development, Values education

**Interest group:** SIS 13 - Moral and Democratic Education

**Discussant:** Dimitris Pneumatikos, University of Western Macedonia, Greece

**To be moral is not enough – Relatedness of moral personality to the professional ethos**

**Presenting Author:** Fritz Oser, Universität Freiburg, Switzerland

In this more theoretical paper we would like to outline why concepts like moral identity or moral self or moral personality, even moral models, do not predict the moral ethos of a teacher. The seeing in the opposite direction mirrors the same problem, namely, high ethos values do not predict a perfect moral personality. This refers of course to all models that presume that a person with high moral identity (Blasi, 1984; Krettenauer, 2015) does not necessarily see the needs and the weaknesses and the learning deficits etc. of a child in which ethos is at stake and which is a necessary condition for having a teaching ethos. In addition to this we begin to see that the moral reaction to a human problem is highly domain and situation related (see Beck 2003).

**Empathy – a core concept of teacher ethos, but not enough?**

**Presenting Author:** Karin Heinrichs, Otto-Friedrich-University Bamberg, Germany

**Co-Author:** Simo Ziegler, Otto-Friedrich-University Bamberg, Germany

**Co-Author:** Julia Isabella Warwas, Lehrstuhl für Wirtschaftspädagogik, Germany

Harter (2015) or Dudding (1992) consider teacher ethos as a set of values teachers committed to in order to act as a professional, in particular to care for their students and a social climate in classes. Thus, teacher ethos is relevant not only in moral dilemmas, but may also effect moral acting in situations of less moral intensity. Studies on patterns of moral decision-making in adulthood, in particular on the happy victimizer pattern (HVP) pointed out that people who decide for breaking a moral rule sometimes feel happy if they could take advantage for themselves. Thus, their social orientation sometimes is limited by their own preferences. This paper presents a study on patterns of moral decision-making among students (economics, business and vocational education as well as students who aim to become teachers). The participants were confronted with moral conflicts. We found that students who liked to become teachers show higher empathy and social orientation than students of economics. However, also among future teachers the HVP emerged. That means that even (future) teachers are sometimes not following their social orientation and care for others. Moreover, they sometimes also care for their own needs. Finally, we would try to conceptualize teacher ethos by referring to Rosenberg's model of non-violent communication. We argue that teacher ethos in a sense of getting into appreciating relationships has to go beyond caring for others but calls for balancing students' as well as teachers' needs.

**Teacher ethos: A stable moral personality trait or a situation-specific competence?**

**Presenting Author:** Alfred Weinberger, Pädagogische Hochschule der Dörzese Linz, Austria

This study scrutinizes two widespread assumptions regarding teacher ethos. The first assumption refers to the view that teacher ethos is a stable personality trait. The second assumption relates to the view that teacher ethos corresponds to the morality of the teacher. The first assumption can be challenged by referring to the theory of situation specificity TSS (Patry, 1991) that postulates that any social behavior is situation specific. The second assumption can be challenged by clarifying the question how teacher ethos is defined. Oser et al. (1991) define teacher ethos as the competence to solve an interpersonal conflict discursively. It is hypothesized that a) pre-service teachers discourse orientation is situation specific and b) there is no correlation between the discourse orientation and the stage of moral judgment.

940 critical incidents of 94 pre-service teachers were content analyzed with respect to the types of interpersonal conflicts and the discourse-orientation. The Moral Competence Test MCT assessed moral judgment competence.
The results indicate a significant situation-effect revealing that pre-service teachers show different discourse-orientation in different situations. A correlation analysis with the variables "discourse-orientation" and "moral judgment competence" yields a zero-correlation revealing that there is no link between ethos and morality. Implications for teacher education are discussed.


Does teachers' ethos need morality? Presenting Author: Brigitte Latzko, University of Leipzig, Germany Co-Author: Eveline Gutwimmer-Helferlinger, University of Teacher Education of Luzerne, Switzerland Co-Author: Anne-Cathrin Pael/er, University Leipzig, Germany Co-Author: Katrin Goffe, University Leipzig, Germany

According to the current research teachers' ethos is mainly conceptualized along moral dimension (e.g. Kaassen,2002; Tirit, 1999). This is not surprising - even from a linguistic point of view - as ethos and morality are often used synonymously. Dominating approaches towards the concept of teacher ethos within teacher education reflect this understanding (e.g. Weinberger, 2014). This presentation aims at analyzing this phenomenon, namely the strong interrelation of professional ethos and morality, in order to question the same. By referring to selected empirical data on diagnostic skills as key competencies of teachers' professionalism (Zlatkin-Troshchanskaya, Beck, Sembill, Nicolau & Mulder, 2006)

we argue that we need to consider more than moral dimensions to capture teachers' professional ethos.

Session A 4

29 August 2017 13:15 - 14:45
Mini-B: B415 Symposium

Transitions of Teacher Education

Improving Teacher Selection Methods: Key Challenges and Steps Forward

Keywords: Assessment methods and tools, Educational Psychology, Pre-service teacher education, Teacher Effectiveness, Teacher Professional Development Interest group: SIG 11 - Teaching and Teacher Education

Discussant: Friederike Zimmermann, Germany

Selection Methods for Teachers and Prospective Teachers: A Meta-Analysis Presenting Author: Robert Klassen, University of York, United Kingdom Co-Author: Jinhui Kim, University of York, United Kingdom

The purpose of this study was to review selection methods for teacher employment and for entrance into initial teacher education (ITE) programs. We posed five questions about selection methods and subsequent teacher effectiveness. An exhaustive search of the literature resulted in 27 studies included in our meta-analysis, with 9063 total participants. Findings showed a small but significant relationship (r = .12, p < .001) between selection methods and measures of teacher effectiveness. Cognitive and non-cognitive selection measures were significantly associated with teacher effectiveness and selection methods were significant predictors both for employment and entry into ITE. There was no significant relationship between cost and predictive validity of selection methods. We conclude by proposing new directions for further development of teacher selection research and practice.

Developing Student Selection for Teacher Training: Pilot Testing Situational Judgment Test in Finland Presenting Author: Anna-Maja Pohke-Kauppi, University of Jyväskylä, Finland

This paper presents findings of a study piloting the SJT method in the context of initial teacher education selections in Finland. It is widely acknowledged that selection approaches which focus exclusively on cognitive attributes do not optimally predict success in the complex, multifaceted job of teaching, and nor do traditional interviews and personality tests. More novel approaches in the form of situational judgement tests (SJT) focusing on non-cognitive attributes related to effective teaching have recently been introduced as a promising alternative to the traditional teacher selections tests (Klassen et al., 2014), but more information is needed on their feasibility in different cultural and educational contexts. The participants of the present study were candidates seeking admission to initial primary teacher education at the University of Jyväskylä, Finland who were administered SJTs and criterion measures. The sample consisted of 118 participants (96 female, 22 male). In addition to the SJT the measures included a test of academic skills, a panel interview, and students' self-ratings of non-cognitive attributes such as empathy, personality characteristics and self-efficacy. The findings failed to show associations between SJT scores and the self-rated non-cognitive measures, but the SJT was found to have statistically significant associations with applicants' academic test score and the panel interview. These findings provided validity information for the SJT by showing its associations with the applicants' ability to reason and knowledge application and the ability to elaborate on one's motivation and manifest critical thinking and communication skills.

To What Extent Can SJT Measure the NonCognitive Attributes of Prospective Teachers in Oman? Presenting Author: Waleed Al Hasmi, University of York, United Kingdom

This study responds to the concerns about the quality of new teachers in Oman by focusing on the current admission process for initial teacher education programs (ITEPs) inside the country. The main aim is to highlight the ability of using situational judgment tests (SJT) to measure the non-cognitive attributes of new applicants, by testing its 'reliability, validity and applicant reactions'. The research design consists of four complementary phases. Results from phase one have identified five non-cognitive attributes of effective teacher in Oman, namely: communication skills, organisation and planning, managing time and mood, primary and secondary. The five attributes were used in phase two for building the SJTs (items, responses and answer key), supported by focus groups of working teachers (N= 62). The resulting SJT consisted of 38 items and was tested in a pilot study in phase three. The participants were a sample of first year university students(N=171, 53.4% female). Results indicate a normal distribution for the sample, internal reliability of 0.81; however, scores were significantly higher for females than for males, p < 0.05. The validity of SJT will be tested in phase four through inclusion of criterion measures (i.e. interview scores, personality test scores).

Piloting Multiple Mini Interview in Teacher Education Selections: Application Reactions and Feasibility

Presenting Author: Ritta Leena Metsapeto, University of Jyväskylä, Finland

This paper examines applicant responses and feasibility of two interview tools applied in student selection to initial teacher education. Traditional panel interview (TPs) a commonly used selection tool for assessing candidate’s interpersonal skills, personality traits and motivation, i.e. the non-cognitive skills. Because little evidence supports the psychometric properties of TPs, there is a need for alternative approaches. In new promising approach, the Multiple Mini Interview (MMI), candidates move through a number of stations (MMIs) in a fixed order, making standardized scoring scheme. Strong psychometric properties of MMI give impetus to apply it in the field of education. This paper investigates feasibility of the MMI in teacher training selections; analyzes the distribution of MMIs in the students' replies; examines criterion-related validity of the MMI. Participants of the study comprised of two samples of candidates seeking entry to primary teacher education at University of Jyväskylä (Finland). Study 1 (n=240) showed that TPs was generally well-received by candidates, but the scores in TPs were not related to any of the criterion variables (empathy, interpersonal functioning, MKAEX exam score). Study II supported the feasibility of MMI, for instance, the design required no more resources with respect to time or number of examiners than TPs. Since the final stage of the MAA (n=50) will be implemented in November 2016, the findings concerning applicant reactions and the associations between MMIs scores and criterion variables will be presented and discussed in the symposium.

Session A 6

29 August 2017 13:15 - 14:45
Mini-B: B415 Symposium

Culture, Morality, Religion and Education, Educational Policy and Systems, Lifelong Learning, Teaching and Teacher Education

Focusing forward in and through the arts through education

Keywords: Arts, Case studies, Communities of practice, Culture, Educational policy, Knowledge creation, Literacy, Out-of-school learning, Qualitative methods, Reflection


Discussant: Viviana Sappa, Swiss Federal Institute for Vocational Education and Training (SVET), Switzerland

The place of the arts in curriculum and schooling: Improving the quality of education

Presenting Author: Georgina Barton, University of Southern Queensland, Australia

Co-Author: Robyn Ewing, University of Sydney, Australia

Recent research demonstrates that the provision of arts education, particularly in developed countries, is at an all-time low. Reasons attributed to this decrease include increasing pressure on teachers and schools to improve results in high stakes testing such as the Scholastic Aptitude Test (SAT) in the United States, Pan-Canadian Assessment Program (PCAP) and the National Assessment Program: Literacy and Numeracy (NAPLAN) in Australia. Most of these focus on the testing of a narrow range of literacy (and numeracy) skills.

Despite this perceived view of limited access to arts education increasing research over the last fifteen years documents the benefits of embedding quality arts experiences and processes in children’s literacy education and across the curriculum more generally. This paper therefore addresses the tension relationship between the arts and literacy by illustrating how the association between the two can be dynamic, rewarding and is flourishing in some in- and out-of-school contexts. We begin by acknowledging a more inclusive definition of literacy as “interpretive and expressive fluency through symbolic form, whether aural/isonic, embodied, textual, visual, written or a combination of these within context” (Barton, 2014, p. 3). We demonstrate how the key aims of the UNESCO Road Map for Arts Education can be realised by highlighting the unique literate practices that underpin effective arts education programs and creative teaching and learning in schools. Finally, several contemporary examples of transformative arts and literacy learning and teaching will be shared.
A number of international declarations and conventions that aim at securing for every child and adult the right to education including The Universal Declaration of Human Rights (1948) and the Convention on the Rights of the Child (1990) exist. In 2006 UNESCO identified the critical importance of arts education through their Road Map for Arts Education (2006).

The importance of the arts in fostering a sense of community and cultural citizenship was a finding in Bamford’s (2006) global study on the impact of the arts in education. She found that “quality arts education within schools can lead to social, economic and educational improvements within communities” (Bamford, 2006, p. 122).

The involvement of the community has been a particular focus of the Australian Government’s approach to the Centenary Commemoration of World War 1. The ‘spirit of Anzac’ is now widely regarded as the “linchpin of Australian national identity” (Deane, 2002 cited in Fischer, 2012, p. 222). Its capacity to generate an “all-inclusive experience of Australian multicultural tollengthess” (Fischer, 2012, p. 226) where once it had been the jealously guarded domain of the white Anglo Saxon male is indicative of the malleability that in part explains its enduring fascination (Seal, 2011).

This presentation describes two arts-based projects in Australia secured under the Queensland ANZAC Centenary Grant and the Australian Government’s Arts and Culture Fund – Public Program grant. Both projects were the result of cross institutional collaborations that drew on individuals with a range of expertise from a variety of fields without an explicit connection to either the military or historical commemoration.

Arts-based research, wellbeing and Artography: Developing individual capabilities Presenting Author: Susanna G-Calvo, University of Guelph, Australia Co-Author: Abbe MacDonald, University of Tasmania, Australia

Arts-based research with young children provides new ways to understand children’s lives and perspectives. Arts-based research can be seen as a method within qualitative research study (Cole & Knowles, 2008). In recent years, there has been growth in the use of arts-based research tools in a number of disciplines, all seeking ways for children to participate and share their understanding of their world. This chapter provides a snapshot of current arts-based research tools with young children (aged birth to five years) in two disciplines; health and education. The chapter concludes with a reflection about visual methods and a call for researchers to also think about the engagement of other arts-based research tools that could be implemented with the youngest of children.

Similarly, Artography is a method by which artists/teachers/researchers can use art as research method. Artography continually asks scholars in an effort to engage with ongoing practices in art and education in order to create knowledge rather than discover it. In so doing, it is only resolved retrospectively as new understandings are shared upon reflection on practice (LeBianc et al., 2015). Six individuals representing six continents share their experiences as university professors teaching undergraduate and graduate classes or supervising graduate students completing artographic dissertations, or as PhD graduates who used artography as the methodology in their theses or dissertations.

Arts, language, training, education, learning (Alfeta) Presenting Author: Martin Kerby, University of Southern Queensland, Australia, Australia Co-Author: Jean-Charles Chabanis, ENS de Lyon, France

Finding the optimal way to integrate the arts and education [AE] is a universal concern. The OECD describes how AE fosters “skills that fuel innovation in the economy and society: creativity, imagination, communication and teamwork to name a few”. AE’s unique contributions to skills considered ‘fundamental’, argue for giving them their rightful place: AE calls upon technical skills, including the broad concept of literacy known as multiliteracy in the 21st century. AE is also inseparable from a cultural education which should provide as many opportunities as possible to encounter, experiment, analyse, discuss, appreciate or criticise as large a range of artworks as possible and through this process to create one’s own personal collection of arts experiences and documented knowledge.

This paper aims at presenting the AlfetaRT project, a research network supported by a research initiative of the University of Lyon and the French national science agency. AlfetaRT means Arts, languages, formation, education, apprenticeships: recherche et transfert (Arts, language, training, education: learning and research and transfer) and has two related objectives. The first consists of identifying and understanding the inequalities in professional and educational careers. Notable issues encountered by teachers who seek to give arts education and education through the arts their rightful place. This research project used methods of field observations, video recordings and interviews. The second objective, linked to the first, was to design a multi-user multimedia resource that can be used for research and teacher education purposes, based on the needs formulated in real settings by the stakeholders.

Session A 7
29 August 2017 13:15 - 14:45
Main Building A - A05
Symposium
Instructional Design
Current issues in navigating self-regulated learning environments
Keywords: Instructional design, Learning Technologies, Metacognition, Self-regulation
Interest group: SIG 97 - Learning and Instruction with Computers
Discussant: Tina Seufert, Ulm University, Germany
Epistemological Beliefs and Metacognition in Self-Regulated Learning Environments Presenting Author: Marco Frenm, Ulm University, Germany Co-Author: Tina Seufert, Ulm University, Germany

What do you think about learning and about your conditions? Learners’ epistemological beliefs are a relevant factor in SRL environments. Their epistemological beliefs influence how learners calibrate their learning process to the tasks at hand. Furthermore, this affects their metacognitive awareness and metacognitive strategy use. This impact of the way learners think about their knowledge is extremely important while learning in discovery-based learning settings. Thus, this study was settled in a discovery-based simulation with the topic of “Buoyancy and density in fluids”. Learners’ (N = 72) had to decide if they will explore new information or will integrate the already explored information in their knowledge. This process incorporated the role of epistemological beliefs, metacognitive awareness and regulation for learning success. This study shows that epistemological beliefs’ dimensions “complexity of knowledge” (r = .36, p < .007) and “justification of knowledge” (r = .26, p = .029) are linked to learning success. Furthermore, cognitive trust is a moderator of the relation between complexity of knowledge and learning success. However, we could not find the expected relation between metacognitive strategies and epistemological beliefs and also miss the relation between metacognitive strategies and learning success.

Training Self-Regulated Learning Skills with Video-based Modeling Examples Presenting Author: Steven Raaijmakers, Utrecht University, Netherlands Co-Author: Martine Baars, Erasmus University Rotterdam, Netherlands Co-Author: Lydia Schaap, Erasmus University Rotterdam, Netherlands Co-Author: Fred Paas, Erasmus University Rotterdam/University of Wolongong, Netherlands Co-Author: Jeroen Van Merrienboer, Maastricht University, Netherlands Co-Author: Tamara Van Gog, Utrecht University / Erasmus University Rotterdam, Netherlands

An effective strategy for students engaging in self-regulated learning in a computer-based learning environment, is to choose tasks adapted to their current level of knowledge. Accurate metacognitive judgments about one’s performance (self-assessment) and about what a suitable next task would be (task-selection) are imperative for such a strategy to be effective. In general, however, students’ metacognitive judgments are inaccurate. Training consisting of video examples in which human models assessed their own performance and selected new tasks based on a performance/effort algorithm, has been found to improve performance after a self-regulated learning phase. This study aimed to replicate and extend these findings, by including a condition in which task selection was trained by the model applying a more general heuristic. Both the specific algorithm condition (n=42) and the general heuristic condition (n=37) were hypothesized to show improved task performance after self-regulated learning compared to a control condition (n=43). Additionally, the heuristic condition was hypothesized to improve transfer of task-selection skills when selecting tasks for a peer in another domain. Our results indicated that both types of training indeed led to an improvement of task performance after self-regulated learning. However, our hypothesis concerning transfer of task selection could not be confirmed. Both types of training showed improved transfer of task-selection skills. Currently, we are following up these results with an experiment where learners engage in self-regulated learning in another domain after training with video-based modeling examples and these data will also be presented at EARLI.

Effects of Task-selection Guidance on Task Selections and Development of Domain-Specific Skills Presenting Author: Haleisha Maria Jardim, Open University, Netherlands Co-Author: Michelle Nugteren, Utrecht University, Netherlands Co-Author: Lyth Kohler, Erasmus University Rotterdam, Netherlands Co-Author: Jeroen Van Merrienboer, Maastricht University, Netherlands

Selecting own learning tasks is an important skill for students, for instance when doing homework and no teacher is present to select tasks for them. However, studies on task-selection guidance thus far provided mixed results, which might have been caused by the different types of guidance used in different studies, and different levels of motivation in students. This research project investigated the different effects of procedural and strategic guidance on actual task selections and the development of domain-specific skills, compared to a control group with no guidance. Procedural guidance provides specific rules for selecting tasks. However, students do not elaborate on these rules, but seem to follow them blindly. Strategic guidance provides similar, but less concrete rules that stimulate students to think about them. Furthermore, we investigated the effect of differences in students’ motivation levels on the effects of guidance on task selections and domain-specific skill development. The results from three experiments
According to the review of Paradiso & Jonsson (2013), criteria transparency is one of the key elements to support a formative use of rubrics. Some authors have postulated from a theoretical stance that involving students in the co-creation of rubrics can have benefits such as better understanding of criteria, engagement, motivation and confidence, learning and performance (e.g. Atter & McTighe, 2001). Nevertheless, the effect of co-creating and using co-created rubrics has never been compared with the effect of using the same rubric given by the teacher, which is the main aim of this study. We explored how the use of co-created rubrics (experimental condition) for three different tasks compared to just handing out the same rubric (control condition) might affect self-regulation, self-efficacy, performance, task stress and students’ perception in two different classroom groups. The group that co-created the rubrics showed a higher level of self-regulation as measured by thinking aloud protocols. Partial significant effects were found for self-efficacy and performance. Clear expectations and training on the use of rubrics are related with criteria transparency and can be attributed to co-creating rubrics. In the light of our results, co-creating rubrics through the collaboration of the teacher and the students is a highly recommended pedagogical enterprise.

Rubrics as diagnostically formative feedback tools – A study in compulsory schools
Presenting Author: Niels Bech Lukassen, University College of Northern Jutland & Aarhus University, Denmark

This research study addresses the challenge of providing students with quality feedback based on a co-constructed rubric. The research suggests that rubrics can be created within a framework of three cyclical elements, and include students as significant co-constructors. The study uses micro- ethnographical classroom methods that include thirty hours of recorded teaching sessions and eight student focus group interviews. The data is from two Danish compulsory schools – from seventh grade classrooms. Rubrics are defined as an educational tool analyzed with a system theoretical approach as suggested by Niklas Luhmann. Rubrics hold the potential to serve as diagnostic tools with the purpose to provide both students and teachers with information of how they construct meaning. Four (selected) results are being displayed: 1) Students observe teaching and learning as very complex phenomena. 2) Students and teachers are in need of a variety of diagnostic assessment tools that assist them in understanding the learning intentions. 3) The results suggest that when teachers are implementing a whole variety of diagnostic assessment tools the students find the teaching more meaningful and motivating. 4) Rubrics hold the potential to reduce in classroom discrepancy and the students are in general motivated to work with rubrics.

The impact of a rubric on primary students’ self-efficacy and mathematical reasoning competence
Presenting Author: Robert Strel, University of Teacher Education St. Gallen, Switzerland
Co-Author: Patricia Bachmann, University of Teacher Education St.Gallen, Switzerland

Rubrics are assessment tools that help students gain complex competencies. Our quasi-experimental study aimed to evaluate an assessment instrument supporting primary teachers to teach and assess mathematical reasoning competence. Students in 44th and 59th grade primary classes (n = 721) in two Swiss cantons worked on their mathematical reasoning competences. In half of the classes a standards-based rubric for peer- and self-assessment was applied. An achievement test and questionnaires for students and teachers were administered before (T1), at the end of the intervention (T2), and four months later (T3). The results of the quantitative analyses demonstrated that our intervention with the rubric significantly fosters the students’ mathematical reasoning competence in the long run. The effects are mediated by self-efficacy beliefs. Classes in the rubric introduction group appeared to have more frequent peer- and self-assessment. Those classes also possessed higher self-efficacy beliefs. However, for reasoning competence there was no difference between the control and the intervention group. Within the classes the effects were different for the individual students. Students, who stated at T3 to have done more peer- and self-assessment, possessed higher self-efficacy beliefs for reasoning. Mediated by the beliefs those students also showed higher mathematical reasoning competence.

Session A 10
29 August 2017 13:15 - 14:45
P能看出 - B14-17
Symposium
Teaching and Teacher Education
Preservice teachers’ talk about dialogues in primary classrooms
Keywords: Case studies, Inquiry learning, Knowledge creation, Mixed-method research, Primary education, Problem solving, Qualitative methods, Quasi-experimental research, Student learning, Teacher Professional development, Teaching / instruction
Interest group: SIG 11 - Teaching and Teacher Education
Discussant: Kathrin Krammer, University of Teacher Education Lucerne (PH Luzern), Switzerland

Presenting Author: Julia Steinfeld, Dusburg-Essen University, Germany

Teachers’ scaffolding in problem solving tasks in Technology Education
Presenting Author: Julia Steinfeld, Dusburg-Essen University, Germany

Teachers’ scaffolding is one of the most influential factors on students’ learning processes, especially in primary schools (Caldina et al. 2010). Moreover, teachers’ scaffolding is in particular crucial in open and problem based learning environments (Hmelo-Silver et al. 2007) which is one of the main approaches in Technology Education (Mödauer 2009, Hill 1998). Through practical problem solving children can understand the manmade world, involving using and discovering scientific concepts and skills in conjunction with design-and-make activities. The complexity and ambiguities for teachers and their scaffolding are challenging in this approach (Hmelo-Silver et al. 2007). Therefore, this exploratory case study investigates teachers’ scaffolding patterns and their cognitions in problem solving tasks in Technology Education in German primary schools. Video tapes and stimulated recalls with teachers have been carried out. The coding system for analyzing the video and interview data has been developed in inductive and inductive way. The results confirm the significance of activating and structuring scaffolds and show how teachers deal with complexities in problem solving processes.

Knowledge-building patterns in educational dialogue
Presenting Author: Hei Mihonen, University of Jyväskylä, Finland
Co-Author: Helena Raikku-Puttonen, University of Jyväskylä, Finland
Co-Author: Eija Pakarinen, University of Jyväskylä, Finland
Co-Author: Anna-Maja Pohkeus, University of Jyväskylä, Finland
Co-Author: Marja-Krista Lenkenen, University of Jyväskylä, Finland

Classrooms create settings of knowledge building, where ideally, students and their teacher jointly develop their understanding (Mercer, 1995). Dialogue can be considered as the facilitator of this collaborative learning process (e.g., Alexander, 2006; Lyle, 2008; Mercer, 2008). This study aimed to examine knowledge-building patterns in Grade 6 educational dialogues. The data consisted of 20 video-recorded lessons from the classes taught by seven teachers, selected by using a latent profile analysis and examined with a qualitative functional analysis of classroom talk. Episodes of educational dialogue were found to represent three main types of knowledge, based on facts, views and experiences. These three types were further identified as forming six diverse knowledge-building patterns in educational dialogues. The findings indicated that factual orientation dominated the Grade 6 lesson dialogues. However, factual knowledge building often occurred with the other two main types of knowledge. Our findings suggest that it is important for teachers to explore the possibilities of different knowledge-building patterns to acknowledge the concrete ways to scaffold educational dialogues and to guide students’ learning through it.

Cognitive activating or social regulating – focus in tutoring dialogues in primary science classes
Presenting Author: Stefanie Schniedel, University of Tuebingen, Institute of Education, Germany

With the aim of increasing scientific literacy, learning arrangements are needed which enable students to learn about scientific ways of working and problem solving. Besides the tools provided and the quality of the use of the teaching arrangements, the support of learners becomes particularly important. (e.g., van Dijck et al. 2015; Huhtamäki et al. 2015). The international research project “Innovations for science and technology education in the region of the Lake of Konstanz” provided 75 teachers in Austria, Germany and Switzerland with the opportunity to work with a mobile learning arrangement on the topic of flying. In the context of this research project, several aspects was studied. The sub-project presented here seeks to determine how teachers support the students in their working and learning processes. In order to achieve a detailed analysis on the support activities, teachers’ actions were videorecorded and coded. The codes were aggregated to the main categories cognitive activating, evaluative and regulative interventions. From the subsequent latent class analysis three types of teacher activities were derived. The findings describe types of teacher who show preferences in special dimensions of learning support.

Teachers’ knowledge, professional development and learning support practice for science education. Presenting Author: Franziska Vogt, University of Education St. Gallen, Switzerland

The paper is based on the research project “Innovations for science and technology education” whereby 75 primary teachers were given a mobile learning arrangement on the topic of flying (physics). The analysis presented seeks to capture the interplay between teachers’ professional knowledge (professional content knowledge (PCK) and content knowledge (CK)), the question of the effectiveness of interventions in form of two different professional development courses focusing on either PCK or CK and the practice of learning support. The research questions concentrate on (i) the effects of the interventions on teachers’ professional knowledge, (ii) the relation between professional knowledge and practice of learning support. Measures include questionnaires with scales on domain specific PCK, a test on CK, as well as the video analysis of teachers’ learning support practice (another contribution of the symposium). The results indicate the challenges of targeting specific competences through professional development. The relations between knowledge and practice can only be found in certain areas, mainly the relation between CK and PCK focusing on students’ sense-making and cognitive activation and content focused structuring and evaluation, which are relevant for an understanding of professional knowledge and practice required for scaffolding.

Session A 11
29 August 2017 13:15 - 14:45
Linna - K109
Symposium
Considering process features in family literacy programs: Ways and explanatory models
Keywords: Experimental studies, Literacy, Parental involvement in learning, Social interaction
Interest group: Paul Leseman, Utrecht University, Netherlands

Outcomes and implementation quality of a Dutch family literacy program: Early Education at Home
Presenting Author: Sanneke de la Rai, Hogeschool Rotterdam, Netherlands
Co-Author: Roel van Steensel, Erasmus University Rotterdam, Netherlands

Family literacy programs (FLPs) aim to promote children’s literacy development by stimulating their home literacy environments (HLE), particularly in at-risk families. Observed differential effects for these family literacy programs in terms of their impact on children’s literacy development, especially among children at risk for reading difficulties, have been the focus of research. In this study, we measured various aspects of implementation quality of the FLP “Early Education at Home” (EEH) and related these to program effects. EEH aims to promote kindergartners’ language and literacy skills by stimulating the kindergartners’ reading activities and by teaching parents strategies for realizing stimulating interactions. We hypothesized shorter term and long-term effects of EEH (enhanced parent–child reading fluency or comprehension of young or struggling readers (Topping, 2001)). EEH’s effects are widely confirmed by many authors (e.g., Lam et al., 2013; Sylva, et al., 2008; Topping & Lindsay, 1992). However, it is still unknown whether all elements of the method are functioning as intended. Therefore, this study investigates mediating effects of process features (fluency and comprehension of children) and their outcome (parent–child reading fluency and comprehension). EEH is a FLP that is part of a larger family literacy program (FLP). In this study, we investigated the impact of program features (fluency and comprehension) on parent–child reading interaction. In addition, we investigated the impact of program features on the reading fluency of the children. We also investigated the impact of program features on the reading fluency of the children's parents. We found that the program features had a significant positive impact on the reading fluency of the children and their parents. This suggests that the program features were effective in improving the reading fluency of the children and their parents. The findings have implications for the design of future family literacy programs.

Paired Reading with parents’ or volunteer tutors: Do process features explain differential effects?
Presenting Author: Caroline VIgier, University of Teacher Education Fribourg/CH, Switzerland
Co-Author: Silke Hauri, Pädagogische Hochschule FR, Switzerland
Co-Author: Annette Tettenborn, University of Teacher Education Lucerne, Switzerland
Co-Author: Isabelle Hugener, University of Teacher Education Lucerne (PH), Switzerland
Co-Author: Manuela Furrer, University of Teacher Education Lucerne, Switzerland
Co-Author: Catharina Naefpf, Pädagogische Hochschule, Switzerland

Paired Reading (PR) is a very established method to enhance reading fluency and comprehension of young or struggling readers (Topping, 2001) whose effects are widely confirmed by many authors (e.g., Lam et al., 2013; Sylva, et al., 2008; Topping & Lindsay, 1992). However, it is still unknown about detailed mechanisms of the method. Therefore, this study investigates mediating effects of process features like interaction and implementation quality on outcome variables, in order to disentangle effects of the acting person (tutor) and the method. A PR program with randomized control group design was implemented with children of kindergarten age in two training conditions – parents’ and volunteer tutor (n = 67; volunteers n = 64; control group A + B). Volunteer tutors outperformed parents’ tutors and the controls. Children who trained with volunteer tutors developed significantly better in reading fluency when controlling for individual characteristics and initial reading level. In contrast, no effects were found on comprehension in none of the two conditions. Analysis of video data of one videotaped training session per pair (N = 113, without control group) showed that parents praised the child significantly less and showed less warmth than volunteers did when interacting with the child. Moreover, volunteers talked significantly more about book content than parents, however, they did not differ significantly in other aspects of implementation. Further analyses will investigate whether effects on fluency were mediated by process factors like praise, warmth or content-related conversation. Findings are discussed with regard to future implementation of PR training in practice.

Stimulating parent-child interaction through storytelling activities of a family literacy program
Presenting Author: Rosa Teope, Radboud University Nijmegen, Netherlands
Co-Author: Inge Molenaar, Radboud University Nijmegen, Netherlands
Co-Author: Ron Osostam, University of Applied Sciences Amsterdam, Netherlands
Co-Author: Ludo Verhoeven, Radboud University Nijmegen, Netherlands

Preschool vocabulary knowledge develops mainly informally via parent-child interaction. Family literacy programs (FLPs) aim to promote children’s vocabulary by supporting parent-child interaction quantity and quality. In addition to traditional storytelling activities that are part of FLPs (such as shared book reading), we developed a technology-enhanced storytelling (TES) activity including real-time interaction support. In this study we investigate parent-child interaction of dyads involved in the regular FLP (n = 15), FLP plus TES (n = 15) and controls (n = 15) during a storytelling activity. We examine the effect of the FLP and TES in their ability to act as an equal, stimulate and exchange with their child’s vocabulary and fluency over time and associations with children’s vocabulary and fluency over time. Parents observed four times during a school year doing a paper-based and technology-enhanced storytelling activity each time. Analyses show that at Time 1 (after 6 weeks of FLP), no significant differences were found in the interaction quality and quality of dyads involved in the different conditions. Moreover, parents and children’s fluency and quantity of interactions were found, indicating the diversity among dyads. Analysis of the other three time slots will examine the development of parent-child interaction over time, and associations with children’s vocabulary development. This will provide insights in how an FLP influences parent-child interaction over time, how much implementation time is required for an FLP to be effective, and how development of parent-child interaction relates to vocabulary.

Beyond the text: fathers and mothers engaging with their toddlers around a book
Presenting Author: Elisabeth Duursma, University of Wollongong/Early Start Research Institute, Australia

Shared parent bookreading is known to benefit children’s language and literacy development (e.g., Bus, Van Uzendoorn, & Pellegrini, 1995; MUL & Bus, 2011). However, what happens during a book reading interaction is perhaps even more important than the reading of the text itself. This study examined the strategies 25 Australian fathers and mothers used during shared bookreading with their 2-year-olds using an embedded child’s question (ECQ) tool (adapted from Fischer & Scollon, 2015). Strategies included asking questions, labelling, expansions and feedback. Initial results indicated that both parents used a wide range of strategies and focused on labelling and asking questions. The association between parental strategies and child language, social, emotional and cognitive development will be discussed.

Session A 12
29 August 2017 13:15 - 14:45
Room B 2016
Symposium
Cognitive Science
The number line revisited: new insights into strategy use and training
Keywords: Cognitive development, Cognitive skills, Game-based learning, Mathematics, Numeracy
Interest group: Discussant: Evelyne Kroesbergen, Utrecht University, Netherlands

Number Line Estimations: An exploration of children’s response strategies
Presenting Author: Virginia Simms, Ulster University, United Kingdom
Co-Author: John Towsley, Lancaster University, United Kingdom
Co-Author: Kevin Muldownon, Heriot Watt University, United Kingdom

Research into number line estimation is burgeoning. Whilst most research focuses on estimation as a response, we consider the underlying process that yields response patterns. Twenty-eight children (mean age 73 months) completed both a 0-10 and a 0-20 number line estimation task. We identified three entry point strategies that children spontaneously exhibit when making estimations; that is, the position on the number line where they first make a move from in order to give their response. We then examine children’s flexibility by modelling the two most common of these strategies in a set of multiple task sessions over the course of a day. The number data confirm the prevalence and frequency distribution of two spontaneous response strategies. Our interventions also confirm that these need not be immutable; we find that for different estimation ranges children do sometimes change their strategy having merely seen another use it. We conclude that number line estimations must be mediated by performance strategies as well as children’s knowledge of the number system.

The effect of labeled benchmarks on number line estimations
Presenting Author: Elke Sikorskis, KU LEUVEN, Belgium
Co-Author: Dominique Peeters, KU LEUVEN, Belgium
Co-Author: Leon Verschaffel, KU Leuven, Belgium
Co-Author: Koen Luwel, KU Leuven, Belgium

Number line estimation (NLE) studies have shown that children can use benchmarks to position numbers on a number line (Barth & Paladino, 2011). Peeters et al. (2016) however demonstrated that the provision of additional benchmarks at 25% and 75% of the number line did not lead to better NLE performance in young children. In the present study we investigated whether labeling benchmarks (i.e. giving a numeric label to the benchmark) has an effect on children's NLE accuracy and benchmark-based strategy use, and whether this differs between grades. Eighty-three third graders and 72 sixth graders were randomly assigned to one of three conditions: (a) a control condition with labeled benchmarks at the origin (0) and endpoint (1000), (b) an unlabeled condition with additional unlabeled benchmarks at 25%, 50% and 75% of the number line, and (c) a labeled condition in which these benchmarks were labeled with, respectively, 250, 500 and 750. Findings showed that third graders estimated more accurately in the labeled condition than in the unlabeled one, while the estimation accuracy of sixth graders did not differ between these two conditions. Trial-by-trial verbal reports and model fits showed that the majority of third graders fitted best with the four-cycle power model (i.e. using benchmarks at 25% and 75%) in the labeled condition only. Whereas the majority of sixth graders fitted best with this model in both the unlabeled and labeled condition. These findings have implications for the amount of support that should be provided to children learning NLE.

Strategy use in bounded and unbounded number lines in MLD
Presenting Author: Anne van Hoogmoed, University of Groningen, Netherlands
Co-Author: Evelyn Kroesbergen, Utrecht University, Netherlands

Number line estimation (NLE) tasks typically measure number placements on a bounded number line. Recently, the unbounded NLE task was introduced in which only the starting point of the number line and one of the task conditions is bounded (Kyllonen & Mars, 1990). This results in more direct measure of understanding numerical quantity. Performance, development, and strategy use differ between the bounded and unbounded NLE tasks in the general population. Research has shown that individuals with mathematical learning disability (MLD) lag behind in bounded NLE tasks. In the current research, we examined whether NLE performance in the unbounded NLE task and whether they use different strategies as compared to individuals without MLD. In the first qualitative study, four strategies were identified for the estimation of benchmark unbounded NLE tasks. These strategies were used by adults with and without MLD. In the second study, performance and strategy use of children with and without MLD on the unbounded number line is compared. The results of these studies give additional insights into the deficits in adults and children with MLD and possible strategies that may improve their number line estimations.
Using a game-based number line estimation task to assess conceptual fraction knowledge

Presenting Author: Korbinian Möller, Leibniz-Institut für Wissensmedien, Germany
Co-Author: Manuel Niusan, Leibniz-Institut für Wissensmedien (IWM), Germany
Co-Author: Kristi Kilb, Tampere University of Technology, Finland
Co-Author: Jake McMullen, University of Turku, Finland

Serious games gain increasing research interest as tools to augment traditional instructional approaches on scholastic learning, especially in mathematics education. In the present study, we investigated whether a game-based approach may not only be useful to foster numerical learning but may also be valid as an assessment tool. Thus, a total of 54 Finnish fifth graders played a math game on tablet computers using tilt-control to maneuver an avatar along a number line for 30 minutes. Findings indicated that hallmark effects of fraction magnitude processing typically observed in basic research, such as the numerical distance effect, were successfully replicated using the game-based assessment. Moreover, in-game performance measures, such as fraction comparison performance as well as fraction estimation accuracy, correlated significantly with students’ math grades. The results of the current study, thus, suggest that game-based learning environments for fraction education (even using tilt-control) also allow for a valid assessment of students’ fraction knowledge.

Session A 13
29 August 2017 13:15 - 14:45
Main Building A - A2A
Symposium
Teaching and Teacher Education

Teachers’ professional competences, instructional quality and student learning outcomes

Keywords: Competencies, In-service teacher education, Mathematics, Mixed-method research, Quantitative methods, Secondary education, Student learning, Teacher Effectiveness, Teacher Professional Development, Teaching / instruction
Interest group: SIG 11 - Teaching and Teacher Education
Discussant: Trude Nilsen, University of Oslo, Norway

Video-based Promotion of Teaching Competences in Teacher Education

Presenting Author: Mirjam Kocher, Educational University Zurich, Switzerland
Co-Author: Matthias Baer, Educational University Zurich, Switzerland
Co-Author: Jan Arnold, Educational University Zurich, Switzerland
Co-Author: Anna Locher, Educational University Zurich, Switzerland

How to promote teaching competencies in teacher education is still a relatively un-researched field. The presentation first shed a light on some elected results from previous studies, which show that lessons of student and experienced teachers contain primarily direct instruction and rather low cognitive demand. Then results of a new intervention study are presented. This study aims the promotion of constructivist ways of teaching instruction in teacher education with a video-based intervention. A central element of the intervention is the analyses of and the reflection on own lesson videos by students teachers and by experienced teachers. The study participants are student teachers of the Educational University of Zurich and experienced teachers, who are mainly involved in the training of the student teachers as mentors. The focus of the intervention is on the adaptive promotion of (1) the student teachers and (2) the experienced teachers by video lessons, which they taught by themselves in the subject German. Additionally data from control groups are recorded without intervention. The intervention is implemented in the regular schedule of the Educational University during three semesters. The effects of the intervention is investigated in a multipuasomal way by eight data collection instruments over four measurement points. By the time of the EARLI-conference we will show results about the development of teaching competences within the intervention groups and the control groups. Additionally differences between the intervention groups and the control groups will be presented.

Session B 14
29 August 2017 13:15 - 14:45
Pini B · B3111
Symposium
Teaching and Teacher Education

Collaborative teaching and inclusion: benefits and challenges

Keywords: Attitudes and beliefs, Case studies, In-service teacher education, Mixed-method research, Primary education, Qualitative methods, Quantitative methods, Special education, Teacher Professional Development, Teaching / instruction
Interest group: SIG 15 - Special Educational Needs
Discussant: Berit Kjetten Rafaelsen, University of Luxembourg, Luxembourg

Under which conditions do primary school teachers cooperate in inclusive education?

Presenting Author: Frank Hehm, Paderborn University, Germany
Co-Author: Susanne Schwab, University of Wuppertal, School of Education, Germany
Co-Author: Fabian Hoya, Paderborn University, Germany
Co-Author: Ganzme Görel, University of Paderborn, Germany

Cooperation between primary school teachers and special education teachers is an important prerequisite in inclusive education. Until now, little is known about the willingness of primary school teachers to cooperate with special education teachers in inclusive schools. Therefore, we investigated 40-168 primary school teachers’ willingness to cooperate in inclusive education, their attitudes towards inclusion, their experiences in joint education of students with and without special educational needs, their self-efficacy beliefs and their attitudes regarding teamwork. The results of a structural equation model illustrate the
importance of attitudes regarding teamwork and primary school teachers’ experiences in joint education of students with and without special educational needs for their willingness to cooperate in inclusive education.

Collaborative classroom practice for inclusion
Presenting Author: Susanne Schwab, University of Wuppertal, School of Education, Germany
Co-Author: Lisa O’Connor Bones, Uster University, United Kingdom

Collaborative practice is integral to effective inclusion. Within schools, teacher collaboration can foster communities of practice through a series of professional relationships that enhance the educational experience and learning outcomes of pupils with special educational needs (SEN). In Ireland, Learning Support Teachers (LSTs) and Resource Teachers (RTs) provide additional support to the increasing numbers of children with SEN in mainstream classrooms. Working alongside Classroom Teachers (CTs), this tripartite of teaching expertise represents an opportunity for whole-school and classroom-based approaches to successful collaborative, inclusive practice.

This presentation describes the perceptions and experiences of collaborative practice between primary CTs, RTs and LSTs in a cohort of primary schools in the West of Ireland. Using a mixed methods approach, the study sought to establish the nature and extent of collaboration amongst these teachers and to identify the benefits and barriers to implementation.

The findings suggest that whilst teachers are increasingly aware of the value of collaboration, its implementation is largely aspirational, with a series of challenges relating to time constraints, ad hoc planning and limited professional development opportunities most commonly identified as constraints to a consistent approach. The article considers the consequences of this shortfall and options for improved engagement between teachers are identified.

Co-teachers as change agents towards more inclusive education
Presenting Author: Elke Struyf, Universiteit Antwerpen, Belgium
Co-Author: Dian Fulti, University of Applied Sciences Utrecht, Netherlands
Co-Author: Coik Bakker, UCR / Utrecht University, Netherlands

Purpose: Four primary schools participated in a three years pilot in which co-teaching was considered as a means to realize more inclusive education. The aim of the research was to study the preparation and daily practice of beginning co-teachers in order to achieve a higher goal: to find out if co-teaching can be a means to reduce the outflow of pupils to special education. During the first year, sixteen co-teachers prepared themselves and their organization for the implementation of co-teaching by means of training, international college consultation and planning. During the second and third year the co-teachers practiced co-teaching in their schools.

Method: We collected naturally occurring and organized data. Naturally occurring data were our field notes from the co-teaching training, collegiate consultation, work- and intervisitation meetings and film and photo shoots. The organized data consisted of data collected with a reflection interview and a survey.

Results: Data collection revealed that co-teachers experienced a deep meaning for their work, experienced fun, professional development and ownership in the work. Further they felt supported by the co-teaching partner(s). Co-teachers indicated the importance of having an open attitude, to be reflective and to feature the integration and communication skills. The pilot demonstrates that the co-teaching teams in each school developed as small intrinsic motivated collegial sub networks who felt able to realize effective and sustainable change in a diverse, comprehensive and diverse organizational process as initiated by the recent law to create more appropriate education for all.

Collaboration for inclusive Education - “It is just there on paper”
Presenting Author: Estelle Swart, Stellenbosch University, South Africa
Co-Author: Mmna Nel, North-West University, South Africa

To become inclusive, schools and classrooms should focus on how to operate as communities where everyone experiences a sense of belonging, is accepted, supports and is supported by all members of the school community. In practice it means that all educational practices should be inclusive, including providing integrated support services through intersectoral collaboration to address a range of internal and external barriers to learning. To realise this, transcendent collaboration within an inclusive learning support framework is essential. As part of a larger project several qualitative studies focusing on how South African teachers understand collaboration within a learning support framework have been conducted.

One of the central findings of this study was that teachers still conceptualise learning difficulties from a medical perspective and consequently refer individual children to specialists for assessments, support and placement in a school environment where they will receive specialist support. The main concern of this paper is that developing sustainable collaborative practices for addressing barriers to learning seems to be a persistent challenge in South Africa. The reasons include amongst others low teacher morale; limited understanding of inclusive education; teachers’ perception that they don’t have the required knowledge and skills to teach all pupils, more specifically those experiencing barriers to learning; lack of resources and support and large classrooms.

Session A 15
29 August 2017 13:15 - 14:45
Pinto B · B1097
Symposium
Higher Education

Research competence as part of scientific thinking in university education
Keywords: Higher education, Misconceptions, Researcher education, Student learning
Interest group: SIG 04 - Higher Education
Discussant: Heidi Hyytinen, University of Helsinki, Finland

Undergraduates’ Conceptions of Research Methods Learning
Presenting Author: Kieran Baloo, University of Roehampton, United Kingdom

A range of conceptions held about research methods learning have previously been identified. The current study aimed to examine in-depth shared conceptions among groups of undergraduate students, since individual conceptions are unlikely to exist in isolation. Utilising Q methodology, which links both quantitative and qualitative methodologies to uncover the subjective viewpoints that a group of individuals hold towards a particular domain, participants ranked statements reflecting different conceptions of research methods learning. Ranks were then factor analysed and seven distinct profiles of student conceptions were identified, labelled and described in qualitative detail: Big Picture Students (Aspiring Researchers) Big Picture Students (Non-Aspiring Researchers) Other-Focused and Superficial Learners, Calm and Defensive Learner vs. Anxious and Concerned Learner, Unconvinced Students vs. Converted Student Side-choosing Researchers, and Relaxed and Reductionist Learners. A significant association was found between these profiles and the students’ year of study; final year students displayed more ‘big picture’ views of research, while first year students showed a more superficial understanding. There was also a significant association between profiles and performance on research assignments; students who exemplified ‘big picture’ narratives performed better than those who exhibited superficial perspectives. Findings are considered in terms of how some conceptions take longer to develop and appear to be more beneficial or problematic to hold than others.

First Year College Students’ Emerging Understandings of Evidence
Presenting Author: Kieran Baloo, University of Roehampton, United Kingdom
Co-Author: Rebecca Sharple, Townson University, United States
Co-Author: Lisa Twiss, Townson University, United States

This qualitative research study examines first year college students’ abilities to think critically in a large state university in the United States. By emphasizing a typology of evidence that includes both qualitative and quantitative research as evidence, we track students’ growth over the course of the semester to see in what ways their thinking develops. Findings included an increase in sophistication in preparing a research paper that included critically evaluating sources, combining types of evidence, increased skepticism towards online information, particularly social media sources. Most importantly, students shifted from seeing information as a commodity to be consumed, to them producing accurate information. This study adds to the field by examining students’ perspectives on critical thinking and also shedding light on the complex processes of teaching students to view information through more critical eyes.

Teacher education students’ conceptions of theory
Presenting Author: Margaret Kelley, Australian National University, Australia
Some University students have problems with understanding the concept of theory. This study explored teacher education students’ conceptions of theory at the beginning and at the end of their five year master’s education. In this study, 127 students’ conceptions of theory were analysed and a six category model of conceptions was created. The categories were named as (1) Conceptions of theory as explaining practice, (2) Conceptions of theory as modelling phenomena, (3) Conceptions of theory related to research, (4) Subjective conceptions of theory, (5) Conceptions of theory as a fact or truth and (6) Conceptions of theory as separate from practice. When comparing the student groups, first year student saw theory more often as explaining practice and as a fact or truth, while more advanced students saw theory as modelling phenomena and being related to research.

Towards a theory of scientific thinking in higher education including research competence

Presenting Author: Mari Murtonen, University of Turku, Finland

Development of higher order thinking skills is an important goal in university education. The question about higher order thinking skills has been studied, for example, under the concepts of scientific thinking, reasoning, critical thinking, and epistemological beliefs. We wanted to explore the question of higher order thinking skills from the perspective of students and teachers by asking them what they think scientific thinking is. University teachers (N = 37) and students (N = 80) in various disciplines answered the research question. On the basis of their answers, eight categories were formed: broad thinking, basic principles of science, discipline based world view, research skills, reasoning skills, generic skills, epistemic beliefs and technical view. The results expressed both contents of the former theories of higher order thinking skills, but also new, very important aspects, such as research skills. The results thus propose a new, wider theory of scientific thinking for the purposes of higher education that includes research competence in addition to the traditional natural science based scientific thinking and critical thinking factors.

Session A 16
29 August 2017 13:15 - 14:45
Main Building D - D108
Symposium

Motivational, Social and Affective Processes

Productive collaboration contextualized in science learning; Theorizing the role of antecedents

Keywords: Collaborative Learning, Educational Psychology, Higher education, Motivation and emotion

Interest group: SIG 08 - Motivation and Emotion, SIG 10 - Social Interaction in Learning and Instruction

Discussant: Robyn Gilkes, The University of Queensland, Australia

Students’ epistemic beliefs about group process as antecedents for collaborative interactions

Presenting Author: Toni Rogal, Purdue University, United States
Co-Author: Ali Sarasonkom, Purdue University, United States
Co-Author: Clark Chinn, Rutgers University, United States
Co-Author: Tmsiötei Adee, Purdue University, United States
Co-Author: Todd Shuba, Purdue University - West Lafayette, United States

One underlying antecedent of productive collaborative interactions may be students’ epistemological beliefs about group learning as a reliable process for developing knowledge. Here, we are conceptualize the beliefs students hold about the role of groups for their individual learning and about the types of group interactions that benefit understanding. This can include beliefs ranging from how groups are best structured, to beliefs about forms of discourse, or beliefs about how learning can best be co-regulated. While present work indicates epistemological beliefs influence employed strategies and learning, this research has focused on individual learning without considering social processes. Prior research suggests that group conceptions can be modified with opportunities to collaborate in the context of curriculum affording meaningful activity. However, previous studies rely on questionnaires, which do not elict student’s detailed beliefs, such as how and why interacting with peers enriches knowledge. In the current study, we examine the university students students in veterinary medicine, with their group, report in open-ended surveys and interviews related to the (1) task product, (2) group strategies, and (3) group processes during collaborative activity in a problem-based learning units when solving authentic cases. Results indicate that when asked to discuss characteristics of good solutions to veterinary problems, students most frequently invoked the use of good group processes as a characteristic of good solutions. This indicates that students view the reliability of processes as an important indicator of high-quality solutions. This belief is very compatible with relabilist approaches to epistemic cognition.

Interdependent impact of diverse motivational profiles in student-led collaborative learning

Presenting Author: Simona Vulet, Murdoch University, Australia
Co-Author: Marja Vauras, University of Turku, Finland

While in student-led collaborative learning, group-level interaction analyses in relation to the quality of joint activity have unveiled meaningful patterns of cognitive engagement and key participatory roles, the antecedents of productive collaboration have received limited attention. Even less known is the impact of group members’ antecedent motivational profiles relevant to the group activity. Our aim is to study how students with diverse profiles engage in and influence productive collaborative learning. Matched pre-post questionnaires were given to 108 first year university teacher students in a science unit including small group laboratory activities, which were video recorded. Based on seven motivation/attitude variables (e.g., interest in science, science self-efficacy, science anxiety), four clusters were identified in both pre and post data: Vulnerable, Disengaged, Promising and Optimal. Evolving profiles were established on the basis of pre and post data clusters, e.g. Vulnerable becomes Disengaged or Promising Optimal. Four groups, differing in members’ evolving motivational profiles, were analysed in terms of their on-going engagement. Two individual-level analysis methods (role and metacognitive regulation) were used to determine the quality of individual contributions towards productive group engagement. Associations of antecedents data (motivational profiles, prior science knowledge) to actual engagement (roles, regulatory functions) were examined at individual and group configuration level. Preliminary results indicate that individuals’ motivational profiles as well as diversity of profiles within the group contribute to affording or constraining productive engagement. In discussion, we stress the systematic approach to understand the impact of motivational profiles in productive collaborative learning and for educational practice.

Investigating the antecedents to productive collaboration in physics teams

Presenting Author: Susanne Lajoie, McGill University, Canada
Co-Author: Haadad Kazemtabar, McGill University, Iran
Co-Author: Emanuela Buonamici, McGill University, Canada

This exploratory study examines the antecedents to productive collaboration in physics teams (n=17) who compete at a one-day physics competition. Productive collaboration is based on social regulation as well as content regulation. In particular, we examine the teams’ regulation processes during collaborative learning in the context of the social challenges faced during team work. An instrument designed to capture the nature of the regulation processes students employ during collaborative learning was used to capturstudents’ goals for participating in the competition along with the challenges they experienced. Using a mixed methods case study approach we found that teams who reported lower levels of reported challenges were more effective at team collaboration. Preliminary results showed that apart from individual student goals, teams who demonstrated more team-based goals, had prior familiarity with each other, and collaborated with more instances of positive social emotional interactions ranked better in the competition.

The role of histories, contexts and interactions in shaping engagement

Presenting Author: Susan Nielsen, University of Washington, United States
Co-Author: Miko Koretsky, Oregon State University, United States

This research study focuses on the relationship between antecedents and productive collaborations in STEM contexts. Antecedents are often seen as characteristics or conditions prior to or at the start of the “main show,” in this case, collaborative learning. Taking a situative perspective, however, boundaries between “before” and “during” are not so clear cut. Histories of individuals and the groups in which they participate are continuous, stretching into the past and into the future, and interacting in a continuously moving “present.” We present a case study that examines the role of individual and group histories, along with affordances of the project, in shaping engagement and learning throughout a university capstone course for engineers. The implications of findings for designing projects bridging school and real world contexts are discussed.

Session A 17
29 August 2017 13:15 - 14:45
Linnà - K108
Symposium

Understanding variability in math anxiety and its impact on math performance

Keywords: Achievement, Cognitive skills, Game-based learning, Mathematics, Motivation and emotion, Pre-service teacher education, Secondary education

Interest group: SIG 08 - Motivation and Emotion, SIG 10 - Social Interaction in Learning and Instruction

Discussant: Denes Szucs, University of Cambridge, United Kingdom

Investigation of the specificity of math anxiety, using both implicit and explicit measures

Presenting Author: Eva Schmiir, University of Amsterdam, Netherlands
Co-Author: Brenda Jansen, University of Amsterdam, Netherlands
Co-Author: Reinout Wiers, University of Amsterdam, Netherlands

Math anxiety has been conceptualized as a negative emotional response evoked by the (prospect of) math-related situations that disrupts performance. Mathmatics anxiety peaks in adolescence, a critical period in which it might negatively influence career choices. Math anxiety is often assessed using explicit measures. Possibly, also implicit processes play a role and learn us more about the mechanism underlying the relationship between math anxiety and math performance. The first research question is whether an implicit association between math and anxiety exists and whether assessing this adds to predicting math performance. The second research question concerns the specificity of the association between anxiety and math in comparison to English and on a more global level to the self. In this study a
Maths anxiety and other anxiety forms in secondary school performance

**Presenting Author:** Emma Carey, Centre for Neuroscience in Education, University of Cambridge, United Kingdom  
**Co-Author:** Danis Szucs, University of Cambridge, United Kingdom

Individuals with high levels of mathematics anxiety are more likely to have other forms of anxiety, such as general anxiety and test anxiety, and tend to have some maths performance decrement compared to those with low maths anxiety. However, it is unclear how the anxiety forms cluster in individuals, or how the presence of other anxiety forms influences the relationship between maths anxiety and math performance.

We measured maths anxiety, test anxiety, general anxiety and mathematics and reading performance in 913 secondary school students in the UK. We conducted latent profile analysis of students’ anxiety scores in order to examine the developmental change in anxiety profiles, the demographics of each anxiety profile and the relationship between profiles and academic performance.

We found that whilst girls exhibited higher scores on all forms of anxiety, boys were more likely to fall into a group whose academic anxiety was raised relative to their general anxiety levels. This suggests that whilst girls have higher absolute levels of maths anxiety, boys are vulnerable to anxiety specifically in the academic domain rather than more generally.

Furthermore, we found that those whose academic anxiety was relatively high compared to their general anxiety had a more impaired academic performance than those who scored highly on all forms of anxiety, once accounting for the effects of maths anxiety. We suggest that this may be because there are different factors generating anxiety in these different groups of students.

**Co-Author:** Oliver Thiel, Dronning Mauds Minne Høgskole, Norway

Studies reveal that maths anxiety can be seen as a common phenomenon among preschool teachers. In the context of preschool teachers’ professional competence in mathematics, especially their mathematics didactical knowledge, maths anxiety is discussed as a meaningful negative aspect. Maths anxiety is also theoretically assumed to consist of affective as well as cognitive components and to show context-specific variability when the occasion is systematically manipulated. Nevertheless, only few studies consider these characteristics of maths anxiety, especially in relation to achievement in mathematics (didactics). The present study investigated these theoretically assumed effects by applying models in terms of Latent State-Trait Theory (LST). N=225 preschool preschool teachers from Norway were asked for their maths anxiety with the Mathematics Anxiety Scale-Revised in a longitudinal design during their exam period. Based on LST, trait factors as well as occasion-specific factors for each component were modelled. Results indicate that no occasion-specific variability can be found and that only the cognitive component (trait factor) shows effects on the exam grade in mathematics didactics. The size of the examined regressive relation is in line with findings from other studies. Findings are discussed concerning the utility of LST, theoretical assumptions about maths anxiety and their practical implications for possible interventions in the educational context.

**The impact of playing a maths game at home on children’s maths anxiety and math performance**

**Presenting Author:** Daniela Sesarea, KU Leuven, Belgium  
**Co-Author:** Luther Dopepe, KU Leuven, Belgium

Recently it has been suggested that there might exist a bidirectional relationship between maths anxiety (MA) and mathematics performance, in which MA and mathematics performance can influence one another in a vicious cycle (Carey, Hill, Devine, & Szucs, 2016). Given this “Reciprocal Theory”, we hypothesised that an intervention will evoke the largest outcomes when children train with math content while their math anxiety is reduced. In order to reduce MA, we made use of technology in the form of a maths app. At least one group controlled group design was conducted to reduce children’s MA and to examine whether training with this math app positively influenced their math performance. In the experimental group, children trained 4 weeks (on 15 minutes/week) with a maths app in the control group, children trained similarly with an app, but not in the domain of mathematics, i.e., a word search app. Both groups registered how much time they played with the app. Pre- and posttest measures consisted of a MA questionnaire and a math performance test. In total, 100 (i.e. 50 per group) fifth graders (11 years) will be examined. Currently, we are halfway data collection (22 children per group) and preliminary results indicated significantly less reported MA and better math performance after the training in the experimental group whereas no significant differences were observed in the control group.

**Session A 18**

29 August 2017 12:15 - 14:45  
Pinni B - B1096  
Symposium  
Instructional Design

**Designing tasks that foster learning**

**Keywords:** Assessment methods and tools, Cognitive skills, Educational Psychology, Higher education, Instructional design, Reading comprehension, Writing / Literacy  
**Interest group:** SIG 06 - Instructional Design  
**Discussant:** Joerg Zumbach, University of Salzburg, Austria

On-line and Off-line Tasks to Foster Learning from Text

**Presenting Author:** Danielle McNamara, Arizona State University, United States  
**Co-Author:** Kathleen McCarthy, Arizona State University, United States  
**Co-Author:** Scott Hinze, Virginia Wesleyan College, United States

This talk provides an introduction to this symposium focused on designing tasks to foster learning from text by providing background learning on the context of comprehension research and theory to establish the types of products and predictions involved during learning. Based on these foundations, we review present tasks that enhance comprehension on-line (encoding during reading) or off-line (testing after reading). Despite the overlap in learning goals of on-line and off-line tasks, little research has directly compared these techniques or explored their potential interactions. Finally, we discuss potential future research on these types of tasks. These comparisons have strong potential to differentiate the mechanisms responsible for the benefits of comprehension tasks, while providing potentially powerful tools for educational interventions.

**Measuring task model construction while working with multiple documents**

**Presenting Author:** Jean-Francois Rouet, Université de Poitiers, France  
**Co-Author:** Raquel Cerdan, Faculty of Psychology, University of Valencia, Spain  
**Co-Author:** Eduardo Vidal-Abara, Universidad de Valencia, Spain  
**Co-Author:** Anna van Beek, Universidad de Valencia, Spain

Theories of task-oriented reading assume that readers construct a representation of the task demands (or task model) that guides their decisions of what to read and how to read it. This study examined the role of undergraduate students’ encoding of search questions in their success at responding the questions based on a set of three related texts on the topic of advertisement. Our main goal is to propose a measure that captures individual differences in task encoding. Forty first year undergraduate students read three complementary texts on advertisement and answered ten comprehension questions. In addition, they were asked to solve a task model assessment on each question by indicating which paraphrase, among three options, better reflected what the question said. Results indicate that success in identifying the task demands seems to be related to precision in searching and learning from text.

**Fostering Text Comprehension by Encouraging Students to Generate and Answer Their Own Questions**

**Presenting Author:** Gregor Damnik, TU Dresden, Germany  
**Co-Author:** Arij Piroke, TU Dresden, Germany  
**Co-Author:** Hermann Körnle, TU Dresden, Germany  
**Co-Author:** Susanne Narciss, Technische Universität Dresden, Germany

Recent research has shown that encouraging students to generate and answer questions during reading an expository text can foster students’ comprehension to a great extent. However, different instructions may affect how well this learning technique promotes students’ knowledge gains. In a three-by-two factorial design participants had to either restudy an expository text or to study this text and to generate and answer questions. If the latter was the case, participants were either trained to generate shallow or deep level questions. Furthermore, participants completed their assignment either for the purpose of tutoring or for their own knowledge acquisition. Results indicate that generating and answering questions is a powerful way to foster students’ comprehension. This is particularly true if students are instructed to generate questions for the purpose of tutoring or if they are encouraged to generate and answer deep level questions.

**Improving academic writing by macro-structural questions that support source text comprehension**

**Presenting Author:** Gregor Damnik, TU Dresden, Germany  
**Co-Author:** Felix Kapp, TU Dresden, Germany  
**Co-Author:** Susanne Narciss, Technische Universität Dresden, Germany

In academic writing often comes from sources. One possibility to support source-based essay writing is to provide questions which facilitate source text comprehension by initiating macro-strategies. In order to examine whether the provision of macro-structural questions during reading source texts leads to better results in academic writing both writing process and performance of a group supported by these questions was compared to a study-only group which read the source texts without answering questions. Results revealed that students provided with macro-structural questions wrote longer essays and spent significantly more time planning and rewriting/their essays than did the students of the study-only group. Studying source texts with macro-structural questions resulted in text products of better readability and partly better accuracy and coverage of content. These findings suggest that engaging students in answering macro-structural questions when reading source texts can positively affect both writing process and performance.

**Session A 19**

29 August 2017 13:15 - 14:45  
Pinni B - B3199  
Symposium  
Literacy, Literacy, Teaching and Teacher Education

Advances in studies on agency and development in educational settings; concepts and methods
Keywords: In-service teacher education, Informal learning, Lifelong learning, Qualitative methods, Quantitative methods, Teacher Professional Development, Workplace learning
Interest group: SIG 14 - Learning and Professional Development
Discussant: Michael Goller, University of Paderborn, Germany

Agency-promoting leadership in transforming organizational practices in Finnish teacher education
Presenting Author: Päivi Holkkila, University of Jyväskylä, Finland

This study examines transforming teacher education by focusing on agency-promoting leadership in one Finnish teacher education department. In the framework of a subject-centred sociocultural approach, the study elaborates on the main challenges, pitfalls and insights in transforming teacher education practices into a more innovative model. Agency is understood to be manifested when professional subjects and/or communities make choices, take stances and have an influence on their work and professional identities. Agency-promoting leadership refers to the idea that educational organizations should be managed and led through communication, collaboration, interaction, highlighting people, relationships and learning, rather than strong management, externally set standards and accountability culture.

The main data consist of videotaped group discussion, in which the four leaders of the teacher education department (the head, deputy, research leader and pedagogical leader) recall their shared leadership history and the most critical events in the department during 2006-2013. The data are analyzed via qualitative approaches, applying thematical analysis. The findings imply that in leading teacher education transformations collective leadership is salient. In creating collective leadership leaders are asked to understand the meaning of professional identity and to renegotiate their professional identities as leaders. It is also critical that the leaders promote the professional agency of their personnel during the transformation processes. This study suggests that agency-promoting leadership can act as an intervening coupling between organizational transformations and individual professional learning and identity renegotiation.

Exploring in-service teachers' sense of agency: changes after participating in a Master program
Presenting Author: Giuseppe Roffia, University of Helsinki, Italy
Co-Author: Maria Beatrice Liporino, Università degli Studi di Bari, Italy

In this research we are interested in understanding changes in how sense of agency is expressed by in-service teachers coming from difficult socio-economic conditions, as a consequence of participating in a Master program. A semi-structured interview was administered to nine in-service teachers, coming from three African countries. The data collected was qualitatively analysed through a coding system based on five types of agency (Subjective, Relational, Epistemic, Proactive and Collective). all designed based on the existing literature. The five themes concerning agency are not mutually exclusive, considering the complexity of the concept and the difficulties in the operationalisation of the abstract concept of agency. Therefore, to assign the statements to this right type of agency, we combined a linguistic analysis (explicit meaning) with a discourse analysis (implicit meaning) by looking at different linguistic features such as the description of the speaker’s desires and intentions. Teachers describe various types of agency, as expressed in their relationships to colleagues, students, and the community.

Assessing contemporary research on agency—a methodological perspective
Presenting Author: Czrlna DAMSHA, University of Oslo, Norway
Co-Author: Harald E. Frolich, University of Vienna, Austria
Co-Author: Andreas Gegenfurtner, Technische Hochschule Deggendorf, Germany

In this presentation, we review eleven contemporary empirical research papers about agency in educational settings. Rather than giving a general impression of the methodological approaches used in the field, we focus on very recent research endeavors only—at the time of writing, all eleven papers are in press and part of an agency-themed edited volume. At the same time, these papers capture a large variety in terms of region (e.g., Australia, Belgium, Chile, Indonesia), industry (e.g., education, healthcare, information technology), methodological approaches (qualitative, quantitative, and mixed method approaches), and feature different flavors of the main concept (e.g., creative agency, relational agency, agentic feedback-seeking, transformative agency). This variety of contexts, methods, and concepts is what has potential to advance our understanding of the concept of agency. However, this variety also creates a problem of integration—how can empirical studies that are conducted in different contexts, with different methods, and with slightly different interpretations of the core concept be reconciled? In this review, we critically assess the empirical and methodological contributions and their theoretical and practical implications. This step of reflection and review is important, as the huge variety of pathways adopted to measure and conceptualize a focal phenomenon needs to be narrowed down to what works (in the given circumstances) to inform future research.

Bridging teacher professional development and school reform; the role of agency
Presenting Author: Jørgen Imants, Radboud University Nijmegen, Netherlands
Co-Author: Merel van der Wal, Radboud University, Netherlands

Teacher agency is identified as an important factor in professional development and school reform. In studies on workplace learning, the role of agency has recently gained attention. We developed a model in which professional development and school reform are linked by means of the concept of teacher agency and insights in workplace learning. The aim of this paper is to present and to use the integrated model as a tool to analyze and interpret assumptions in teachers’ professional development and school reform research. Based on the model, an instrument is constructed and applied for the analysis of empirical studies on teacher professional development and school reform. 44 recent research articles on agency and reform / development were analyzed. Results show that the model is a dynamic framework to describe professional development and reform at both organizational and individual levels, and to explicate teachers’ agency role in the enactment of content and strategy of professional development and reform, and the interaction with outcomes.

The model integrates agency in interaction with structural data and provides a conceptual connection between school reform and professional development literature. As such, it serves as an extension of previous theoretical models of professional development towards integration of change context and school context in its terms of workplace learning. Practically, the model provides an analytical framework to evaluate professional development and school reform from an agentic perspective. This offers opportunities for an all-round evaluation of professional development and school reform, initialized either top-down or bottom-up.

Session A 20
29 August 2017 13:15 - 14:45
Pinn 6B - B3110
Symposium
Learning, Social Interaction, Motivational, Social and Affective Processes

Interactions with teachers, peers and parents: joint contributions to child development in school
Keywords: Achievement, Developmental processes, Early childhood education, Motivation, Peer interaction, Social development, Social interaction, Teaching / instruction
Interest group: SIG 05 - Learning and Development in Early Childhod, SIG 10 - Social Interaction in Learning and Instruction
Discussant: Erin McGue, University of Stavanger, United Stated

How do teacher emotional and autonomy support relate to child language and self-regulation skills?
Presenting Author: Marina Lemos, University of Porto, Portugal
Co-Author: Patrícia Nogueira de Porto, Portugal
Co-Author: Tiago Ferreira, University of Porto, Portugal
Co-Author: Teresa Leal, University of Porto, Portugal
Co-Author: Karina Verschueren, KU Leuven (BE), Belgium

In this study, we examine the extent to which teacher emotional and organizational/autonomy support at dyadic and classroom levels predict language and self-regulation skills in preschool. Participants were 187 children (49% boys; M=4.95 years) attending 43 preschool classrooms and their respective teachers. Children were assessed at the beginning of the year with a self-regulation and vocabulary measure. Classrooms were observed using the Classroom Assessment Scoring System and rated on the overall emotional and organizational support. Teachers reported on levels of dyadic teacher–child closeness and autonomy. At the end of the school year, children were assessed using direct measures to tap vocabulary and self-regulation skills. Multilevel analyses indicated that closeness at the dyadic level made a positive significant contribution to vocabulary, after controlling for initial levels of vocabulary. In addition, dyadic autonomy support positively predicted self-regulation skills, after controlling for these levels of self-regulation. Moreover, moderating effects for boys and girls were found such that girls benefit the most from autonomy support. The findings underscore the importance of dyadic closeness relationships for fostering vocabulary in preschool, while individual autonomy support may be additionally important to foster children’s ability to regulate their own behaviors. Findings have important implications for understanding the role of dyadic and classroom social processes on the development of language and self-regulation skills.

Peer acceptance and teacher-child interactions; Relative contribution to kindergarteners’ development
Presenting Author: Tessa Weyns, KU LEUVEN, Belgium
Co-Author: Hilde Cojan, KU LEUVEN, Belgium
Co-Author: Sarah Doumen, Universiteit Hasselt, Belgium
Co-Author: Karine Verschueren, KU Leuven (BE), Belgium

The present longitudinal study examined the joint effects of peer acceptance and individual and class-level teacher-child interactions on the development of externalizing and internalizing behaviors in kindergarten. A sample of 237 children (49% boys, M = 5.19 years) from 36 classrooms was followed during three waves in kindergarten. Individual and class-level teacher-child interactions were observed, while peer ratings were used to assess peer acceptance, and teacher ratings to assess child behavior. Multilevel modelling showed that children who were better accepted by peers at the start of kindergarten had lower levels of externalizing and internalizing behavior over time. Children who had more negative individual interactions with their teachers displayed higher levels of externalizing behavior throughout
kindergarten, and children whose teacher displayed more sensitive interactions at class-level had lower levels of internalizing problems over time. Our study has several implications for further research and practice. Regarding research, it provides strong evidence for the inclusion of both individual and class-level teacher-child interactions, given the different characteristics of these two levels, and for the importance of including several dimensions of teacher-child interactions in future research. Regarding practice, our study underscores the value of involving several social actors in the school context for improving behavioral development of children.

Teacher behavior with peer-rejected students: Associations with peer status and academic achievement
Presenting Author: Marloes Hendriks, Utrecht University, Netherlands
Co-Author: Tim Mainhard, Utrecht University, Netherlands
Co-Author: Henrik Boor Klip, Radboud University, Netherlands

Research question: How does teacher behavior relate to peer rejection and academic achievement? The present study first explored teacher behavior and then examined the role of teacher behavior in changes in peer liking status as well as academic achievement for 228 peer-rejected students (Mage = 10.47). Frequency and valence of teacher behavior were observed, peer rejection and liking ratings were measured using peer reports, and academic achievement was measured using standardized tests. Results of multilevel analyses showed that peer-rejected students had lower scores on the standardized tests and received higher frequency and more negative valence of teacher behavior. More peer rejection was associated with an increase in peer liking ratings, and academic achievement was not significantly associated with peer rejection.

Children’s behavioral and motivational adjustment: Relationship with mothers and teachers
Presenting Author: Elja Pakarinen, University of Jyväskylä, Finland
Co-Author: Rititta Leena Metsapelto, University of Jyväskylä, Finland
Co-Author: Marja-Kristina Lekkanen, University of Jyväskylä, Finland
Co-Author: Anna-Maja Pokkeus, University of Jyväskylä, Finland
Co-Author: Jari-Erik Nurmi, University of Jyväskylä, Finland

Previous research highlights the benefits of warm and supportive relationships with caring adults for child adjustment. The present study investigated the cross-lagged associations between children’s behavioral adjustment, task-avoidant behaviors and relationships with mothers and teachers in a sample of 444 Finnish students. Teachers evaluated children’s internalizing and externalizing problems, prosocial behavior and task-avoidant behavior at the end of Grades 4 and 6, and also reported closeness and conflict in their relationship with a particular child. In addition, mothers reported affection and negative affect with their child and also rated children on task-avoidant behaviors. The results of cross-lagged path models showed that the higher the children scored on externalizing problems at Grade 4, the more the children reported closeness with their mother at Grade 6, and this was associated with a decrease in mother-reported task-avoidant behaviors. Children’s self-reported closeness with their teacher at Grade 4 was predicted by a previous level of teacher-rated conflict. Mothers’ negative affect was related to increased task-avoidant behaviors. Boys’ prosocial behavior positively predicted whereas their externalizing problems negatively predicted subsequent maternal affection. High maternal affection was negatively related to girls’ subsequent internalizing problems. Implications for educational practice and future research are discussed.

Session A 21
29 August 2017 13:15 - 14:45
Linna • K1110
Symposium
Learning and Special Education

Cognitive determinants and association between arithmetic and reading
Keywords: Cognitive skills, Learning and developmental difficulties, Learning disabilities, Literacy, Mathematics, Metacognition, Numeracy
Interest group: SIG 15 - Special Educational Needs
Discussant: Ann Bowker, University of Oxford, United Kingdom

Domain specific and general cognitive correlates of arithmetic and its covariance with reading
Presenting Author: Tuire Koponen, University of Jyväskylä, NMI, Finland
Co-Author: Jonna Salminen, University of Jyväskylä, Finland
Co-Author: Riikka Heikkilä, University of Jyväskylä, Finland
Co-Author: Mikko Arö, University of Jyväskylä, Finland
Co-Author: Asklo Tolvanen, University of Jyväskylä, Finland
Co-Author: Marja-Kristina Lekkanen, University of Jyväskylä, Finland
Co-Author: Anna-Maja Pokkeus, University of Jyväskylä, Finland
Co-Author: Jari-Erik Nurmi, University of Jyväskylä, Finland

The present study aimed to examine the extent to which there is stability in the Concordance Between Reading and Arithmetic Skills: Stability and Change from Grade 1 to Grade 7
Presenting Author: Heidi Korppila, University of Jyväskylä, Finland
Co-Author: Tuire Koponen, University of Jyväskylä, NMI, Finland
Co-Author: Mikko Arö, University of Jyväskylä, Finland
Co-Author: Asklo Tolvanen, University of Jyväskylä, Finland
Co-Author: Marja-Kristina Lekkanen, University of Jyväskylä, Finland
Co-Author: Anna-Maja Pokkeus, University of Jyväskylä, Finland
Co-Author: Jari-Erik Nurmi, University of Jyväskylä, Finland

The present study aimed to examine the extent to which there is stability in the concordance between reading and arithmetic skills from Grade 1 to Grade 7. The reading and arithmetic skills of 335 Finnish children were assessed at the beginning and end of Grade 7. Stability and change in the concordance of these skills were examined with respect to the following predictors: linguistic skills (phonological awareness, letter knowledge, rapid automatized naming (RAN)), basic number skills (counting), general cognitive abilities (working memory, nonverbal reasoning) and parent education level. All predictors except working memory and nonverbal reasoning were measured when the students were in kindergarten. The results showed that there was substantial stability in the concordance between primary school reading and arithmetic skills. There was a decrease in the concordance between reading and arithmetic skills measured at the start of Grade 7. This stability was predicted by letter knowledge, RAN, counting, working memory, and nonverbal reasoning. Unstable, time-specific concordance in Grade 1 was predicted by reading and arithmetic pre-skills including phonological awareness, letter knowledge, and counting, whereas time-specific concordance in Grade 7 was predicted by parental education level and nonverbal reasoning.

Keywords: Reading, arithmetic, concordance, comorbidity, development

Learning from your mistakes: Associations between cognitive control, metacognition and arithmetic
Presenting Author: Elinn Bellon, KU Leuven, Belgium
Co-Author: Wim Fias, University of Ghent, Belgium
Co-Author: Ben De Smedt, KU Leuven • University of Leuven, Belgium

We investigated the theoretically appealing, but empirically little explored association between cognitive control and arithmetic. As arithmetic facts are stored in an associative network, incorrect but competing alternatives have to be inhibited when retrieving the answer. Consequently, individual differences in cognitive control are expected to contribute to individual differences in arithmetic fact retrieval. An important factor that has been often neglected in theoretical models of cognitive control, but received a lot of attention in educational research, is metacognition (i.e., the ability to assess one’s own cognitive knowledge). To the best of our knowledge, there are no studies that have investigated the joint roles of cognitive control and metacognition in children’s arithmetic. Furthermore, their unique roles in addition to the well-known domain-specific determinant of arithmetic, numerical magnitude processing, remains unclear. We investigated this issue in 127 typically developing 2nd/3rd graders. Our data revealed that inhibition (an aspect of cognitive control), calibration of confidence (a measure of metacognition) and numerical magnitude processing were significantly related to addition and multiplication. Regression analyses revealed that calibration of confidence and numerical magnitude processing remained unique predictors of addition and multiplication, and that inhibition was a unique predictor of multiplication. These data stress the importance of children’s calibration of confidence, which should be considered as an important variable in studies on children’s arithmetic performance. From an educational point of view, children can be instructed to identify their own mistakes, which consequently will improve their arithmetic performance.

Cognitive correlates of dysfluency in arithmetic and reading
Presenting Author: Tim Mainhard, Utrecht University, Netherlands
Co-Author: Tuire Koponen, University of Jyväskylä, NMI, Finland
Co-Author: Riikka Heikkilä, University of Jyväskylä, Finland
Co-Author: Mikko Arö, University of Jyväskylä, Finland

This study examined cognitive correlates related to dysfluency in calculation (MD) and reading (RD), and comorbid fluency problems (MD/RD) with regard to arithmetic operation used in classification of problems (addition vs subtraction). The group of children with MD (N = 21 / N = 18), RD (N = 18), and MD/RD (N = 14) were compared in terms of domain-specific (numercy and language) and domain-general cognitive skills (working memory, short term memory and processing speed). Results showed expected differences between MD and RD groups in domain-specific skills. RD group was slower in naming objects and letters than MD, and MD group was weaker in number comparison than RD but only when subtraction was used in defining MD. When addition was used in defining MD single-deficit groups (MD and RD) were more similar and they differed only in letter naming, where MD group was faster. Several differences in domain-specific and domain-general skills were found between MD and MD/RD as well as
between RD and MDRD groups. In sum, the overlap and specificity of the cognitive skills in children with MD, RD, and MDRD should be examined in more detail with regard to the educational performance and the development of academic support.
A Mixed Methods approach to evaluate the effectiveness of mathematics teacher education in Germany

Presenting Author: Nils Buchholz, University of Oslo, Norway

In a longitudinal evaluation study at several German universities a.o. the acquisition and development of mathematical pedagogical content knowledge (MPCK) of future mathematics teachers was investigated (Buchholz & Kaiser, 2013). The study is a German supplementary study of the international comparative TEDS-M 2008 study on the professional competence of future mathematics teachers (Tatto et al. 2012). On the one hand the development of the MPCK of future teachers from first-year cohorts of five universities was surveyed longitudinally using quantitative instruments relating to TEDS-M 2008. Additionally, it was examined in qualitative oriented interviews, what individual perceptions the future teachers have of courses on mathematics education. As a result, different systematic perceptions could be identified that could be assigned to the characteristics of university courses on mathematics education. Through the combination of data from the instrument-driven survey and from the interviews relationships between knowledge acquisition and perceptions could be described that indicate aspects of effective teacher education in courses on mathematics education. Hence the future teachers’ explanations provided an interpretation background for the development of their MPCK.

Combining methods to study the effects of first-year support on students’ academic competence

Presenting Author: Elke Brisse, University of Hanburg, Germany

Co-Author: Miriam Barnat, University of Hamburg, Germany

For a comprehensive understanding of study success and the transition into higher education, research needs to gain insights into the complex interplay of individual and contextual factors (Kleib, 2014). While the existing research on individual factors (Richardson, Abraham, & Bond, 2012) allows testing hypothesis based on a quantitative approach, qualitative studies may serve to further explore the role of contextual factors. To combine both perspectives, mixed-methods research suggests creating meta-inferences, i.e. to integrate quantitative and qualitative data (Tashakkor & Tappel, 2006). Based on a study that investigates the effects of first-year support on the development of academic competence in German higher education, the paper demonstrates the benefits as well as the challenges of mixed-methods research. In a longitudinal student survey and interviews, the study confirms empirical findings in the field (e.g., the relevance of learning strategies) and complements them with insights into the role of support programmes (e.g., study skill workshops).

Using mixed methods to support educational decisions in ‘bad’ data contexts

Presenting Author: Tobias Jenett, University of St. Gallen, Switzerland

Educational research is often conducted in practical contexts such as schools or higher education institutions and aims to contribute to the development of instructional designs or programmes. Consequently, there have been repeated attempts to methodologically integrate the design aspect into educational research leading to concepts such as design-based research. Ideally, design decisions are based on clear evidence, obtained through an analysis of data gathered from the intervention. In actual projects, however, design decisions often have to be taken based on data that is incomplete, ambiguous or not meeting established criteria. We illustrate and discuss examples of actual design research-quality standards. We illustrate how the data on hand can be used in such ‘bad’ data contexts. Examples include different mixed methods configurations that help to increase the interpretability and practical significance of the data. We will discuss methodological variants of ‘mixing’ and triangulation such as combining quantitative and qualitative data or applying different analyses on a dataset. In addition, we discuss limitations regarding the consistency between data, design decisions, and resulting effects.

Session A 24
29 August 2017 12:15 - 14:45
Main Building C - C6
Symposium
Learning and Instructional Technology

Processing dynamic visuospatial information: influences of hand proximity and multi-touch gestures

Keywords: Cognitive skills, Comprehension of text and graphs, Computer-assisted learning, Experimental studies, Instructional design, Learning Technologies, Multimedia learning

Interest group: SIG 02 - Comprehension of Text and graphs

Discussant: Paul Giannis, University of Sydney, Australia

Hands on and action: Near-hand film presentation boosts attentional control on multi-touch devices

Presenting Author: Romy Brilmme, Leibniz-Institut für Wissensmedien (iWM), Germany

Co-Author: Birgit Brucker, Leibniz-Institut für Wissensmedien (iWM), Germany

Co-Author: Peter Georgits, University of Tuebingen, Germany

Previous research revealed preferential processing of static visuospatial objects near the hands that might be the result of enhanced perceptual-driven bottom-up or cognitive control-driven top-down processes. The current study investigated whether this hand-proximity bias also applies to dynamic information, for example in films or animations. The Monkey Business Illusion (Simons, 2015) was used to differentiate between bottom-up (dejection of unexpected events) and top-down (accomplishment of a monitoring task) processes of attention. An enhanced task-relevant processing in the monitoring task was hypothesized, because of a fostered attentional (top-down) control when the film was presented near the hands. Participants watched the film once on a tablet PC by either touching the tablet at both sides (near hand) or laying their hands on the tablet (far hand). As expected, the monitoring task was accomplished more often correctly when the film was presented near the hands. This result pattern indicates an increased attentional control for task demands in dynamic multi-touch environments. Thus, training and instructional videos that afford a high amount of attentional resources should be touched directly to ensure a more effective processing and elaboration of the dynamic material.

Learning on multi-touch devices: Is directly touching dynamic visualizations helpful?

Presenting Author: Romy Brilmme, Leibniz-Institut für Wissensmedien (iWM), Germany

Co-Author: Birgit Brucker, Leibniz-Institut für Wissensmedien (iWM), Germany

Co-Author: Sarah-Christina Weber, Leibniz-Institut für Wissensmedien (iWM), Germany

Co-Author: Immanuel Rentsch, University of Tuebingen, Germany

There is strong evidence that visuospatial processing and also learning is fostered near the hands. This near hand-effect is particularly of interest during interacting with information on multi-touch devices, because on these devices usually the hands are used to interact with digital objects and thus, the hands are near to the displayed information. Two studies addressed the question whether the near-hand effect also occurs during interacting with dynamic visualizations in two domains (perceptual vs. conceptual). Participants interacted in the first experiment with videos (perceptual domain: human movements) and in the second experiment with animations (conceptual domain: biological processes) on a multi-touch monitor and were in both studies randomly assigned to one of two conditions (hand proximity: near vs. far). Participants either held their hands constantly at the dynamic visualizations during their whole playtime (near) or they placed their hands into their lap while they watched the dynamic visualization (far). Moreover, the visuospatial abilities of the participants were assessed as a potential moderator during learning with dynamic visualizations. Results showed a near-hand effect in both experiments. In the first experiment only participants with higher visuospatial abilities in the near hand condition showed better learning in terms of recognition performance, whereas in the second experiment participants in the near hand condition generally showed better learning in terms of decomposition performance. These findings give first evidence that the near-hand effect also occurs for perceptual and conceptual learning from dynamic visualizations.

Impact of visuospatial abilities and interaction device in learning to manipulate 3D virtual objects

Presenting Author: Mireille Betancourt, University of Geneva, Switzerland

Co-Author: Damien Gauthier, University of Geneva, Switzerland

Many disciplinary domains involve the understanding and manipulation of computerized 3D objects that can be tough to acquire for some students. The study was conducted to investigate whether the type of interaction modality (keyboard, mouse and touchscreen) had an impact on learning to perform manipulation tasks on 3D virtual objects for participants with low or high visuospatial abilities (median split using the scores obtained to the Mental Rotation Test prior to the experiment). According to the literature, it was expected that touchscreen interaction, that involves meaningful gestures, would be the most effective and preferred mode of interaction, especially for participants with low visuospatial abilities. The participants (N = 36) learned to manipulate the 3D objects during a 10-trial training phase with one of the three interaction modalities. Then they performed the same manipulation task on 12 trials but without feedback, using the same modality as in the training phase. Regardless performance in accuracy during training, there was no effect of interaction modality or visuospatial abilities. However, a significant interaction between the two factors was found, with participants with low visuospatial abilities achieving the best accuracy using the keyboard and participants with high visuospatial abilities achieving higher performance with mouse and touchscreen. The same interaction pattern was found in the test phase. Interestingly, the participants, though they used only one interaction modality in this experiment, massively expressed preference for the touchscreen.

Impact of Touch gestures on the 3D rotation of a figure in an embodied cognition approach

Presenting Author: Didier Blanqui, University of Toulouse, CLe, France

Co-Author: Franck Amadieu, University of Toulouse, CLe, France

Co-Author: Claudette Mariné, University of Toulouse, CLe, France

Co-Author: Mireille Betancourt, University of Geneva, Switzerland

The aim of this study was to investigate the effect of MultiTouch gestures on strategies and performance in a visuospatial task. The task was adapted from Shepard and Metzler's (1971) mental rotation task and consisted in judging whether two 3D virtual objects presented in different positions in space were the same or different. Four conditions were compared depending on the type of interaction implemented to rotate the object: keyboard, mouse, MultiTouch interaction or automatic rotation (no user control). Regarding MultiTouch interaction, a congruent gesture, similar to a real rotation gesture, was developed for rotating the object along one axis. Following an embodied cognition approach, we assumed that training with user control conditions should be more effective to the development of visuospatial abilities. In addition, MultiTouch interaction should favour perspective strategies (visual alignment of the objects) due to the congruent gesture while the other modes should more promote mental rotation strategies. The Vandenbergh and Kuse's mental rotation test was administered before and after the training. During training, automatic rotation lead to lower performance and more mental rotation strategies than the three conditions with user control. However, there was no clear difference between the three types of interactions with user control.

Session A 25
29 August 2017 12:15 - 14:45
Main Building A - A3
Symposium
Cognitive Science, Learning and Instructional Technology

Trajectories towards adaptive expertise: connecting school mathematics and out-of-school experiences

Keywords: Cognitive development, Cognitive skills, Computer-assisted learning, Developmental processes, Mathematics, Numeracy

Interest group:
Organiser: Erno Lehtinen, University of Turku, Finland
Discussant: Camilla Björklund, University of Gothenburg, Sweden

Developing calculation flexibility in multi-digit division – a latent transition analysis

Presenting Author: Andreas Schulz, Zurich University of Teacher Education, Switzerland
Co-Author: Tino Leuders, University of Education Freiburg, Germany

The aim of this study is to shed light on learning trajectories within the development of calculation flexibility in multi-digit division. During an intervention, 209 fourth graders first discovered, then compared and practiced division strategies. Latent classes and transition probabilities concerning the use of distinguishable strategies were identified. Furthermore, students’ abilities in reasoning about number relations were assessed. It was shown that students with lower reasoning abilities had only a slim chance of developing flexibility, whereas students with higher reasoning abilities had a substantial chance. In particular, children’s abilities in the pretest in using 10x patterns alone do not facilitate the further development of flexibility. However, abilities in using the split and add strategy appear to be an important stepping stone towards the flexible use of more advanced shortcut strategies and for the development of flexibility in multi-digit division.

The Effects of the Number Navigation Game on the Development of Adaptive Number Knowledge

Presenting Author: Boglarka Brezovszky, University of Turku, Finland
Co-Author: Jake McMullen, University of Turku, Finland
Co-Author: Minna M Hannula-Sormunen, University of Turku, Finland

It is suggested that in order to develop adaptive expertise with arithmetic problem solving, instruction should place more focus on practice with different combinations of numbers and operations. This practice should enhance students’ adaptive number knowledge, described as students’ recognition and flexible and adaptive use of different numerical characteristics and relations during problem solving. The aim of this study was to examine the effects of the Number Navigation Game (NNG), a game-based learning environment in the enhancement of elementary school students’ adaptive number knowledge and general arithmetic skills such as arithmetic fluency and pre-algebra knowledge. Participants of the study were 1168 fourth, fifth and sixth grade students. Classes were randomly assigned to experimental (n = 642) and control (n = 526) groups. The experimental group played Number Navigation for ten weeks while the control group participated in regular mathematics instruction. Both groups completed paper-pencil pre- and post-tests of adaptive number knowledge, arithmetic fluency and pre-algebra knowledge. Results show that the experimental group improved more than the control group on all the measured mathematical learning outcomes. Results also showed a variation in the effectiveness of the intervention across different skills in the three grade levels. These results are in line with previous research, showing small general but stronger specific effects when looking at sub-groups, suggesting that focus should rather be placed on exploring more specific questions regarding the effectiveness of game-based interventions.

Is it real, or a joke? Realistic considerations to word problems in a test versus a humor setting

Presenting Author: Wim Van Dooren, KU Leuven, Belgium
Co-Author: Lieven Verschaffel, Katholieke Universiteit Leuven, Belgium

Research has shown that learners have a strong tendency to exclude real world considerations when solving word problems. In this study, we investigated whether children would adapt their behavior when solving word problems in which realistic considerations are required (P-items) when these problems are embedded in a humoristic context as compared to when they are offered a typical word problem solving context. 148 sixth graders solved four P-items in a humor condition versus a word problem condition. It was found that significantly more realistic responses were given in the humor condition than the word problem condition, and this was the case for 3 of the 4 administered problems. Suggestions for further research and potential implications for classroom instruction will be discussed.

Approaching basic mathematics in a non-conventional way

Presenting Author: Erno Lehtinen, University of Turku, Finland
Co-Author: Minna M Hannula-Sormunen, University of Turku, Finland
Co-Author: Jake McMullen, University of Turku, Finland
Co-Author: Norman Pontsalko, University of Turku, Finland
Co-Author: Boglarka Brezovszky, University of Turku, Finland

The standard way to teach school mathematics is not providing citizens with the adaptive and flexible mathematics literacy needed in future society and working life. We have conducted a series of studies in which children and school pupils approach mathematical skills in a non-conventional way. In the first study, small children in day care used a tablet game (Fingu) to deal with number pattern and then the same figures and number combinations (adapted from the game) were connected to their regular everyday activities. In the second study, mathematics training was integrated with a strategic computer game environment in which there were no ready-made mathematics tasks but students had to create and solve their own tasks in order to conduct arithmetic operations needed to progress in the game. In the third study teachers were trained to deal with word problems differently. First complex word problems were solved in small groups and after that students were asked to think about exciting experiences they have had and then model them as mathematical word problems. All conditions resulted in slightly better achievement in standard mathematics tasks than conventional mathematics education but in addition triggered spontaneous focusing on mathematically relevant features of the environment and more flexible ways to use mathematical skills.

Session A 26
29 August 2017 13:15 - 14:45
Linnu - Valli Linnu (K104)
Symposium
Learning and Social Interaction

Socio-cognitive conflict and learning: the role of regulation, argumentation and motivation

Keywords: Argumentation, Cognitive development, Conceptual change, Conversation / Discourse analysis, Motivation, Qualitative methods, Reasoning, Social aspects of learning and teaching, Social interaction, Technology, Writing / Literacy

Interest group: SIG 10 - Social Interaction in Learning and Instruction, SIG 26 - Argumentation, Dialogue and Reasoning
Discussant: Anne-Nelly Perret-Clermont, Université d’Édition, Université de Neuchâtel, Switzerland

The regulation of socio-cognitive conflict: Consequences for learning and interpersonal relations

Presenting Author: Fabrizio Butera, Institute of Psychology, University of Lausanne, Switzerland

I will first present the early research that led to develop the theory of socio-cognitive conflict, which argues that dissent with one or several partners over a task in which learning is concerned may stimulate task-related cognitive activity and result in progress. Then, I will report research showing that socio-cognitive conflict is beneficial for learning to the extent that conflict is regulated in an epistemic manner; that is, by focusing on the task or on the knowledge at hand. On the contrary, socio-cognitive conflict can result in detrimental effects whenever conflict is regulated in a relational manner, that is, by focusing on status and on interpersonal dominance. Finally, I will move to more recent research addressing the question of the motivational determinants of various forms of conflict regulation. I will conclude on the interest of studying the specific forms of conflict regulation for teaching at school and at university.

The role of argumentative discourse goals in mitigating my-side bias in the writing of arguments

Presenting Author: Mark Polton, San Jose State University, United States
Co-Author: Amanda Crowell, Hunter College, City University of New York, United States

Research has shown that novice writers tend to ignore opposing viewpoints when framing and developing arguments in writing, a phenomenon commonly referred to as my-side bias. In a recent study, we tested whether manipulating argumentative discourse goals in a dialogue that occurred prior to writing would mitigate my-side bias. We found that consensus-seeking argument with a disagreeing partner was more effective in mitigating my-side bias than persuasion-seeking argument. Here, in Study 1, we revisit the dialogue data from this previous study to explore how differences in the two argumentative discourse conditions might explain their differential effects on my-side bias. In study 2, we ask whether similar differences in argumentative discourse can be found when we test the same manipulation in discourse goals (persuasion vs. consensus) with expert authors. The educational implications of both studies are discussed.

Socio-cognitive conflict and conceptual change: Unrealistic hopes and suggestions for improvement

Presenting Author: Christa Asterhan, Hebrew University of Jerusalem, Israel

Conceptual change involves both an improved capability to construct the correct scientific explanation, as well as more efficient inhibition and overriding of automatically activated, but irrelevant schemas and propositions. Instructional strategies for conceptual change should then support both, by providing students with opportunities to detect and understand the errors in (their) naïve theories and to fully comprehend the scientifically accepted theory. However, traditional show-and-tell instruction only focuses on the latter, whereas traditional socio-cognitive conflict research mainly focuses on making students...
aware of differences. Collaborative argumentation with a disagreeing peer is an activity that, in potential, combines both and can therefore be very powerful. However, this potential is often not realized. In this presentation, I present evidence from recent studies that suggest that students need additional instructional supports that (a) make them aware of the conceptual differences between solutions, and (b) make the correct full explanation more salient and accessible.

Supporting socio-cognitive conflict awareness in SNS discussions groups: A social network analysis

Presenting Author: Dimitra Tsivalti, Saarland University, Germany
Co-Author: Nikita Dutta, Saarland University, Germany
Co-Author: Tania Schröder, University of Twente, Netherlands
Co-Author: Armin Weinberger, Saarland University, Germany

Socially embedded large-scale forms of communication, like SNS (social networking sites) provide a rich context of socio-cognitive interactions where conflict can arise. However, without support users may not be able to register this conflict appropriately, or they might not know how to deal with it in a productive way. This may lead to missed opportunities of individual and group-level learning. Supports for conflict awareness and for processes of argumentation to resolve the conflict in group discussions can facilitate the richness of socio-cognitive interactions. This article presents a comparison of such supports in a university teacher training course on communication theory that included weekly SNS discussions. Group Awareness Tools (GATs), were used to increase attitude conflict awareness. Argumentation scripts were used as a cognitive guidance to help learners capitalize on this awareness and resolve the conflict. We use Social Network Analysis (SNA) to analyze conversational data and data from a communication argumentation questionnaire on group-level processes relevant to attitude change during argumentative SNS discussions: number of interactions, information flow control, influence distribution, and attitude similarity. Both GATs and argumentation scripts influence argumentation processes positively, but scripts influence even more processes.

Session A 27

29 August 2017 12:15 - 14:45
Pini B · B4113
Symposium
Motivational, Social and Affective Processes, Teaching and Teacher Education

Professional development of student teachers during their field experiences

Keywords: Attitudes and beliefs, Cooperative / collaborative learning, Design based research, Developmental processes, Higher education, Knowledge creation, Motivation and emotion, Pre-service teacher education, Quantitative methods, Student teachers, Subjective norm.

Interest group: SIG 08 · Motivation and Emotion, SIG 11 · Teaching and Teacher Education, SIG 14 · Learning and Professional Development
Discussant: Marj E.W. van de Wiel, Maastricht University, Faculty of Psychology and Neuroscience, Netherlands

Changing is learning - teach patterns of - in teacher training courses on long-term internships

Presenting Author: Dagmar Festner, University of Paderborn, Germany
Co-Author: Alexander Grosschner, Friedrich Schiller University of Jena, Germany

Teacher education should be aimed at developing students’ learning-to-teach patterns from arnatical/survival/or reproduction oriented learning pattern to an (in)dependent meaning oriented learning pattern. Although the change in the direction of independent meaning oriented learning patterns is desirable, previous studies provide evidence that changes in learning-to-teach patterns are mutable in all directions. To gain deeper insights into the changes for these patterns of the present study is the comparison of two groups of student teachers, who change their learning-to-teach pattern during a five months internship in an (un)desired direction.

In the study N=182 student teachers in the second semester of the teacher education master program filled out an online-questionnaire at the beginning (t1) and at the end (t2) of their five months internship.

The findings show that students are more likely to change their patterns towards independent meaning oriented a if they perceive the behavior of mentors in a positive way, b) if they feel in a larger extend satisfied with (less) strain and c) if they are convinced that they achieved the targets within the internship. Furthermore, we found an increase of self-estimated competence in both groups. But the group which changed patterns in a desired direction d) rated their competence at the beginning of the internship lower and at the end higher compared to the group which changed in undesired direction.

The development of educational knowledge during long-term internships in teacher education

Presenting Author: Sarah Mentens, University of Wuerttemberg, Institute for Educational Research, Germany
Co-Author: Cornelia Grassel, Bergische Universität Wuppertal, Germany

One recently introduced and increasingly important element in German teacher education is extended period short-term internships. These long-term internships are supposed to improve the professional teacher education. Overall, research addressing competence development during these long term internships in teacher education is still rare. Most of the current research focusses on self-assessment of competences on the one hand and objective tests on the other hand (for an overview see Besa & Böttcher, 2014). A combination of both ratings is rarely used. Additionally, most of the studies do not include control groups.

The purpose of this study is to examine three kinds of competence measures to inspect if students with and without a long term internship differ in their development of educational knowledge as one part of professional competence. Besides a self-assessment questionnaire (Grösschner, 2009), students had to answer an educational knowledge test (Sefofot & Sitapha, 2010), as well as a video-based tool to measure teachers’ professional vision (Seidel & Stümer, 2014).

To examine the competence development, a 2x2 mixed design was used. Here, the group membership (internship group vs. control group) was chosen as between-subjects factor and the measurement point (t1 and t2) as within-subjects factor. In t1 and t2 the internship group showed a significantly higher professional vision and competence self-assessment than the control group which did not pass the long-term internship. A significant development of the conceptual knowledge determined by the educational knowledge test could not be demonstrated for any of the two groups.

Emotions in cooperative field experiences

Presenting Author: Tina Hascher, University of Bern, Switzerland
Co-Author: Lea de Zordo, University of Bern, Switzerland
Co-Author: Gerda Hagenauer, University of Bern, Switzerland

Collaboration is an essential element of the teaching profession and a precondition of school development and school. One key learning opportunity for collaboration are internships in pre-service teacher education where they often take place in team. Although there is some evidence that learning during internships can be fostered by collaborative settings such as student teacher teams and peer-coaching (Goodnough et al., 2009; Lu, 2010), little is known about the learning processes and outcomes. Even less is known about the emotional experiences of student teachers in collaborative internships.

Our qualitative study with future preschool and primary school teachers (N1 = 205; N2 = 132) aimed at analysing cooperative student teaching from an emotional point of view: Which emotions do pre-service teacher experience regarding collaborative student teaching during internship? How are these emotions correlated to different forms of collaborative student teaching? Results showed that the emotional potential of collaborative internships is high: Emotions occur both before and during collaborative internships with a stress on positive emotions such as excitement, enthusiasm, and proud. However, student teachers also experience an array of negative emotions such as nervousness, irritation, and anger. Teaming models are the most frequent forms of team teaching right from the beginning of internships. There is no clear pattern regarding the correlation between emotions and team teaching forms.

Fostering student teachers’ deliberate practice: a school-based educators’ perspective

Presenting Author: Maike Endrășk, University of Twente, Netherlands
Co-Author: Larke Bronkhorst, Utrecht University, Netherlands

Deliberate practice, defined as prolonged engagement in practice that is purposefully designed to improve performance, even when a satisfactory level of performance has already been reached/ is immediately recognized as necessary for professional development across professions. Yet, exemplary of how to stimulate deliberate practice, particularly during teacher education, are limited. This paper sets out to explore how student teachers’ deliberate practice can be promoted during a dual teacher education program, capitalizing on expert school based educators’ experience. Based on a thematically analysis of interactions with prospective school based educators, locally recognized as experts, our results refine and elaborate on previously developed design principles. Findings stress the importance of working from explicit theories of practice, using pupils as sources of feedback, anticipatory reflection, creating powerful learning contexts in school, and keeping professional development, especially during teacher education, realistic. Using these design principles can complement existing supervision practices in teacher education, typically directed at (retrospective) reflection. The findings tie in with recent articles describing deliberate practice as necessary, but perhaps not sufficient for (student) teacher expertise development.

Session B 28

29 August 2017 15:15 - 16:45
Pini B · B3817
Single Paper
Instructional Design

Paper Presentation: Instructional Design

Keywords: Comprehension of text and graphics, Computer-assisted learning, E-learning / Online learning, Educational Psychology, Educational Technology, Higher education, Instructional design, Learning analytics, Meta-analysis, Mixed-method research, Multimedia learning, Quantitative methods
Interest group: SIG 06 · Instructional Design
Chairperson: Marion Rein, University of Augsburg, Germany

A Meta-Analytic Review of Signaling Effects on Cognition and Learning

Keywords: Educational Psychology, Instructional design, Meta-analysis, Multimedia learning
Presenting Author: Malte Beige, Technische Universität Chemnitz, Institute for Media Research, Germany
Co-Author: Sascha Schneider, Technische Universität Chemnitz, Institute for Media Research, Germany

This presentation reviews the existing evidence on the signaling effects on learning outcomes in educational research. A signaling effect is defined as an increase or decrease in performance through the provision of extraneous information that is not necessary to solve the task. The presentation focuses on two types of signaling: the provision of redundant information and the provision of superfluous information. The presentation reviews the existing evidence on the signaling effects on learning outcomes in educational research. A signaling effect is defined as an increase or decrease in performance through the provision of extraneous information that is not necessary to solve the task. The presentation focuses on two types of signaling: the provision of redundant information and the provision of superfluous information. The presentation reviews the existing evidence on the signaling effects on learning outcomes in educational research. A signaling effect is defined as an increase or decrease in performance through the provision of extraneous information that is not necessary to solve the task. The presentation focuses on two types of signaling: the provision of redundant information and the provision of superfluous information. The presentation reviews the existing evidence on the signaling effects on learning outcomes in educational research. A signaling effect is defined as an increase or decrease in performance through the provision of extraneous information that is not necessary to solve the task. The presentation focuses on two types of signaling: the provision of redundant information and the provision of superfluous information. The presentation reviews the existing evidence on the signaling effects on learning outcomes in educational research. A signaling effect is defined as an increase or decrease in performance through the provision of extraneous information that is not necessary to solve the task. The presentation focuses on two types of signaling: the provision of redundant information and the provision of superfluous information. The presentation reviews the existing evidence on the signaling effects on learning outcomes in educational research. A signaling effect is defined as an increase or decrease in performance through the provision of extraneous information that is not necessary to solve the task. The presentation focuses on two types of signaling: the provision of redundant information and the provision of superfluous information.
Promoting digital wisdom through students' involvement in pedagogical design of an academic course

Keywords: Computer-assisted learning, Educational Technology, Higher education, Instructional design

Presenting Author: Tamar Shamarin, the Open University of Israel, Israel

Co-Author: Inna Blau, the Open University of Israel, Israel

The signaling effect states that learners profit from cues that highlight organization or relevant information. This meta-analysis included 95 studies and n = 11,499 participants. One hundred thirty-one retention, 156 practice, and 160 transfer mean effect sizes. Additionally, nine possible moderators (e.g., type of signaling) were identified. The retention (g = .52, 95% CI [.44, .60]) and transfer (g = .31, 95% CI [.22, .40]) sizes support the positive effect of signaling learning. Prior knowledge was identified as a moderator. Interestingly, cognitive load was not significantly affected by signaling (g = .25, 95% CI [.14, .36]). The results were interpreted using media learning theories. General problems of aggregating cognitive load measures and recommendations for future studies are included herein.

Learning from videos: Effects of Subtitles, Complexity, and Language proficiency

Keywords: Comprehension of text and graphics, E-learning / Online learning, Educational Technology, Multimedia learning

Presenting Author: Tim van der Zee, Leiden University, Netherlands

Co-Author: Wilfred Adriaan, Leiden University, Netherlands

Co-Author: Fred Pas, Erasmus University Rotterdam of University of Wollongong, Netherlands

Co-Author: Seb Saab, Leiden University, Netherlands

Co-Author: Bas Giesbers, Erasmus University Rotterdam, Netherlands

Open online education has become increasingly popular. In Massive Open Online Courses (MOOCs) videos are generally the most used method of teaching. While most MOOCs are offered in English, the global availability of these courses has attracted many non-native English speakers. To ensure not only the availability, but also the accessibility of open online education, courses should be designed to minimize detrimental effects of a language barrier, for example by providing subtitles. However, with many conflicting research findings it is unclear whether subtitles are beneficial or detrimental for learning from a video, and whether this depends on characteristics of the learner and the video. We hypothesized that the effect of 2nd language subtitles on learning outcomes depends on the language proficiency of the student, as well as the visual-tactual information complexity of the video. This three-way interaction was tested in an experimental study. No main effect of subtitles was found, nor any interaction. However, the student's language proficiency and the complexity of the video do have a substantial impact on learning outcomes. These results question the generalizability of earlier findings which showed either a positive or negative effect of subtitles on learning.

Constructive Retrieval by Prompted Recall

Keywords: Instructional design, Learning analytics, Mixed-method research, Quantitative methods

Presenting Author: Tino Endres, University of Freiburg, Germany

Co-Author: Shana Carpenter, Iowa State University, Department of Psychology, United States

Co-Author: All Martin, University of Freiburg, Institute of Psychology, Germany

Co-Author: Alexander Renkl, University of Freiburg, Institute of Psychology, Germany

Retrieval fostering learning is a quite robust finding in memory research. When applying retrieval practice in educational settings the used task can be very different. Several studies have shown that memory can be enhanced using tasks that promote learners to link new learned contents to their prior knowledge. This pattern of results could also be used for retrieval practice. In this study we used simple retrieval tasks and enriched them with the requirement to link the retrieved contents to what learners already know. Fifty-six undergraduate students learned from a video-recorded lecture. Afterwards they were randomly assigned to either a free-recall condition, as used in many studies on learning by retrieval, or a prompted recall condition in which learners were required to recall the information and apply it to their lives. A one week delayed posttest comprised a fact recall and comprehension scores. Learners in the prompted recall group used more elaborate strategies in their answers. There was no significant difference between groups regarding the fact scores. The prompted recall group outperformed the free recall group on comprehension scores. The effect on comprehension was mediated by the use of elaborative strategies. This results underline the findings that retrieval is most effective when it involves constructive elaboration. This finding should encourage instructors to combine elaboration and retrieval in their learning environments.

Session B 29

29 August 2017 15:15 - 16:45
Main Building D - D10B
Single Paper

Instructional Design, Learning and Social Interaction

Paper Presentation: Teaching and Instruction

Keywords: Assessment methods and tools, Content analysis, Educational Psychology, Educational Technology, Experimental studies, Game-based learning, Instructional design, Mathematics, Peer interaction, Qualitative methods, Secondary education, Teaching / instruction

Interest group: SIG 06 - Instructional Design, SIG 10 - Social Interaction in Learning and Instruction

Chairperson: Susan Marie Harding, The University of Melbourne, Australia

Developing better educational videogames: optimising gameplay and difficulty within leadboards

Keywords: Educational Psychology, Educational Technology, Experimental studies, Game-based learning

Presenting Author: Steve Nabel, Technische Universität Chemnitz, Institute for Media Research, Germany

Co-Author: Sascha Schneider, Technische Universität Chemnitz, Institute for Media Research, Germany

Co-Author: Meike Bege, Technische Universität Chemnitz, Institute for Media Research, Germany

Co-Author: Günther Daniel Rey, Chemnitz University of Technology, Germany

The inclusion of leadboards is a frequently used mechanism within the process of gamification or within the method of game-based learning. However, research regarding the underlying processes when including leadboards within learning environments is still scarce. To address this gap, this study introduces competitive effort and perceived difficulty as central concepts for educational leadboards. Furthermore, the connected gameplay mechanics are investigated. More specifically, penalties were included to influence the most successful learner behavior. The two facets were manipulated independently to investigate how leadboards should be designed to support learning. Students played an educational videogame especially designed for this research while being randomly assigned to a cell of a 2 (low vs. high difficulty) x 2 (with or without penalties) between-subjects design. Following, data on retention and detail knowledge, learning efficiencies and goal orientations were collected. Results revealed that participants with penalties scored higher on retention tests than participants without penalties. Additionally, detail knowledge is enhanced by a low difficulty in contrast to a high difficulty. Furthermore, students within the penalty condition were more efficient. An additional exploratory analysis of goal orientations revealed several significant connections between individual dispositions and affective responses. In addition, several positive correlations with performance goals could be observed. Finally, with the impacts of gameplay characteristics and individual gameplay experiences, the connections of learning outcomes and individual traits highlight the significance of this study, the potential of educational videogames in general and the need for further research in the field.

Instruction after problem solving: Learning by elaborating on errors

Keywords: Educational Psychology, Experimental studies, Instructional design, Mathematics

Presenting Author: Katharina Lohr, University of Education Freiburg, Germany

Co-Author: Timo Leuders, University of Education Freiburg, Germany

Students, who engage in problem-solving activities targeting yet-to-be-learned concepts, usually generate erroneous or incomplete solution attempts. These erroneous solution concepts can form the basis for acquiring valid target concepts during subsequent instruction. Literature on conceptual change suggests that students who engage in activities that introduced canonical solutions (instruction phase) in this phase, students worked with a) only canonical solutions (control condition), b) canonical and typical erroneous solutions without prompts, c) canonical and typical erroneous solutions with prompts to compare these solutions. The comparison prompts aimed at focusing students' attention on relevant aspects. Results indicate that including erroneous solutions is beneficial for learning. However, only students who were prompted to compare the erroneous solutions to the canonical solutions significantly outperformed students in the control condition on posttest.

Developing a framework for the teaching of collaborative talk

Keywords: Peer interaction, Qualitative methods, Secondary education, Teaching / instruction

Presenting Author: Ruth Newman, University of Exeter, United Kingdom

ABSTRACT
Pedagogical Usability Assessment of Digital and Non-Digital Learning Objects

Keywords: Assessment methods and tools, Content analysis, Educational Technology, Instructional design
Presenting Author: Leonard Matarigua, Pontificia Universidad Católica de Chile, Chile
Co-Author: Faustino Marañón, Pontificia Universidad Católica de Chile, Chile
Co-Author: Miguel Nuñez, Pontificia Universidad Católica de Chile, Chile

Usability evaluation in education has been mostly devoted to the study of transactional artifacts such as websites, mobile and desktop applications, on-line learning systems, among others. Little attention has been paid to the evaluation of traditional information items provided to students like study guides, podcasts, demonstrations, step-by-step solutions and any other supporting materials. Furthermore, a considerable interaction between educators and students occurs in the process of usage of these conventional digital and non-digital learning objects. The Usability study of these items becomes a primary objective in supporting their effective use, redesign or eventual process of discard. In this research, we developed a model in which Usability is not only an inquiry process directed from the information provider to the user, but rather a process of contrast between the Usability goals of the educator with the perceptions of the students. The first evaluation, deploy a contextualized Usability benchmark allowing the measurement of the possible Usability gap. We developed an on-line platform to assess the Usability of lecture materials provided to engineering students enrolled in a physics course in a Chilean university. The study involved 5 lecturers and 150 students. We observed that the model was able to respond to different types of study materials (conceptual through a podcast versus a problem solving paper guide). Analysis shows that the model clearly identifies the dimensions where the gap is present; this gap defines the redefinition of the learning objects.

Session B 30
29 August 2017 15:15 - 16:45
Main Building E - E222
Single Paper
Learning and Social Interaction

Paper Presentation: Social Interaction in Learning and Instruction – G

Keywords: Attitudes and beliefs, Collaborative Learning, Competencies, Environmental education, Inquiry learning, Learning and developmental difficulties, Mathematics, Out-of-school learning, Primary education, Qualitative methods, Secondary education, Social aspects of learning and teaching, Teacher Effectiveness, Teaching / instruction
Interest group: SIS - 10 Social Interaction in Learning and Instruction
Chairperson: Hanni Muukkonen, University of Oulu, Finland

Teachers’ insights on connected learning networks: Emerging activities and forms of participation

Keywords: Inquiry learning, Out-of-school learning, Qualitative methods, Social aspects of learning and teaching
Presenting Author: Henriëtte Vartianen, University of Eastern Finland, Finland
Co-Author: Saara Nissinen, University of Eastern Finland, Finland
Co-Author: Sirkka Piällänen, University of Eastern Finland, Finland
Co-Author: Pia Vanrinne, University of Eastern Finland, Finland

The aim of this socioculturally informed study is to explore teachers’ insights on connected learning activities and networks. An instructional approach based on design-oriented pedagogy (DOP) was carried out on a teachers’ in-service project in Finland, which aimed to connect teachers, researchers, and experts to advance students’ meaningful participation and inquiry activities around forest-related phenomena in an open-ended design task for the participating teachers and educators from kindergarten (N = 27), primary school (N = 2), and secondary school (N = 3) to design, implement, and document a forest-related learning project with their own students or kindergarten children. In total, 11 learning projects were implemented with the support of the in-service project and shared in an OpenForest wiki environment. A deductive content analysis of openly published project presentations revealed that the teachers and educators working with children and youth of various ages all harnessed learners interest as a basis for connecting with extended learning networks. Learners’ interest and questions were cultivated by connecting with peers, family, external experts, and extended environments through diverse physical and digital information resources, tool-mediated activities, and by the externalization of evolving object-oriented ideas. In this study, the teachers’ insights on emerging learning activities are bridged to highlight potential extended participation of the system.

Prerequisites of Primary School Students’ Attitudes Towards Peers with Social or Emotional Disorders

Keywords: Attitudes and beliefs, Learning and developmental difficulties, Primary education, Teacher Effectiveness
Presenting Author: Marvin Felix Lüder, Paderborn University, Germany
Co-Author: Frank Hellrich, Paderborn University, Germany

In the present study Ni-743 third and fourth grade primary school students’ attitudes towards peers with emotional or social disorders and towards peers with learning disabilities were examined. The attitudes towards peers with special educational needs were assessed by using a short version of the “CheckDo-McMaster attitudes towards children with handicaps scale” (Bossaert & Poty, 2013). The results indicate neutral to slightly positive attitudes towards peers with special educational needs. In detail, primary school students’ attitudes towards peers with emotional or social disorders are significantly less positive than towards peers with learning disabilities. Furthermore, the outcomes of a structural equation model in Mplus reveal that children’s attitudes towards peers with social or emotional disorders can be explained by their perceived teacher behavior towards children with special educational needs, their contact experiences and their self-efficacy beliefs concerning their interpersonal skills. The effects of the perceived teacher behavior on children’s attitudes towards peers with emotional or social disorders are mediated by their self-efficacy beliefs.

Scaffolding Mathematics Discussion vs Conventional Teacher Help in a Collaborative Setting

Keywords: Collaborative Learning, Mathematics, Secondary education, Teaching / instruction
Presenting Author: University of Amsterdam, Netherlands
Co-Author: Rijkje Deiker, University of Amsterdam, Netherlands
Co-Author: Jannet van Drie, University of Amsterdam, Netherlands
Co-Author: Bonne Zijlstra, University of Amsterdam, Netherlands
Co-Author: Monique Volman, University of Amsterdam, Netherlands

Scaffolding enhances learning outcomes. However, how can scaffolding small groups and how scaffolding of small groups affects mathematical learning, has not yet been investigated. We investigated whether scaffolding small heterogeneous student groups at group level in a collaborative setting would have a greater effect on students’ mathematical knowledge than conventional support. A quasi-experimental study (pre- and post-test) was conducted in four 7th grade classes. Participants were four teachers and 109 students working collaboratively in 28 small heterogeneous student groups on the topic of Algebra. Two classes (14 groups) were scaffolded according to a Small-Group Scaffolding Model (SGSM Model). The lessons were designed in (a previous study) with the specific aim to invoke mathematical knowledge and the level of mathematical knowledge (Math Discussion Lessons). Results showed a larger difference in mathematical knowledge gain for the Scaffolding condition. Interaction processes in four groups were analyzed. Analysis showed that approximately half of all group interactions in both conditions consisted of task-related utterances. One fifth of all group interaction in the Scaffolding condition existed of mathematical discussions and more mathematical discussions took place in the Scaffolding condition. Activities that are known to contribute to mathematical level raising took place more in the Scaffolding condition. Scaffolding small heterogeneous student groups at group level during Math Discussion Lessons in the 7th grade seems to result in more mathematical level raising and more mathematical discussions.

Nature as a Setting and Resource to Promote Learners’ Agency and Competences in Education

Keywords: Competencies, Environmental education, Out-of-school learning, Primary education
Presenting Author: Marijana Kangas, University of Lapland, Finland
Co-Author: Hanna Vuojoki, University of Lapland, Finland

Educational reform in Finland is concerned with how to shift school practices to foster students’ agency and active participation. We investigated how nature, specifically a hiking course in Finnish wilderness, can enable students’ agency and how it promotes their skills and competences. Agency is considered a social action that emerges in relation to associating with other people, including peers and teachers. Twenty-one eight-grade upper secondary students and their two teachers participated in the research. All participants and a researcher hiked 35 kilometers during the hiking trip that lasted for three days, including two nights outdoors. Various qualitative research data were gathered: unstructured student and teacher interviews, audio-recorded field notes and photos, and the students’ digital diaries. The focus of the analysis was on the descriptions and representations of activities that reflected agency, and the various competences needed for the learning activities. The findings indicate that the students’ agency emerged out of accountability, resilience, collectivity and success. The students were responsible for their own and others’ well-being; they were highly satisfied with the experience although the hiking activity was very tiring; they collectively contributed on common activities, which became evident in reciprocity and equality; and they felt a joint satisfaction and joy resulting from their success. In terms of competence areas, the hiking trip in nature enabled the students to exercise collaboratively skills for negotiation, problem-solving, and personal and social responsibility. Pedagogically, critical methods based on giving students freedom, ownership, and trust enabled a sense of agency for the students.

Session B 31
29 August 2017 15:15 - 16:45
Main Building D - D13
A Phenomenographic and Variation Theory Study of Lower Secondary Students' Personal Finance

Keywords: Attitudes and beliefs, Conceptual change, Phenomenography, Student learning, Teaching and learning approaches

Presenting Author: Hua Loon Loo, The University of Hong Kong, Malaysia

This study aimed to understand the financial education needs of ethnic minority (non-Chinese ethnicity) lower secondary students in Hong Kong. Improving the financial well-being of students has been recognized as an important endeavour. But beyond teaching knowledge and skills, it has been suggested that it is also essential to be teachable on values and behaviours. Values can be understood as the evaluative and prescriptive beliefs whereby individuals see the decision-making process and make judgments to guide behaviours. As discussed in phenomenographic theory, more powerful ways of thinking become the dominant ways of acting. In this study, 300 lower secondary students were interviewed. Phenomenographic analysis was carried out on the qualitative data and findings of the critical aspects and features informed variation theory design of financial education lessons that were taught to the intervention group students. Data was collected through student work, audio-recordings of class discussions, and interviews. At the follow-up phase, all students answered a survey again. Findings were compared and contrasted between groups through quantitative statistical analysis of the phenomenographic outcome spaces and self-reported financial behaviours to evaluate effectiveness of the lessons to develop more powerful ways of seeing personal finance in the intervention group.

Describing the internal and external horizons: evidence from graduates' conceptions of finance

Keywords: Conceptual change, Phenomenography, Teaching and instruction, Teaching approaches

Presenting Author: Guy Durden, institute of education, United Kingdom

In Phenomenography/Variation Theory (PVT), most research has focused on identifying differences in conceptions of phenomenon within the internal horizon, without making explicit reference to the context, or external horizon (e.g. Pang & Martin, 2003). The interaction between the external and internal horizons (Marston & Booth, 1997) could mean that this has limited the power of these research findings in developing effective pedagogical practice. The study reports evidence of innumerable differences in conceptions of the phenomenon of price in terms of a combination of aspects of the external and internal horizons. The study found that the external horizon was structured in terms of qualitative differences, in the same way as the internal horizon. These findings allow educators to more aptly delimit the context from the phenomenon, and to focus on a more clearly defined object of learning (Kulberg, Mattson & Rinnsen, 2015). The importance of this is indicated in the study’s findings that the external horizon has a powerful effect on revealed conceptions. The study raises questions about the nature of the relationship between aspects of the internal and external horizons in terms of the phenomenon of price, and the ‘correct’ way to sequence variation in order to trigger conceptual change.

The Accuracy of Teacher Expectations: Implications for Equal Educational Opportunities

Keywords: At-risk students, Attitudes and beliefs, Primary education, Social aspects of learning and teaching

Presenting Author: Christine Rubie-Davies, University of Auckland, New Zealand

Co-Author: Kane Meissel, Institute of Education, University of Auckland, New Zealand

The accuracy of teacher expectations is important because when expectations are inaccurate, teachers plan inappropriate learning experiences for students; some are given challenging tasks and whereas others receive lower level assignments. In two samples, this study explored the accuracy of teacher expectations in a number of ways. First, whether expectations were accurate overall was examined. Second, whether some teachers were more accurate than others was explored. Third, the accuracy of teacher expectations for different groups (ethnicity, SES and gender) was explored. Finally, whether teacher expectancy predicted end-of-year mathematics achievement was investigated. Only one-third of expectations for students were accurate and some teachers were more accurate than others. Ethnic minorities and those from low socioeconomic backgrounds were more likely to be underestimated. Teacher inaccurate predicted end-of-year achievement such that those who were overestimated achieved at higher levels and the opposite. The educational and theoretical implications of the findings are discussed.

School Stress among Sixth-Grade Students – Associations with Academic Buoyancy and Temperament

Keywords: Attitudes and beliefs, Educational Psychology, Emotion and affect, Self-regulation

Presenting Author: Rikka Hivonen, University of Jyväskylä, Finland

Co-Author: Laura Yli-Kotil, University of Jyväskylä, Finland

Co-Author: Mette Hovsing, University of Jyväskylä, Finland

Co-Author: Noona Kuuru, University of Jyväskylä, Finland

The aim of the study was to examine to what extent sixth-grade students’ academic buoyancy and temparamental effortful control and negative affectivity predict their experiences of school-related stress, after controlling for gender, GPA, and previous stress level. A total of 678 students (55% girls; mean age 12.5 years, SD = 0.33) were included. The findings showed that high academic buoyancy and effortful control correlated with less stress. The findings suggested that interventions aiming at supporting students’ academic buoyancy could also reduce their experiences of stress at school. Training of coping strategies and stress management techniques could be beneficial among sixth graders, especially among those with high negative affectivity.

Session B 32

29 August 2017 15:15 - 16:45
Pinni Å – Paavo Kali
Single Page

Motivational, Social and Affective Processes

Paper Presentation: Motivation and Emotion

Keywords: Assessment methods and tools, Competencies, Educational Psychology, Emotion and affect, Goal orientation, Motivation, Motivation and emotion, Multimedia learning, Parental involvement in learning

Interest group: SIG 08 - Motivation and Emotion

Co-Author: Maria Barranti, University of Leiden, Leiden

When parents support students' choices: Parents' role in students' choice of a high school major

Keywords: Educational Psychology, Motivation, Parental involvement in learning, Motivation and emotion

Presenting Author: Idd Katz, Ben-Gurion University of the Negev, Israel

Co-Author: Moran Green-Cohen, Ben-Gurion University of the Negev, Israel

Co-Author: Rinat Cohen, Ben-Gurion University of the Negev, Israel

Co-Author: Suvi Morsani-daepur, Ben-Gurion University of the Negev, Israel

The goal of this longitudinal study is to examine how parents' involvement in the decision making process of choosing a high school major, is associated with the type of motivation, well-being and success of their children in studying the major. The study employs Self-Determination Theory as the theoretical framework for the investigation.

Two hundred and twenty-nine 10th grade students graduated questionnaires at the very beginning and at the end of the school year. Through path analysis, the findings indicated that students’ who perceived their parents as supportive during the process of choosing, chose a subject for autonomous rather than controlled reasons, had autonomous rather than controlled motivation to learn the subject, and had higher well-being, higher self-perception of ability and higher grades. The results highlight the positive role that parents can play in their children’s choices in order to enhance autonomous motivation, well-being, and success.

Is Confusion leading to frustration or engagement? An emote-aloud study on achievement emotions

Keywords: Assessment methods and tools, Emotion and affect, Motivation and emotion, Multimedia learning

Presenting Author: Hannes Muenchow, University of Wuerzburg, Educational and Developmental Psychology, Germany

Co-Author: Silke Sonnenberg, University of Wuerzburg, Germany

Co-Author: Maria Barranti, Technische Universität of Munich, Germany

Learning related achievement emotions appear frequently and change dynamically while learning (e.g. D'Mello, 2013). According to the cognitive disequilibrium framework proposed by D'Mello and Graesser (2012), the learner's perceived confusion due to obstacles while learning can lead to feelings of euark and engagement if the obstacle was overcome. Otherwise, the model assumes that ongoing confusion may lead to frustration or boredom that cause learner to disengage. The present study examines the model's assumptions by the help of process analyses. Because of difficulties in measuring emotional dynamics while learning, we designed an intervention using retrospective questionnaires, an emoji rating during the learning task (D'Mello & Graesser, 2006). A total of N=20 university students were asked to freely express changes of their emotional experiences during a 30-minute learning phase on 'probability theory'. As a guide, the participants were given a list of 13 learning-related emotional states that were derived from the literature. Other emotional states should also be verbalized. The statements were recorded and classified categorically (Cohen's kappa > .75). Descriptive results show that confusion (19%), boredom (15%) and frustration (15%), but also joy (11%) and Eureka (10%) were verbalized most frequently. Process mining analyses taking into account the sequential order of the verbalizations indicate important relations between confusion and eureka as well as frustration. These findings are in line with the cognitive disequilibrium framework. Additional analyses for conformance checking will be presented.

Developmental Interplay of Tempeament and Motivation During the Early School Years

Keywords: Educational Psychology, Goal orientation, Motivation, Motivation and emotion

Presenting Author: Anna Rawlings, University of Helsinki, Finland

Co-Author: Anna Tapola, University of Helsinki, Finland

Co-Author: Marjuk Niemivirta, University of Oslo, Norway
As yet, little is known about the antecedents to individual differences and change in students’ goal orientations over the school years. While approach and avoidance tendencies are known to predict students’ achievement goals, research into the effects of temperament on the development of goal tendencies remains sparse. This study examined the development and reciprocal predictions of temperamental reward and punishment sensitivities and achievement goal orientations, in a longitudinal framework over three years. Participants were students from 16 elementary-school classes (N = 286, 52% girls, 46% rural, and 50% class teachers rated the students on the spring or the fall vs. winter or spring). The authors used a cross-lagged panel model to examine the development of the latent constructs and their reciprocal predictions over time. Findings showed relatively high stability over all for constructs. Reciprocal negative predictions were found between reward sensitivity and mastery orientation, and positive between performance-approach tendencies and mastery. Reward sensitivity in the first and second grades predicted performance-avoidance orientation in the following year. Avoidance and mastery orientations were found to have negative reciprocal predictions. Our findings provide new knowledge on the development of students’ temperamental sensitivities and motivation, and how they may become linked already in the early school years.

The effect of classroom processes on reading comprehension: the mediating role of mastery goals

Keywords: Competencies, Goal orientation, Motivation, Teaching / instruction

Presenting Author: Desiree Theis, Deutsches Institut für Internationale Pädagogische Forschung, Germany
Co-Author: Natalie Fischer, Universität Kaiserslautern, Germany

Transition to middle school is generally associated to decreases in student motivation and achievement. The stage-environment fit approach postulates that the maladaptive development of students in middle school is due to a misfit between students’ basic needs for autonomy, social relatedness, and competence and the school context. Research confirms that classroom processes significantly affect students’ achievement and motivation. The aim of this study is to investigate the association between perceived need fulfillment during German lessons, students’ reading motivation (namely mastery goals) and performance. Moreover, we investigate whether the adoption of mastery goals mediates the effect of perceived quality of instruction on reading performance. 210 fifth grade students answered questions (on-line) about their mastery goals and the amount of perceived autonomy, competence and social support by the teacher as indicators of quality in German lessons. Reading performance was assessed by a reading comprehension test. The association between perceived quality of instruction, students’ mastery goals and reading performance was tested by latent regression analysis. Perceived need fulfillment was positively related to students’ mastery goals. Mastery goals, perceived support by the teacher predicted higher values on the reading test. In terms of perceived autonomy and competence the effect on academic achievement was mediated by the students’ mastery goals. Our findings underline the importance of the students’ basic needs and their support and indicate that perceived classroom processes are mediated by the students’ motivation.

Session B 33
29 August 2017 15:15 - 16:45
Main Building C - C6
Single Paper
Teaching and Teacher Education

Paper Presentation: Teaching and Pre-service Teacher Education - B

Keywords: Achievement, Attitudes and beliefs, Cognitive skills, Comparative studies, Competencies, E-learning / Online learning, Educational Psychology, Integrated learning, Mixed-method research, Phenomenography, Pre-service teacher education, Teacher Professional Development, Vocational education
Interest group: SIG 11 - Teaching and Teacher Education
Chairperson: Minna Tähtinen, University of Helsinki, Finland

Personality, opportunities to learn and teaching skills in field experiences of student teachers

Keywords: Competencies, Educational Psychology, Pre-service teacher education, Teacher Professional Development
Presenting Author: Anja Biermann, Saarland University, Germany
Co-Author: Isabelle Grassmé, University of Erlangen-Nuremberg, Germany
Co-Author: Michaela Glaeser-Zikuda, University of Erlangen-Nuremberg, Germany
Co-Author: Thomas Penter, Saarland University, Germany

The development of teaching skills in student teachers is influenced by a set of personality variables as well as the quality of the opportunities to learn (OPL) at university and during practical phases. Another important factor is the usage of these OPL by student teachers but until now no evidence exists about the mediating effect of OPL between personality variables and teaching performance. The present study examined this mediating effect between the personality factors extraversion, neuroticism and conscientiousness as well as motivation for choosing teacher education, the usage of OPL as a mediating variable and teaching skills of student teachers (N = 404) in a practical phase during teacher education as an outcome. The results of a path analysis show that students with higher values on the factors extraversion as well as conscientiousness have higher motivational dimensions pedagogical abilities. A direct path only leads from motivational factors to teaching skills. The results show the vitality importance of OPL during practical phases and the necessity for a complex view on processes of development of teaching skills in teacher education.

New perspectives to evaluate the mediating processes in longitudinal studies and consider other relevant personality factors (cf. beliefs or self-efficacy).

Conceptions of connecting learning across education and workplace settings

Keywords: Comparative studies, Integrated learning, Phenomenography, Vocational education
Presenting Author: Viviana Sappa, Swiss Federal Institute for Vocational Education and Training (SFVET), Switzerland
Co-Author: Sariqul Choy, Griffith University, Australia
Co-Author: Carmela Aprino, Friedrich Schiller University Jena, Germany

Integrating learning across education and workplace settings is an important, but challenging task in most VET systems. Several strategies were developed in different countries to encourage collaborations between VET actors to design and implement integrated curricula. However, effective connection between learning and teaching in the different locations depends also on the conceptions of different actors. Specifically, scholars adopting a socio-cultural perspective stressed the need for key actors to develop a shared view of such learning as a transnational and diachronic process across different socio-cultural contexts and practices. The main aim of this study was to identify and compare conceptions of vocational teacher learning and teaching across education and workplace settings in Switzerland and Australia. A total of 37 VET actors were interviewed in Switzerland and Australia, asking them about their view and experience of learning and teaching across educational and workplace settings. A phenomenographic procedure was applied as the main strategy for data analysis. Two sets of four conceptions were identified, respectively. Conceptions were first interpreted using a socio-cultural perspective. Similarities and differences between Swiss and Australian conceptions were then discussed in relation to the structural peculiarities of VET systems in the two nations.

Esoused and Enacted Beliefs about Intelligence and Teaching Among Preservice Teachers

Keywords: Attitudes and beliefs, Educational Psychology, Mixed-method research, Pre-service teacher education
Presenting Author: Lella Eve Ferguson, University of Oslo/ University College Kristiania, Norway
Co-Author: Martin Myrhaug, University of Oslo, Norway

This study focused on esoused and enacted beliefs about students’ intelligence and sources of teaching knowledge among 68 Norwegian preservice teachers. To assess esoused beliefs, participants responded to a questionnaire measuring to what extent they believed students’ intelligence to be fixed and malleable, respectively, and a questionnaire measuring to what extent they believed knowledge about teaching knowledge to come from formalized sources, own experiences, and social and popular media, respectively. Cluster analysis was used create profile groups based on participants’ scores on these belief measures, resulting in three distinct cluster profiles. To assess enacted beliefs, all participants also responded to an enacting lesson scenario based classroom problems designed to elicit their beliefs about student learning and teaching. The three cluster groups were compared with respect to how they solved the scenario problems, suggesting that their esoused beliefs were reflected in their responses to the scenarios and were differentially adaptive in those contexts.

Training Success in an Online Training Course for Teachers

Keywords: Achievement, Cognitive skills, E-learning / Online learning, Pre-service teacher education
Presenting Author: Klaus Stillier, University of Regensburg, Germany
Co-Author: Regine Bauchmaier, University of Regensburg, Germany

According to Cognitive Load Theory and associated studies the way of presenting information in an instructional environment is essentially related to the success of learning. By avoiding unnecessary extraneous load rising from badly designed instructions and other sources learners are more likely to successfully construct knowledge. In addition it is known that learner characteristics like prior knowledge affect learning. Therefore, this study explores the effects of some learner characteristics like prior knowledge and learning strategies on learning success (cognitive load ratings, subjective success of learning, and test performance) in an online training about media pedagogy for trainee teachers by using regression analyses. The training consists of eight modules. The core element of each module was an instructional test. Trainee teachers who worked through one or more modules received a training certificate listing all of the mastered modules. A module completion was possible as a workload of 60 to 90 minutes. The data of 191 trainee teachers, who worked on all eight module task and requested a training certificate, were analyzed. Teachers evaluated modules (domain-specific prior knowledge test, cognitive load ratings, subjective success of learning, and performance test) and answered questionnaires before starting the course (cognitive motivation, computer attitude, computer anxiety, and learning strategies). Subjective success of learning could be modelled by learning strategies and load ratings (R² = .71), test performance by learning strategies, prior knowledge and load ratings (R² = .46).

Session B 34
29 August 2017 15:15 - 16:45
Main Building D - D11
Single Paper
Teaching and Teacher Education

Paper Presentation: Teacher Professional Development

Keywords: Action research, Collaborative Learning, Educational policy, Educational Technology, In-service teacher education, Primary education, Reflection, Teacher Professional Development, Teaching / instruction
Interest group: SIG 11 - Teaching and Teacher Education
Chairperson: Thomas Gallagher-Mitchell, Liverpool Hope University, United Kingdom
On the path to dialogic teaching: Learnings from action research

Keywords: Action research, Reflection, Teacher Professional Development, Teaching / instruction
Presenting Author: Klaia Sedova, Department of Educational Sciences, Faculty of Arts, Masaryk University, Czech Republic
Pedagogy under pressure? Primary school teachers’ perceptions of their pedagogical actions.
Keywords: Educational policy, Primary education, Teacher Professional Development, Teaching / Instruction
Presenting Author: Michelle Gemmink, Rijksuniversiteit Groningen, Netherlands
Co-Author: Marjolien Fokkema-Brunsmann, University of Groningen, Netherlands
Co-Author: Joëlle Pauw, Katholieke Pablo Noble, Netherlands
Co-Author: Klaas van Veen, University of Groningen, Netherlands

In Dutch primary schools, pedagogical actions seem to receive much less attention than content knowledge. This is the consequence of several developments and innovations that aimed at enhancing pupil learning outcomes and at improving teachers’ content knowledge and skills. This results in a multitude of tasks and responsibilities for teachers around didactics and seems to constrain time and attention for pedagogical actions. This research explores whether the pedagogical actions of primary school teachers are indeed under pressure in the current educational climate. The goals of this study were therefore: (1) to examine teachers’ perceptions regarding their pedagogical actions, (2) to examine how teaching experience, age of the students and the specific school context influence these perceptions, (3) to determine which needs for professionalisation teachers have to increase their pedagogical actions in the classroom.

A survey was conducted among a sample of 261 Dutch mainstream primary education teachers in the northern part of the Netherlands. Data were collected with a questionnaire, which consisted of fifteen open and closed questions about the impact of pedagogical actions in the classroom, the school’s vision of pedagogy, their personal vision of pedagogy and background variables of the respondents. Half of the responding teachers (47.5%) indicate that pedagogical actions of primary schools are under pressure. Over 60% of teachers indicated that they would like to pay more attention to this issue. Pedagogical actions in primary schools must be given more attention in the current educational climate.

Changing pedagogies and practices with digital storytelling: from teachers’ perspective
Keywords: Educational policy, Educational Technology, In-service teacher education, Teacher Professional Development
Presenting Author: Marianna Vittuau, University of Helsinki, Finland
Co-Author: Hannele Niemi, University of Helsinki, Finland
Co-Author: Veera Kallunki, University of Helsinki, Finland

This study aims to investigate four Finnish primary school teachers’ views of how pedagogical actions and digital storytelling practices change when digital storytelling is the teaching method. Digital storytelling is a pedagogical approach for student-driven knowledge creation by making and sharing oral and written stories in video format. In order to meet this end, teachers need to introduce, support and facilitate student collaborative work in groups and/or pairs. In addition, they need to introduce the use of web-based environments, adapt their teaching plan accordingly, and enrich existing instructional material. As this process involves applying new ideas at work, making decisions on the ways of teaching, and developing own work, both the social and material aspects of teaching change (Biesta & Todder 2007, Priestley et al. 2012). In addition, teacher professional agency also changes (Erlampehto et al. 2015, Erllampehto et al. 2013, Vahbtsantane et al. 2009).

The focus of this study is to find out how teachers apply new pedagogies and how they expand the teaching plan and practices in order to deal with the change.

To analyse data resulting from teacher interviews we used qualitative methods. The analysis indicated three main categories in teacher definitions of change in their professional agency: contextualization of science-related learning; enabling collaborative work for knowledge building; and expanding available resources.

Making sense and enhancing teachers’ collaborative expertise of school well-being
Keywords: Action research, Collaborative Learning, In-service teacher education, Teacher Professional Development
Presenting Author: Tuija Uusikoski, University of Jyväskylä, Finland

This action research examines an intervention aiming to develop teachers’ expertise collaboratively. The context of the expertise is focused promoting educational well-being for preventing bullying. The intervention is implemented in two Finnish comprehensive schools, and as teachers’ in-service training at workplace. Teachers (n=44) were informant and the data has been gathered before, during, and at the end of the intervention. The intervention was based on integrative pedagogy. The themes of the training sessions constituted on the theories of well-being and bullying. Theoretical foundation lies here on the theory of well-being and bullying, as well as the other hand a deductive, theory-based approach, and on the other hand an abductive, thematic step-by-step analysis along the process of systematic coding. The process enhanced the collaborative expertise of well-being and revealed the main elements of this collaborative process. Also, it generated new understanding about bullying from the perspective of the school personnel, and possibilities and limitations of promoting well-being. The research presents an example for organizing teachers’ in-service training and novel practice in order to develop the school culture from the perspective of the organizational theory of collaborative leadership and sensemaking process.

Session B 35
29/08/2017 15:15 - 16:45
Pinni B - 84113
Single Paper
Cognitive Science, Learning and Social Interaction

Paper Presentation: Learning and Professional Development
Keywords: Cognitive skills, Collaborative Learning, Conversation / Discourse analysis, Informal learning, Problem solving, Professions and applied sciences, Qualitative methods, Reasoning, Social aspects of learning and teaching, Social interaction, Teacher Professional Development, Vocational education, Workplace learning
Institutional Code: SIG 14 - Learning and Professional Development
Chairperson: Kyle Shaw, SORTI, The University of Newcastle, Australia

Team learning and innovative work behaviour in vocational teacher teams
Keywords: Vocational education, Workplace learning
Presenting Author: Andreas Widmann, University of Regensburg, Germany
Co-Author: Regina Mutler, University of Regensburg, Germany

In workplaces, innovations are required to address emerging problems and challenges. Also in vocational education there are many challenges in meeting the demands of students, of the labour market and society. In order to meet these demands, teacher teams need to work and learn together to develop innovative solutions such as products, processes and strategies. Research indicates that WB can be facilitated by individual learning processes, but insight in the relation between team learning processes and WB is lacking. Team learning is defined as a compilation of processes that circularly generate changes for teams, team members or organizations. Inputs from multiple levels can influence team learning processes: structural and cultural work condition, which produce in turn team learning outputs at multiple levels. We examine the relations between individual learning inputs, processes and WB as behavioral output. We conducted three waves using questionnaires with 315 vocational teachers of 87 interdisciplinary work teams. The results indicate a positive relationship between team learning processes and WB: (ranging from T1: r=.27 to .51; T2: r=.27 to .56; T3: r=.29 to .55, p<.01) between all learning processes (ranging from T1: r=.27 to .72; T2: r=.29 to .72; T3: r=.30 to .72, p<.01) and between all cultural conditions and all learning processes (ranging from r=.38 to r=.76; T2: r=.24 to r=.76; T3: r=.26 to r=.85, p<.01), except for safe team climate with storage and retrieval.

Intergenerational relationships in elementary school teams. A social network approach
Keywords: informal learning, Social aspects of learning and teaching, Teacher Professional Development, Workplace learning
Presenting Author: Kandra Geaats, University of Antwerp, Belgium
Co-Author: Jan Vanhoof, University of Antwerp, Belgium
Co-Author: Piet Van den Bossche, University of Antwerp, Belgium
Co-Author: Nieneke Moolenaar, University of Antwerp, Belgium

This paper examines the extent to which teachers’ work-related social networks are affected by different generations of teachers. Data were gathered through a survey with socio-metric questions among 301 school team members in 15 elementary schools in the Netherlands (n=301). Using social network analysis, in particular p2 modeling, we analyzed the effect of being part of a generation on teachers’ probability of having relationships in networks such as discussing work, asking and providing advice, and collaboration. Findings indicate that generational cohorts based on chronological age do matter in the formation of work-related ties. These findings also support the importance of focusing on different instrumental networks since different age dynamics can be at play. Our findings also show that school team members of the youngest cohort tend to form intra-generational ties, whereas older generational cohorts form inter-generational ties.

Images of the possible: Leaders’ effective interpersonal behaviours in difficult conversations
Keywords: Cognitive skills, Conversation / Discourse analysis, Qualitative methods, Teacher Professional Development
Presenting Author: Frauke Meyer, University of Auckland, New Zealand
Co-Author: Desire Le Fevre, University of Auckland, New Zealand

Principals commonly struggle to have effective conversations about staff performance issues and parental complaints (Auhtors, 2011, 2014, Cardno, 2007, Yariv, 2009). They tend to tolerate and work around performance issues, sometimes even protecting staff members from further scrutiny, rather than effectively address issues (Bridge, 1992). Principals often avoid dealing with such difficult issues, because
The road to hell is paved with good intentions, but what happens to them along the way?

Keywords: Achievement, E-learning / Online learning, Informal learning, Motivation

Presenting Author: Maarten Hendrix, Open University of the Netherlands, Netherlands
Co-Author: Marco Knez, Open University of the Netherlands, Netherlands
Co-Author: Karol Krijens, Open Universiteit Nederland, Netherlands

Currently success measurement of MOOCs is certificate- and completion-centric and fails to take student intention into account. While this view of success has been criticized by the research community, no suitable alternative has yet been developed. This study addresses this gap and proposes a theoretically grounded model for measuring success and dropout in MOOCs. The reasoned action approach (RA) for behavioral reasons and the transformation of an intention to achieve certain goals, serves as a theoretical framework for our model, in particular the intention-behaviour gap. A new model for measuring success and dropout in MOOCs is proposed. This model redfines success in MOOCs as all MOOC-takers who achieve their individually intended goals are considered successful. The model also provides insight into the dynamics of the intention-behaviour process on an individual level and therefor into possible reasons that can cause the intention-behaviour gap.

Object-oriented learning activities to innovate Higher Education: a case-study

Keywords: Case studies, Computer-supported collaborative learning, Design based research, Knowledge creation

Presenting Author: Nadia Sansone, Sapienza University of Rome, Italy
Co-Author: Donatella Cesaroni, University of Rome, Italy

This paper describes a case-study in which the Triangulated Learning Approach (TLA) has been applied to a university course for Psychologists. Our aim was to observably TLA impacts on students’ participation, learning and appreciation of the course, thus gathering suggestions on how to improve it, in accordance with the Design-based Research methodologies inspiring our study. To this end, it has been provided a double implementation of the course. Fifty-five students participated to the first course, divided in six groups of 9 students in average. Following TLA prescriptions, a set of individual and collaborative technology-supported activities was orchestrated, leading to the creation of a shared and meaningful object. Observational and ethnographic data has been collected so far 968 web forum posts, 44 pre-post questionnaire investigating students’ perception about the acquisition of knowledge work competencies. On these data we have performed qual-quantitative analysis, by the use of specific codebooks for the content analysis. Preliminary results indicate a generally positive impact in terms of students’ participation and satisfaction of the activities. Students of the first course have gradually learnt effective methods of discussion, of activating knowledge building and collaboration. However, the analysis allowed us to identify some areas for improvement and to redesign the course – currently ongoing – by reviewing a few activities and introducing new ones. Similarly, we have perfected the method. In the presentation, it will be shown the comparison between the two editions in terms of intervention, method and results.

Children’s scientific thinking skills for programming a robotic car

Keywords: Assessment methods and tools, Computer-supported collaborative learning, Educational Technology, Inquiry learning

Presenting Author: Eva van der Sande, Behavioural Science Institute, Radboud University Nijmegen, Netherlands
Co-Author: Tijekleeman, Behavioural Science Institute, Radboud University, Netherlands
Co-Author: Elane Segers, Radboud University / University of Twente, Netherlands
Co-Author: Lucio Verhooven, Radboud Universiteit Nijmegen, Netherlands

Although the need for programming in everyday life for young children rapidly increases, it is by no means clear how children perform while programming. Moreover, very little empirical studies to date have focused on the widespread claim that programming is a rich learning environment to exercise scientific thinking skills. Such thinking entails the 21st century skills to discover, examine, and reflect during knowledge seeking. The present study therefore examined (1) the processes while children program a route for a Lego Mindstorms ® car, and (2) how these processes relate to their scientific thinking. Scientific thinking skills were assessed in 292 children, who then programmed Lego Mindstorms® robots for a required route on a map. Children’s programming behaviors were recorded on process and outcome variables, such as programming efforts, testpoints, and endpoint that was succeeded on the map. Results indicate that children used different strategies of varying efficiency to program the robotic car, and that these strategies related to children’s scientific thinking skills.

Session B 40
29 August 2017 15:15 / 16:45
Main Building C - C8
Single Paper
Learning and Social Interaction

Paper Presentation: Social Interaction in Learning and Instruction

Keywords: Achievement, Cognitive development, Cognitive skills, Collaborative Learning, Computer-assisted learning, Conversation / Discourse analysis, Cooperative / collaborative learning, Learning analytics, Motivation, Primary education, Quantitative methods, School effectiveness, Social aspects of learning and teaching, Teaching / instruction
Interest group: SIG 10 - Social Interaction in Learning and Instruction
Chairperson: Frederik Althgirm, Universität Potsdam, Germany

Positive effects of physical and mindfulness training on children's attention and academic skills

Keywords: Cognitive development, Cognitive skills, Motivation, School effectiveness

Presenting Author: Christian Möller, Institute of Psychology, Germany
Co-Author: Sven Lindberg, Deutsches Institut für Internationale Pädagogische Forschung (DIPF), Germany
Co-Author: Viktoria Sawitzki, Goethe University, Frankfurt, Germany
Co-Author: Priyangka Kanagalingam, Goethe University, Frankfurt, Germany
Co-Author: Stefan Scherer, Deutsches Institut für Internationale Pädagogische Forschung (DIPF), Germany
Co-Author: Christoph Michel, Goethe-Universität Frankfurt, Germany
Co-Author: Julia Kahrbe, Goethe-Universität Frankfurt, Germany

The goal of this study was to investigate positive effects of a physical training and mindfulnesstraining in the classroom on attention and academic skills of children. Both studies with pretest-training posttest designs consisted of a ten-minutes-per-day for two weeks standardized intervention. An audio-CD with instructions and music was produced for both studies and played while research assistants of the university performed either physical training exercises (e.g. cardiovascular activation) or mindfulness exercises (e.g. body scans) with children together in the classroom. Different attention skills, one measure for reading and mathematics for different individual sub-scales were used as independent variables. The sample in study one consisted of 157 elementary school children aged between nine and ten years visiting urban elementary schools in Germany and in the second study consisted of 101 school children aged between ten and twelve visiting fifth and sixth grade. Intervention and control groups did not differ in age, intelligence, sex or pre-tests differences for independent variables. Moderate interaction effects between intervention and control group were found for attention speed and visual scanning speed in study one and for reading in study two. In sum results indicate that acute physical training as well as mindfulness training can improve cognitive performance in children and young adults. We will discuss implications of these findings and issues that should be addressed in future work for instance training regimes including both physical training and mindfulness training aspects.

Impact of parental beliefs and teacher expectations on mono- and multilingual students' achievement

Keywords: Achievement, Primary education, Quantitative methods, Social aspects of learning and teaching

Presenting Author: Edith Niederbichler, University of Applied Sciences and Arts Northwestern Switzerland FHNW, Switzerland
Co-Author: Markus P. Neuenschwander, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

The present research examines how the mother tongue, parental beliefs and teacher expectations influence the achievement development of mono- and multilingual children in primary education. The study investigates if a) the parents’ perceived efficacy regarding the support of their child's achievement and teachers’ achievement expectations are mediating the impact of the mother tongue on the students’ achievement development and b) how these factors are interacting. The sample consists of 541 mono-lingual German speaking and 274 foreign language speaking or multilingual students from three Swiss cantons. They completed questionnaires and achievement tests in the subjects Mathematics and German in the 5th and 6th grade of primary school. Questionnaires were also filled in by their parents and teachers. The findings reveal that the mother tongue influences the students’ achievement development between the measurements in the subject German, but not in Mathematics. The effect of the mother tongue on achievement development is significantly mediated by the parents’ perception of efficacy regarding the support of their child’s achievement, but not by teacher expectations. The direct effects of the parents’ perception of their efficacy in school related supporting and teachers expectations on achievement development are significant in both subjects. Furthermore, the perceived support efficacy of...
parents is fully mediated by teacher expectations in Mathematics and partially mediated in German. Implications for educational practice of these mediation effects will be discussed.

It is great she is really checking she wants us to pass – Facilitating student project work

Keywords: Collaborative Learning, Conversation / Discourse analysis, Social aspects of learning and teaching, Teaching / instruction

Presenting Author: Anders Ekblom, Kristianstad University, Sweden

Co-Author: Tina Kullenberg, Kristianstad University, Sweden

All students in Swedish upper secondary school have to do one mandatory project work course aimed at developing general skills such as independence, initiative, creativity and imagination. The students have to pass the course to receive their upper secondary diploma. Our study aims to investigate how students talk about the task of doing ‘independent’ project work in the diploma course.

Three focus group conversations of totaling twelve students are filmed and analyzed through topic analysis, an analytical approach based on dialogism as theoretical framework. The empirical material is analyzed from the perspective of how the design of the project course and the assessment regime influences the students work. Findings indicate that the students rely heavily on help and instruction from the teacher. They perceive of this help as a crucial asset in passing the diploma course. They state that the kind of help they receive are strongly focused towards the dividing line between pass and fail. Help is hard-导向 towards the scientific form and the content of their essays are treated as almost uninteresting. Support for independence therefore seems to be significantly restricted in practice. The teacher is in fact working as a facilitator guiding students towards dependence. This is accomplished through framing doing project work as doing template science.

Applying analytics to multimodal data: Methodological challenges and opportunities

Keywords: Computer-assisted learning, Conversation / Discourse Analysis, Cooperative / collaborative learning, Learning analytics

Presenting Author: Jonathan White, Högskolan Dalarna, Sweden

Co-Author: Giulia Messina Dahlgren, University of Skövde, Sweden

In this paper, we present analyses regarding some of the challenges and opportunities of applying learning analytics to multimodal online discourse. The data come from seminars held through the videoconference software Adobe Connect on a bimonthly course in Italian run by a Swedish university. Building on our previous analysis of the blurring of boundaries between the oral and written modes, this presentation focuses on how this blurring affects students’ noticing. What is the role of the written text in an otherwise oral discussion, and how do students notice textual comments? Science is another issue that is relevant, as reading textchat bring additional instances of stance into the oral discussion. How is this navigated by students? Finally, we discuss issues arising from the methods of learning analytics. What normative challenges arise for the researchers in applying analytics to such a hybrid data format? We argue that analytics can bring a rigor to research into multi-modal data, but that there are considerable challenges given that common mediated communication in oral and especially multi-modal communication, is changing the norms of research methodology and language use. Such data challenges us as researchers, but equally brings opportunities for insights into new media communication. We will present empirical examples using learning analytics based on discourse analysis, and preliminary findings show that a range of methodologies need to be put to work to create the learning analytics able to study the richness of multimodal environments, requiring in particular a dialogical approach to knowledge creation.

Session B 41

29 August 2017 15:15 - 16:45

Pinni B - B3109

Single Paper

Educational Policy and Systems, Learning and Social Interaction

Paper Presentation: Social Interaction

Keywords: Conversation / Discourse analysis, Cooperative / collaborative learning, E-learning / Online learning, Educational policy, Language (Foreign and second), Qualitative methods, Science education, Secondary education, Social interaction, Teacher Professional Development, Video analysis, Vocational education, Workplace learning

Interest group: SIG 10 - Social Interaction in Learning and Instruction

Chairperson: Gerta Hagenaar, University of Bremen, Austria

Shaping participation in vocational training interactions: the case of schimising

Keywords: Conversation / Discourse analysis, Social interaction, Vocational education, Workplace learning

Presenting Author: Laurent Filliettaz, University of Geneva, Switzerland

Co-Author: Vassiliki Markaki, University of Grenoble, France

This paper focuses on one empirical field of the school-to-work transition: that of the vocational training of students learning to become early-childhood educators. During internships in early childhood day care centers, students have the opportunity to experience educational activities involving children, under the close guidance of mentors, who are qualified staff members. The paper examines the sorts of interactional competences and institutional demands required from students as they engage in complex forms of participation combining educational and training purposes. In the paper, we focus on a series of empirical cases, recorded through video data and analysed in a conversation analytic perspective (Sacks, Schegloff & Jefferson, 1973; Schegloff, 2007), in which mentors make the decision to intervene, and therefore to guide or shape children’s behavior, during a session moderated by the student. Such interventions do not interrupt the student’s activity and lead to the emergence of two distinct but not impermeable interactional spaces. This complex participation framework, known as “schimising” (Elgort, 1993), contributes to overcome practical issues within multiparty settings. Our study shows how schimising constitutes a particular sequential phenomenon where participants re-organize the interaction and co-construct a social and cognitive interactional space, thus enabling a shared understanding of the specific training context.

Exploring How Wiki-blogs are constituted as Learning Resources in a Science Project

Keywords: Science education, Secondary education, Social interaction, Video analysis

Presenting Author: Astrid Camilla Wig, University College of Southeast Norway, Norway

Co-Author: Anne Line Wette, University of Oslo, Norway

Exploring how Wiki-blogs contribute to structuring learning activities, the paper draws on data from an empirical, longitudinal study in a lower secondary school in Norway to analyze dialogues and interactions in a science project lasting for 2 months. The analysis is based on sociocultural and dialogical approaches to learning with mediational means, in which video data, Wiki-blogs and students written laboratory reports is subjected to interaction analysis. The focus of the analysis is on episodes where the teacher encounter the Wiki-blog as a resource for learning and meaning-making.

The findings show that the Wiki-blogs to a significant degree structure the learning activities. In line with czerw (2010), our findings illuminates that while the Wiki-blog is not itself a dialogic space, it appears to make possible changing, expanding and enhancing the social learning space. However, the results show that the potential of the Wiki-blog must be considered in light of several crucial issues. The constitution of the Wiki-blog invites to certain types of activities such as a normative way to construct laboratory reports in a digital manner. In addition, our findings illuminates that the learning activities encountering the Wiki-blog make possible dialogues of what is considered as accountable to the learning community such as sharing and copying. The accountability to knowledge that is accurate and relevant and the accountability to accepted standards of reasoning is negotiated in the classroom dialogues, and make visible the thinking with the Wiki-blogs as learning resources.

Integration and language acquisition: a link built by governmental program’s makers and other actors

Keywords: Educational policy, Language (Foreign and second), Qualitative methods, Social interaction

Presenting Author: Stéphanie Ballat, University of Lausanne, Switzerland

Adopting a sociocultural approach in psychology, the paper presents a research on a governmental program, which aims to increase the quality of language courses for immigrants in Switzerland. Many studies on legal frameworks of European countries have highlighted a strong relationship between language education for immigrants and their "integration". The public policies and governmental programs, which result from this context, are built on a tension between the will to give access to language learning to immigrants and the will to use their linguistic abilities to evaluate the "level of integration". According to the perspective that designing a governmental program of language education and learning French are not only cognitive processes, but engaged also socio-cognitive processes and processes of meaning making, this paper tries to better understand: 1) how the governmental program’s designers define and negotiate the identity of this program, its boundaries, and their own role in it and 2) how they perceive and construct a representation of the French teachers and the immigrants.

By recorded and non-recorded observations, interviews and analysis of documents written by the program’s designers, the analysis of the discourses and practices seems to show that the designers construct and negotiate among themselves and with other institutional actors the meaning of the program, of their role and of the practices of French teachers. Furthermore, while the program announces the immigrants as principal beneficiaries, they seem seldom to take into consideration the immigrants’ perspective in the implementation of the program.

Professional identity management in a thematic Facebook group

Keywords: Collaborative / collaborative learning, E-learning / Online learning, Social interaction, Teacher Professional Development

Presenting Author: LOUISE PETERSON, University of Gothenburg, Sweden

Co-Author: Anna Lantz-Andersson, University of Gothenburg, Sweden

Co-Author: Thomas Hillman, University of Gothenburg, Sweden

Co-Author: Anna Bergviken-Ranfeldt, University of Gothenburg, Sweden

Co-Author: Mona Linde, University of Gothenburg, Sweden
A recently developed self-generated relevance intervention requires students to write brief essays describing how course content might be relevant to their lives, which has promoted student performance and motivation in high school and college courses (Harackiewicz et al., 2014). A recent review highlighted the need for greater conceptual clarity to more closely align this intervention with motivation theory and explain why self-generating relevance connections improve students’ academic value beliefs (Rosenzweig & Wigfield, 2016). To address that challenge, the present mixed-methods study employed a qualitative approach that examined student-generated essays through the lens of expectancy-value theories of achievement motivation. The results contribute to our understanding of how students’ self-generated relevance interventions may broaden students’ perspectives and achievement motivation and can be leveraged to design more effective and engaging educational experiences.

Reference Group Effects on Task Interest in an Academic Learning Task - An Experimental Study

Antecedents and consequences of student responsiveness to a relevance intervention in the classroom

Why do some students profit from interventions and others do not? Although research on interventions implemented in real-life educational settings is steadily growing, systematic studies on the processes leading to the effectiveness of these interventions are still rare. By investigating the antecedents and consequences of students’ responsiveness to written intervention material, the current study aims to shed a closer light on the components that make classroom-based motivational interventions work. Using a sample of 1916 ninth grade students in 82 classrooms, students’ responsiveness to two written intervention tasks about the personal relevance of mathematics (quotations condition: evaluating quotations; text condition: writing a text) was assessed. First, students’ responsiveness was analyzed by coding 1289 essays on three theory-driven fidelity indicators (positive arguments, personal connections, in-depth reflection) which were combined into a responsiveness index. Second, Linear regression analyses showed that students’ conscientiousness, gender, math achievement, and math motivation predicted the responsiveness index. Third, complier-average causal effects analyses revealed that intervention effects on students’ utility value beliefs compared to the control group were stronger for responsive than for nonresponsive students. The current study highlights the importance of investigating the processes underlying the intervention effects (e.g., subgroup effects) in order to optimize the designs of classroom-based motivational interventions.

Session B 44

29 August 2017 15:15 - 16:45
Pens A - A1081
Single Paper
Culture, Morality, Religion and Education, Developmental Aspects of Instruction

Paper Presentation: Moral and Democratic Education

Is democratic agency possible? How an international school network puts its ‘IDEALS’ into practice

A comprehensive framework for assessing college students’ reactions to faculty incivility
well as confirmatory factor analysis (CFA) to corroborate the theoretical structure of reactions to FI. In accordance with the FT strategy used in this study, a mapping sentence was constructed expressing the composite of three individual facets based on the theoretical framework: Facet A including four types of reactions (1)Eff (2)Voice (3)Loyalty and (4)Neglect (EVLN); Facet B reflecting the destructiveness – constructiveness theoretical dimension, and Facet C illustrating adhesion ranging from passive to active responses. Data were gathered by a scale measuring students’ reactions to FI, and finally, a multidimensional statistical technique of SSA was applied. According to the findings, the CFA result presented four relatively interpretable factors (EVLN) while the SSA allowed for the examination of these factors as well as additional facets (B and C). The findings clearly indicated that the latest theoretical variation of the EVLN model is valid as a framework for explaining and measuring reactions to FI Methodologically, the use of the SSA unreduced approach in this exploratory study helped revealing insights that the CFA technique has not revealed.

Shaping the Resilient Subject: Professional Interventions, Culture and Politics in Israeli Schools
Keywords: Citizenship education, Culture, Morality, Quantitative methods
Presenting Author: Galia Plotkin Amram, Ben Gurion University of the Negev, Israel

While the concept of resilience has attracted a great deal of academic interest, less attention has been paid to the particular traits of the resilient subject(s) this presentation I extract the prototype of the resilient student as constructed through mental health projects that build resilience in Israeli schools in the context of the Israeli-Palestinian conflict. Drawing on sociological scholarship that interweaves the domains of therapeutic discourse and cultural context, I describe the resilient subject not only as a psychological but also as a cultural prototype. Based on analysis of the manuals of resilience building projects that were designed and implemented by leading mental health centers in Israeli schools, I demonstrate that the design of the resilient student is actualized primary through emotional, physical and cognitive work. The professional practices foster the ability to process feelings, think rationally and control instinctive and potentially damaging emotional reactions. I argue that the prototype of the resilient subject emerges as one characterized by the avoidance of violent behavior. This ethics of non violence draws on the western cultural ideal of a normative personality and status of emotions in western therapeutic culture rather than on a particular political context. However the impact of professional interventions on the design of students’ civil rights regarding the conflict might warrant consideration.

Children’s epistemic beliefs for moral reasoning in elementary school: a longitudinal study
Keywords: Attitudes and beliefs, Citizenship education, Cognitive skills, Values education
Presenting Author: Jo Lunn Brownlee, Queensland University of Technology (QUT), Australia
Co-Author: Susan Walker, Queensland University of Technology, Australia
Co-Author: Eva Johansson, University of Stavanger, Norway
Co-Author: Laura Scholes, Queensland University of Technology (QUT), Australia
Co-Author: Donna Berthelsen, Queensland University of Technology, Australia

In recent years, issues related to citizenship education and values for democracy have been emphasised in educational policies worldwide. In promoting children as active citizens, we need to understand how children reason about social and moral values. The capacity to reason about others’ perspectives reflects individuals’ epistemic beliefs, which are the beliefs we hold about knowing and knowledge. The study investigated changes in children’s epistemic beliefs in the context of moral reasoning for active citizenship. Scenario-based interviews explored children’s epistemic beliefs across the early years of elementary school (Years 1, 2, and 3) in 10 independent and public schools in Queensland, Australia. Children provided their perspectives in response to conflicting opinions expressed in three scenarios across domains requiring judgements about moral values, ambiguous facts, and personal taste. The use of three judgement domains enabled comparisons to be drawn between moral values and the other domains of reasoning. The data showed changes in epistemic beliefs occurred between Year 1 and 2 for personal taste and between Year 2 and 3 in the moral and ambiguous judgment domains. The findings showed that children were more likely to accept that people can hold different beliefs about personal taste at an earlier age than for ambiguous facts and moral judgements in which there is only one correct answer. We argue that it is important for teachers to pay attention to children’s beliefs about knowledge and knowing in the process of scaffold their reasoning, especially in domains related to moral values for active citizenship.

Session B 45
29 August 2017 15:15 - 16:45
Pinno B - B3118
Single Paper
Cognitive Science, Instructional Design, Motivational, Social and Affective Processes
Paper Presentation: Metacognition - B
Keywords: Cognitive skills, Comprehension of text and graphics, Early childhood education, Metacognition, Misconceptions, Motivation, Pre-service teacher education, Reading comprehension, Self-regulation, Teaching approaches, Technology
Interest group: SIG 16 - Metacognition
Chairperson: Kaisa Jokiranta, University of Jyväskylä, Finland

Misconceptions Impede Text Comprehension and Metacognitive Accuracy in the Domain of Statistics
Keywords: Metacognition, Misconceptions, Reading comprehension, Self-regulation
Presenting Author: Anja Pirnitz, University of Freiburg, Germany
Co-Author: Stafanie Gokle, University of Freiburg, Germany
Co-Author: Josef Wittwer, University of Freiburg, Germany

Prior research shows that misconceptions have detrimental effects on text comprehension. However, whether misconceptions also impair metacognitive accuracy, that is, the accuracy with which one self-assesses one’s own text comprehension, has received far less attention. Yet, this ability usually affects whether learners engage in further learning activities to eliminate problems of understanding. We conducted a correlational study with N = 49 university students with varying levels of statistical misconceptions and examined the extent to which their misconceptions affected their comprehension and metacognitive accuracy when reading an expository statistics text. Comprehension and metacognitive accuracy referred to both conceptual and procedural aspects of statistics. The results showed that misconceptions not only impaired students’ conceptual text comprehension but also prevented them from accurately self-assessing their text comprehension as indicated by overconfident predictions of their conceptual and procedural comprehension. This finding suggests that misconceptions in learning and in teaching activities that would enhance their text comprehension. The results call for methods to overcome misconceptions in the service of improving text comprehension and metacognitive accuracy.

Does visualization affect text comprehension monitoring, restudy choice, and comprehension scores?
Keywords: Cognitive skills, Comprehension of text and graphics, Metacognition, Self-regulation
Presenting Author: Danny Kostons, University of Groningen, Netherlands
Co-Author: Björn de Koning, Erasmus University Rotterdam, Netherlands

In the present study, we investigated how 116 fourth and fifth grade students’ monitoring skills were associated with restudy choices and explored whether drawing was a useful intervention to improve monitoring accuracy, restudy choice, and reading scores. During the first session, all students read a text, judged their comprehension of the information within that text, selected paragraphs to reread, reread those parts, and then made another judgment of comprehension before doing a post-test. Positive correlations were found between the posttest and Judgments of Learning, posttest and JOL-accuracy, and number of paragraphs reread and JOL-accuracy, as well as negative correlations between effort and JOLs, and JOLs and number of chapters reread. For the second session, students were split-up into three conditions: a control condition and two drawing conditions. In the long-drawing condition, students were allowed to draw throughout the whole second session, including post-test. In the brief-drawing condition participants only got to draw the first time they read the second text. We did not find the expected differences between conditions on the post-test. And contrary to our findings, having the drawing available all the time, led to significantly lower accuracy on judgments of learning and higher mental effort compared to the other two conditions. Drawing more elements was positively correlated with the posttest scores and JOLs, whereas drawing more details was negatively correlated with posttest scores and did not correlate with JOLs.

Immediate and Long-Term Effects of Training in ‘Learning by Teaching’ on Knowledge of Cognition
Keywords: Cognitive skills, Pre-service teacher education, Teaching approaches, Technology
Presenting Author: Mary Gutman, Efrat College, Israel

Learning By Teaching (BLT) programs for pre-service teachers in two different environments (technological and face-to-face) were compared using 100 pre-service teachers as subjects. Both programs were based on the IMPROVE instructional method (Mevarech & Kramarski, 1997) which provides explicit metacognitive steps for BLT with a dual perspective (2P); that of teacher and that of learner. The dependent variables Knowledge of Cognition (KC) in learning and teaching were tested for their immediate and long-term effects in a technology-based system group (TBS-2P), and Face-to-Face group (F2F-2P). Post- test results of KC indicate that the TBS-2P group showed a higher level of conditional and procedural knowledge of teaching. The TBS-2P group also outperformed in measures of long-term effects of declarative knowledge in teaching. Both theoretical and practical implications of this study are discussed.

Help-seeking and private speech during a problem-solving task in 2-5 year olds
Keywords: Early childhood education, Metacognition, Motivation, Self-regulation
Presenting Author: Loren Marulis, Connecticut College, United States
Co-Author: Lindsey Nelson, Connecticut College, United States

Private speech and help-seeking behaviors have found new traction through Zimmerman’s conceptualization of self-regulated learners as “metacognitively, motivationally, and behaviorally active participants in their learning... and are aware when they know a fact or possess a skill and when they do not and, unlike passive classmates... proactively seek out information when needed and take
necessary steps to master it” (1990, p. 4). Likewise, Vygotsky noted that young children use private speech while trying to understand new situations, problem-solve, and plan. Essentially, young children’s private speech is an early type of self-regulation (Manning et al., 1994; Winistorfer, 2005).

The current study is a follow-up of Metacognitive Processes in Development (MiDo), through which we analyzed metacognitive skills (i.e., knowledge; behavior) using a puzzle task in a College lab (2-5 year olds), by examining associations to executive functioning (EF) and motivation. Many of the children used private speech during the puzzle task, particularly when it got challenging to self-sooth, problem-solve, and speak about prior experiences/ knowledge.

We propose that expressive language (to self or others) is a critical mechanism enhancing self-regulated learning particularly for children at risk for learning difficulties.

Specifically, we are investigating private speech and help-seeking behaviors as predictors of metacognitive skills, EF, motivation, and task performance and examining whether demographic variables (e.g., SES, race, family structure) moderate these learning-related skills. Preliminary results indicate that children who use more private speech during the puzzle task had higher metacognitive, EF, motivation, and performance skills.

**Session B 46**

29 August 2017 15:15 - 16:45
Peni B - 00539
Single Paper

Cognitive Science, Culture, Morality, Religion and Education, Teaching and Teacher Education

**Paper Presentation: Argumentation, Dialogue and Reasoning**

**Keywords:** Argumentation, Assessment methods and tools, Attitudes and beliefs, Cognitive skills, Culture, Developmental processes, Literacy, Primary education, Reasoning, Science education, Social aspects of learning and teaching, Student learning, Teacher Professional Development

**Interest group:** SIS 28 - Argumentation, Dialogue and Reasoning

**Chairperson:** Hadley Solomon, University of New Hampshire, United States

**The Argumentation Rating Tool: Supporting Systematic Reflection on the Quality of Classroom Talk**

**Keywords:** Argumentation, Assessment methods and tools, Primary education, Teacher Professional Development

**Presenting Author:** Alina Reznitskaya, Montclair State University, United States

**Co-Author:** Ian G.W. Wilkinson, The Ohio State University, United States

This paper discusses the Argumentation Rating Tool (ART), an observational rating scale designed to help practitioners assess the quality of teacher facilitation and student argumentation during group discussions of texts in elementary language arts classrooms. Users of the ART watch short segments of videotaped discussions and apply a set of evaluation criteria. We describe the theoretical and empirical foundations of the ART and discuss several validation studies. In these studies, we analyzed teacher reactions to using the ART during a year-long professional development program designed to help teachers acquire knowledge and skills to facilitate discussions that engage students in collaborative and rigorous argumentation. We also examined the psychometric properties of the ART. The results show high inter-rater reliability and internal consistency of the ART scores. We also confirmed the ART’s sensitivity to experimental manipulation of talk and documented medium-to-high correlations with scores on two criterion measures. In conclusion, we found the ART to be a promising assessment and instructional tool that can be used as part of a comprehensive professional development program to help students improve research-based practices and support systematic reflection on the quality of classroom talk.

**Effects of learning about evolution on religious belief: Israeli schools as a natural experiment**

**Keywords:** Argumentation, Attitudes and beliefs, Culture, Social aspects of learning and teaching

**Presenting Author:** Eli Gottlieb, Mandel Leadership Institute, Israel

This year’s EARL conference theme challenges us to connect our research on learning and instruction to contemporary political debates. Evolution is a key concept in biological sciences and yet, in many societies, also one of the most controversial. Several studies have examined how students’ religious beliefs affect their learning about evolution. This study examines the effects of learning about evolution on students’ religious beliefs. Israel is a natural laboratory for exploring these effects because its public school system includes both religious and secular schools, all of which are required to teach evolutionary theory as part of the national biology curriculum.

In individual interviews, 205 fifth, eighth, and twelfth graders from religious and secular schools in Israel were asked to justify their beliefs about whether or not God exists. Many of the arguments that students offered reflected explicit creation and evolution. Analyses of how these arguments were distributed across the sample indicate intriguing patterns of divergence between the two types of school, despite the fact that evolution is taught in both of these. These differences indicate that contemporary political debates about the teaching of evolution in public schools mistakenly cast scientific and religious thinking as polar opposites. In practice, students find a variety of ways to accommodate religious and scientific argumentation and to assimilate what they learn about evolution with their other beliefs.

**The Development of Relational Reasoning in Children and Youth**

**Keywords:** Cognitive skills, Developmental processes, Reasoning, Student learning

**Presenting Author:** Patricia A. Alexander, University of Maryland, United States

**Co-Author:** Sophie Jaltarayi, University of Maryland, United States

The purpose of this investigation was to explain the relational reasoning of 59 K-12 students in New Zealand engaged in the analysis of form and function of familiar and unfamiliar technological objects. These reasoning data were gathered at two time points. Time 1 was at the outset of these students’ participation in a curricular innovation intended to increase their technological literacy. Time 2 took place almost two years later at the conclusion of the curricular program. For analytic purposes, the sample was divided into three groups (i.e., Early, Middle, and Late) corresponding to grade level. The longitudinal data for 59 students revealed the presence of relational reasoning at all grade levels for both time points. However, the frequency and form of that reasoning varied by group, and there were differential shifts in reasoning patterns over the period of this study. In addition, there were unique patterns in students’ use of relational reasoning for familiar versus unfamiliar objects, although the role of familiarity was more influential. The implications of this longitudinal investigation of relational reasoning will be considered.

**A perfect match? Studying the role of source expertise and expertise type in claim evaluation**

**Keywords:** Argumentation, Literacy, Reasoning, Science education

**Presenting Author:** Eva Thomm, Faculty of Education, Germany

**Co-Author:** Rainer Bromme, University of Münster, Germany

Laypeople increasingly need to reason about science-related knowledge claims. A prime example are claims about health-related topics. Prior research underestimates the relevance of particularity two evidence types: both statistical and narrative evidence are shown to impact individuals’ assessments of claims. However, facing complex health-related topics, laypeople usually lack expert knowledge to directly assess claim validity. Instead they need to consider the credibility of the claim’s source. Accordingly they may assess evidence also in light of its origins. The present study aims to examine whether and how laypeople may link their understandings of evidence and of its source in order to make reasoned claim assessments. The study follows a 2x2 repeated-measures design with the within-participants factors source expertise and expertise type. In each condition undergraduates with low prior topic knowledge read an argument that consisted of a causal claim that was supported by either empirical or narrative evidence. Additionally each argument was said to be stated by either an expert or a layperson. Prior knowledge, claim credibility, claim agreement and source credibility are measured. The findings are analyzed regarding differences in assessments of claim credibility and source credibility depending on the interaction of evidence type and source expertise. Analogously differences in personal claim agreement are tested and related to credibility assessments. The findings contribute to current research which underscores the educational value for fostering individuals’ science literacy as the means to evaluate both knowledge claims and their sources. Educational implications will be deduced and discussed with regard to science education.

**Session B 47**

29 August 2017 15:15 - 16:45
Main Building A - A3
Single Paper

Higher Education

**Paper Presentation: Higher Education - C**

**Keywords:** Argumentation, Assessment methods and tools, Case studies, Communities of learners, Cooperative / collaborative learning, E-learning / Online learning, Educational Psychology, Higher education, Mathematics, Out-of-school learning, Qualitative methods, Self-regulation, Social interaction

**Interest group:** SIS 04 - Higher Education

**Chairperson:** Niklas Harring, Sweden

Do students’ subjective theories agree with Bookaerts’ Dual Processing Self-Regulation Model?

**Keywords:** Assessment methods and tools, Educational Psychology, Higher education, Self-regulation

**Presenting Author:** Sarah Grabler, Paris-Lodron University Salzburg, Austria

**Co-Author:** Eman Luc Pacz, University of Salzburg, Austria

In this paper the students’ subjective theories about self-regulated learning when working on their Master’s thesis will be compared with the Dual Processing Self-Regulation Model (PSR, Bookaerts, 2011).

For most students, writing a Master’s thesis is the first major piece of work which they have to do with only little support and supervision. Therefore, self-regulation is crucial to be successful. This can only be achieved if the students are aware of self-regulation principles, i.e., that they have concepts of self-regulation in their action-guiding subjective theories. In psychology and education, the DPSRM has been quite successful to account for such processes. The hypotheses state that (1) the elements in the students’ subjective theories about the regulation of their work on the Master’s thesis differ from those of the DPSRM, and (2) the relationships between these elements are comparable. The sample consisted of ten students in education who were working on their Master’s thesis. This sample offers the possibility to investigate students at a very high level of self-regulation requirements and even students who have learned a lot about learning itself during their academic studies. The results show some correspondences and some differences between the core elements of the DPSRM and the students’ subjective theories. The students have a clear picture of the Well-Being Pathway and Growth Pathway in their subjective theories. Conclusions are that training students for their Master’s thesis using Bookaerts’ model might consist in further developing and differentiating their previous concepts.
Challenges of student leaders as facilitators in learning communities

Keywords: Communities of learners, Cooperative / collaborative learning, Out-of-school learning, Social interaction

Presenting Author: Spencer Carlson, Northwestern University, United States
Co-Author: Matthew Eastern, Northwestern University, United States
Co-Author: Elizabeth Gerber, Northwestern University, United States

In schools, teacher-led learning communities (CLCs) stimulate a community of practice to provide student authentic experiences learning disciplinary practices. Undergraduate, student-led CLCs might also encourage students to develop leadership skills and qualities in professional communities of practice. However, there is a paucity of research on student-led CLCs. For student-led CLCs to develop disciplinary abilities, student-leaders must diffuse—persuade and teach peers to use—new practices. How do student-leaders diffuse new practices in student-led CLCs? In this ethnographic case study, we examined student-leaders’ attempts to diffuse a professional project management practice in a student-led CLC developed to teach design innovation project teams. To promote team progress, student-leaders introduced their own way of weekly project updates so teams would plan, reflect, and seek help effectively. We analyzed project diffusion attempt using a framework based on Rogers’ (2003) model of diffusion of innovations, which we augmented with codes from Gibbani and Goldstein’s (2004) review of factors that create social influence. We found student leaders struggled to diffuse the project updates practice and that some students became reluctant to use persuasive attempts to persuade peers. Meanwhile, while student-leaders capitalized on the social influence to get teams to do project updates, teams also influenced leaders to abandon project updates by voicing negative opinions about the practice. By integrating these findings, we contribute a new causal model for understanding diffusion practices in student-led CLCs that identifies key factors we must address to design student-led CLCs that teach both disciplinary and leadership practices.

Combining campus education with a MOOC: the case of an Innovation Management course

Keywords: Case studies, E-learning / Online learning, Educational Psychology, Self-regulation

Presenting Author: Bas Giesbers, Rotterdam School of Management, Erasmus University, Netherlands
Co-Author: Serge Rijdijk, Delft University of Technology, Netherlands
Co-Author: Sandra Langelveld, Rotterdam School of Management, Erasmus University, Netherlands

We investigated student evaluations and self-regulated learning (V = 158) in the context of a blended BSc course on Innovation Management, which combined campus education with a MOOC. Initial results show that there are no differences in student performance compared to the previous instance of the course. Though students seem quite satisfied with the course, the perceived level of self-regulation is both seen as a merit as well as a threat by students. Other points for improvement concern the quality of the learning material (namely the quality of narration in some of the videos), the amount and quality of interaction with teachers and fellow students. The level of self-regulation seems not to have a large influence, though further analysis still is required.

Student Perspectives on the Transition to Proof in Collegiate Mathematics

Keywords: Mathematics Education, Proof, Transition to Proof

Presenting Author: Mariana Levin, Western Michigan University, United States
Co-Author: John P. Smith, III, Michigan State University, United States
Co-Author: Youngjon Bae, Michigan State University, United States
Co-Author: V. Rani Sathyam, Michigan State University, United States

We report a qualitative analysis of 14 undergraduate students’ experience in a semester long introduction to proof course in the United States. Half were mathematics majors. Our research aims to characterize, conceptualize, and empirically, students’ transition from a focus on computation to proof in mathematics. Our analysis focused on how students saw the course as different from prior courses, how they described their work in it, and whether being successful in the course required new or different types of activity. We also asked students how they used proof in the course, while student-leaders capitalized on the social influence to get teams to do project updates, teams also influenced leaders to abandon project updates by voicing negative opinions about the practice. By integrating these findings, we contribute a new causal model for understanding diffusion practices in student-led CLCs that identifies key factors we must address to design student-led CLCs that teach both disciplinary and leadership practices.

Session B 48

29 August 2017 15:15 - 16:45
Pitts B - 84117
Single Paper
Assessment and Evaluation, Culture, Morality and Religion, Education and Emotion

Paper Presentation: Moral and Democratic Education - B

Keywords: Attitudes and beliefs, Case studies, Citizenship education, Emotion and affect, Higher education, Mixed-method research, Morality, Motivation and emotion, Parental involvement in learning, Quest for excellence, Science education, Secondary data analysis, Interest group, SIS 13 - Moral and Democratic Education

Co-Author: Regina Mutters, University of Regensburg, Germany

Emotional/moral episodes in university teaching: authenticity, authority, respect and loyalty

Keywords: Case studies, Emotion and affect, Higher education, Motivation and emotion

Presenting Author: Kathleen M. Quinnan, Centre for the Study of Higher Education, United Kingdom

Authentication of students’ emotions and aspects of moral purpose are under-researched. Assuming that teachers’ emotions are bound up with their moral purposes, this study investigates emotional/moral episodes in university teaching. The study draws on Graham, Noske, Haidt, Iyer, & Ditto (2011) moral foundation theory which postulates that there are five main moral concerns found across cultures: Harm/Care, Fairness/Reciprocity, Ingroup/Loyalty, Authority/Respect, and Purity/Sanctity. There has been disproportionate attention to concerns related to Care/Harm and Fairness/Reciprocity in educational literature in the social sciences. Moral foundations theory, therefore, expands research attention to include questions about Ingroup/Loyalty (to country, family and groups), which is vital for research on prejudice and identity). Authority/Respect (concerned with traditions, hierarchies, social roles and order), and Purity/Sanctity (concerned with standards of purity, decency, charity, and laws) as part of the moral realm. This paper examines a subset of 16 case examples of university teachers’ moral/emotional moments (written as emotionally evocative poems) that deal with authority/respect (n=8), ingroup/loyalty (n=6), or a combination of these two (n=4), drawn from a larger sample of 66 case examples of emotions in university teaching. This pairing of two moral concerns was the most frequent combination found in the larger set, suggesting its importance to the practice of university teaching. These particular moral concerns are also important insofar as identity and respect are central to authentic leadership, a key element in supporting students’ holistic development in higher education.

Task dependency of citizenship entitlement through education for responsible research and innovation

Keywords: Citizenship education, Morality, Quasi-experimental research, Science education

Presenting Author: Eleni Kyza, Cyprus University of Technology, Cyprus
Co-Author: Yiannis Georgiou, Cyprus University of Technology, Cyprus
Co-Author: Andrea Hadjichambis, Cyprus Center for Environmental Research & Education, Cyprus
Co-Author: Andria Ageolice, Cyprus University of Technology, Cyprus

Moral reasoning is a crucial aspect of citizenship education and can contribute to the development of democratic citizens. Nonetheless, little empirical research exists investigating secondary school students’ moral reasoning. This study seeks to contribute to this gap, by examining the task dependency of moral reasoning in two different disciplines (chemistry, biology) at two education levels (lower and upper secondary education). A quasi-experimental design was used to investigate task dependency. Four hundred and seventy-five students participated in this study. The intervention students (n=283) used materials on complex, socio-scientific issues, which raised opportunities for highlighting and discussing the ethical, societal and scientific dimensions. The four sets of materials (one for each level and discipline) were developed by their teachers who worked in disciplinary co-design groups. The matched control students (n=190) did not use any of the new materials but were taught their standard curriculum. Ethical reasoning was assessed using the validated Global Scientific Literacy Questionnaire (Mun et al., 2012) at two points in time. Statistical comparisons revealed the equivalency of the two groups. Results after the implementations mainly indicated no negative difference for the control group, and positive differences for the intervention students, which were, nonetheless, mediated by the context created by the learning materials. These results suggest that the development of moral reasoning is context-dependent. The analysis of the learning materials, in connection to these results, suggests design principles that can foster the development of moral reasoning in school contexts.

Environmental attitudes in parents and students – a cross-cultural comparison

Keywords: Attitudes and beliefs, Parental involvement in learning, Science education, Secondary data analysis

Presenting Author: Nina A. Jude, German Institute for Int. Educational Research, Germany
Co-Author: Nina Rozen, German Institute for International Educational Research (DIPF), Germany
Co-Author: Sorja Bayer, German Institute for International Educational Research (DIPF), Germany

Climate change is regarded as one of the central global challenges. To address this challenge, it is necessary to take action at the political and at the individual level. To advance behavior that aims at combating climate change, different preconditions of that behavior and their interrelations need to be understood. The Programme for International Student Assessment provides data to analyze these interrelations (considering both the family and the school perspective). Our analyses are built on PISA 2006 data from N = 75,000 students and parents from 16 countries. We consider questions addressing awareness, opinion and concern regarding environment-related issues as well as interest in the natural sciences. We examine whether these scales can be compared across countries. We furthermore test the anticipated structure of doubt, awareness, opinion, and concern among parents and students, respectively, using multi group structural equation modeling. Analyses of the factorial invariance reveal that correlations may be compared between countries (metric invariance), however, it is not possible to compare mean values (scalar invariance). As regards the interplay between different environmental dispositions in parents and students, besides the already known positive correlation between students’ and their parents’ optimism as well as between interest and awareness and the negative correlation between students’ awareness and their optimism, only small connections between students’ and parents’ optimism, awareness, concern and interest are found in most countries. By offering insights into the interplay between different environmental dispositions, we provide information that helps to more effectively promote sustainable behavior in different contexts.

Assessing Emotions and Moral Functions - Moving beyond the Happy Victimizer Paradigm

Keywords: Emotion and affect, Mixed-method research, Morality, Motivation and emotion

Presenting Author: Eveline Gutzwiller Hefelfinger, University of Teacher Education of Lucerne, Switzerland
Co-Author: Brigitte Latzko, University of Leipzig, Germany
Co-Author: Carmen Armin, University of Teacher Education of Lucerne, Switzerland
Co-Author: Romy Schneider, University Leipzig, Germany
Co-Author: Lydia Köttner, University Leipzig, Germany

The present contribution discusses approaches for investigating moral emotions in adolescents and adults. Research on moral emotions and their development has followed several, often unrelated strands within various disciplines. In the developmental literature, one predominant approach has been the so-called Happy Victimizer Paradigm (HVP), encompassing the study of the relationship between moral rule
knowledge and moral emotion attributions, mainly in young children. More recently, HV Research has been conducted with adolescents and adults, necessitating a re-consideration of the general measurement paradigm to explain the complexity of moral functioning in adolescence and adulthood. We discuss the need for (a) a developmentally appropriate, enriched measurement approach involving a more profound conceptualisation of the cognitive and emotional dimensions of morality as well as their interplay; and (b) the need of including the biological/physiological dimensions of moral experience and functioning in the context of naturalistic moral conflicts. We introduce two measurement approaches to address these considerations. The first relates to an enriched assessment of adolescents’ moral functioning and was implemented in a qualitative interview study (study 1). The second approach focuses on physiological/biological dimensions in the context of naturalistic moral conflicts and is in preparation (study 2). By outlining the limitations of the predominant HVP, we discuss the potentials of enriched assessment methods allowing for a more holistic, developmentally appropriate measurement of adolescents’ and adults’ moral functioning. This is important for education and teacher education, as socio-moral and socio-emotional functioning has an impact on social relationships in the classroom and students’ academic achievement.

Session B 49
29 August 2017 15:15 - 16:45
Linna - K108
Single Paper

Educational Policy and Systems; Learning and Special Education

Paper Presentation: Educational Evaluation, Accountability and School Improvement


Interest group: SIG 23. Educational Evaluation, Accountability and School Improvement

Chairperson: Eva Vass, Australia

School-to-school collaboration as a school improvement strategy

Keywords: Achievement, Educational policy. Quasi-experimental research. School effectiveness

Presenting Author: Daniel Mulas. University of Southampton, United Kingdom

Research is increasingly showing that, under the right circumstances, collaboration can be an effective way of developing and improving schools and their capacity. It is, however, not a panacea for school improvement, and other studies show a lack of effect. This therefore begs the question of not so much whether, but under what circumstances collaboration can be a successful school improvement model. In this paper we will explore two such models, with a particular emphasis on determining the extent to which they effectively lead to improvement in school (attainment) outcomes, and what factors are related to the success or failures of these models. Both programmes were evaluated using secondary data analysis of large-scale databases, and employed propensity score matching methods to create matched comparison samples, thus creating a quasi-experimental design. Results showed that intervention 1 was not related to improvement in school attainment outcomes over time, regardless of type of school. In intervention 2, however there was a significant relationship between participation in the intervention and improvement in attainment in the supported schools in both contexts. The implications of these findings relate to the theoretical models described earlier in providing support to a more limited model of collaboration, linked to concepts prevalent in High Reliability theory, and social capital, and to a lesser extent, constructivist organizational models.

To lead school development towards inclusion - changes in school culture, norms and practice

Keywords: Aspects of learning and teaching effectiveness, Social aspects of learning and teaching. Teacher Professional Development, Workplace learning

Presenting Author: Magnus Erlandsson, Malmö University, Sweden

This paper elaborates on school leaders’ strategies in efforts to change school culture and teachers’ professional norms with the objective to alter educational practice. The point of departure is the opportunities and obstacles that emerged in a large-scale program (with over thirty participating schools in twelve different municipalities) launched for the implementation of inclusive learning environments. The paper has an organisational cultural theoretical approach, focusing on how to change teachers’ practices through the change of school culture and teachers’ professional norms. Empirical data has been collected through several recurrent interviews with school principals, as well as coordinators and evaluators at the municipal-administrative levels. The results highlight the importance of a shared and delegated leadership between different levels and units. Successful implementation rests on the participation of many – school leaders, educators and pupils – and their possibilities to influence the processes and take joint responsibility. As the study shows, this is not developments or practices that can be forced, through binding rules or new formulations in policy documents. The change in professional norms – a prerequisite for changes in practices – must grow from below, using the impulses, inspiration and legitimacy from the levels of principals, but where changing norms and renewed practice should find its forms through a shared, delegated and collegial leadership.

Changing policy, legislation and its effects on educational leadership: a comparative study

Keywords: Comparative studies. Culture. Educational policy. Qualitative methods

Presenting Author: Jiří Kropáč, Palacký University, Czech Republic

Co-Author: Stefan Chudy, Faculty of Education, Palacký University, Czech Republic

Co-Author: Danping Peng. Faculty of Education, Palacký University, Czech Republic

The relationship between school development and changing policy is in constant flux which adds to the complexity of school leadership. Based on investigation of the theories surrounding headteacher's pedagogical leadership, the main purpose of this study is thus to explore the quality of pedagogic leadership in schools providing compulsory education under current policies. A semi-structured interview was used on 10 headteachers. 5 are from Sichuan Province in China and 5 are from Oломouc region in Czech. Results show that the current educational policies in China and Czech are both supportive to the development of pedagogical leadership, and four dimensions of pedagogical leadership are significantly affected by changing policies. Despite that, the education policy implementation processes do not always support school development, which is a growing need to pay more attention to the effective and sustainable development of pedagogical leadership.

Keywords: Policy. school development; pedagogical leadership; policy implementation; comparative study

Measuring Learning, Governing Education

Keywords: Educational Technology, Higher education. Learning analytics. Synergies between learning - teaching and research

Presenting Author: Asko Kauppinen, Malmö University, Sweden

In this paper we discuss the recent trend of measuring learning and its effects on shaping conceptions of education. We start by looking at the use of digital tools for teaching writing, and how these can be used to generate analytics to track evidence for learning, development and the success or failure of educational interventions. We then look at how these analytics are used to launch, for example, evidence-based curriculum changes. We further connect this micro-level trend of measuring learning to a larger trend of using evidence-based models for governing educational pursuits. In fact, we suggest that measuring learning should not be seen as a separate educational phenomenon, but is indicative of a larger change in governance, where scientific methods are called for to evaluate inputs, and practices are shaped to provide data that qualifies as evidence for the success or failure of inputs. If practices do not produce acceptable measurements for evaluation, eventually, they have no right to exist.

Session B 50
29 August 2017 15:15 - 16:45
Linna - Vänrik Linna (K104)
Single Paper

Culture, Morality, Religion and Educational Instructional Design

Paper Presentation: Numeracy, STEM and Values Education


Interest group: SIG 09 - Phenomenography and Variation Theory, SIG 19 - Religious and Spiritual Education

Chairperson: Anja Linberg, University of Bamberg, Germany

Do Mathematically Skilled Adults Have a Sense for Irrational Numbers?

Keywords: Cognitive development, Cognitive skills, Mathematics, Numeracy

Presenting Author: Andreas Obstner, University of Education Freiburg, Germany

Co-Author: Veronika Hofreiter, Technical University of Munich, Germany

Number sense requires at least an ability to assess magnitude information represented by number symbols. Most educated adults are able to assess magnitude information of rational numbers fairly quickly, including whole numbers and fractions. It is to date unclear whether educated adults without training are able to assess magnitudes of irrational numbers, such as the cube root of 41. In a computerized experiment, we asked mathematically skilled adults to repeatedly choose the larger of two irrational numbers as quickly as possible. Participants were fairly accurate when reasoning about the exact or approximate value of the irrational number components yielded the correct response. However, they performed at random chance level when these strategies were invalid and the problem required reasoning about the irrational number magnitudes as a whole. Response times suggested that participants hardly even tried to assess magnitudes of the irrational numbers as a whole. We conclude that even mathematically skilled adults struggle with quickly assessing magnitudes of irrational numbers in their symbolic notation. Without practice, number sense seems to be restricted to rational numbers.

Coherence in Pluralistic Societies and Public Education. A Framework Based on Rawls and Habermas

Keywords: Citizenship education, Reflective society, Religious studies, Values education

Presenting Author: Manfred L. Pomer, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

The paper is based on the hypothesis that the question of social philosophy of ‘how citizens who remain deeply divided on religious, philosophical, and moral doctrines, can still maintain a just and stable democratic society’ (John Rawls) corresponds with the question discussed in educational philosophy of how a consensus on major objectives of public education can be reached. It is demonstrated, how the two recently most influential social theories, those developed by John Rawls and Jürgen Habermas can provide guidelines for dealing with worldviews and cultural diversity in the context of public education. Rawls’ concepts of ‘public reason’ and ‘overlapping consensus’ provide a framework for conceptualizing productive interrelationship between basic ‘(thm’) political values, such as international human rights values, and strong ‘(thql)’ ethical values of particular worldview or religious communities that challenges and demands public education. With his concepts of ‘complementary learning processes’ of religious
and nonreligious citizens and inter-worldview "translations" Habermas further develops and concretizes Rawls' ideas. Both philosophers' vision of a pluralistic as opposed to a secularistic society and world can encourage the vision of pluralistic instead of secularistic public schools. On the basis of human rights values public education can be open to admit various worldviews and promote critical as well as dialogical processes of learning from one another.

The Effect of an Integrated STEM Intervention on Attitudes towards STEM

Keywords: Attitudes and beliefs, Integrated learning, Quantitative methods, Quasi-experimental research

Presenting Author: Haydée De Loof, University of Antwerp, Belgium

Co-Author: Annie Stuyt, University of Antwerp, Belgium

Co-Author: Jelle Boeke de Pauw, University of Antwerp, Belgium

Co-Author: Peter Van Petegem, University of Antwerp, Belgium

Despite the insufficient evidence of students in STEM-oriented study programs in secondary education, few students are choosing STEM in higher education. Previous research has highlighted the importance of attitudes towards STEM when it comes to choosing a career or study. Research has demonstrated that an integrated approach to STEM education could increase STEM-literacy, interest, and engagement. However, less attention has been given to students' attitudes towards STEM as an outcome measure. The goal of this study was to measure the effect of an integrated STEM intervention on attitudes towards STEM. The study involved a quasi-experimental design in which participants (N = 978, age = 14-15) attended secondary education in 38 different schools (26 experimental schools and 12 control schools). Outcomes were measured quantitatively through an online questionnaire using an adapted version of the validated PATT survey, and the obtained data were analyzed relying on a multilevel approach. The multilevel model revealed that students in the experimental condition of integrated STEM education reported more positive attitudes towards STEM than those in the control group. The effect sizes of type of STEM education were medium to large. This study indicates that integrated STEM education is an effective way to improve students' attitudes towards STEM. Suggestions for future research are discussed.

Learning to know how many six are: a preschool intervention study that targeted the relationship of numbers

Keywords: Design based research, Early childhood education, Numeracy, Phenomenography

Presenter: Angelika Kulberg, University of Gothenburg, Sweden

In this paper we report on a year-long intervention from a one-year-old program with preschool teachers trying to enhance children's knowledge of the first ten numbers and arithmetic skills. The aim of the research was to investigate preschool children's conception of number(s) and how these can be developed through participating in a theoretically driven pedagogical approach. Here we build on previous research and the idea that to avoid mathematics difficulties children need strategies that direct their attention to "manyness" of numbers and numbers' part-part whole structure. The study consists of task-based interviews with 103 4-5-year-old children aiming to establish children's knowledge of numbers and strategies for arithmetic problem solving, and designed activities conducted by preschool teachers with 65 of the children during one preschool year. This particular paper focuses on the learning outcomes revealed among the participating children, e.g. how children experience the "manyness" of six and its part-part whole relation before and after the intervention.

Session B 51

29 August 2017 15:15 - 16:45

Poster Session I

Single Paper

Higher Education

Promotion of Representation: Higher Education - H

Keywords: Attitudes and beliefs, Engineering, Higher education, Qualitative methods, Student learning, Teaching approaches, Technology, Writing / Literacy

Interest group: SIG 04 - Higher Education

Chairperson: Esther Zieliger, ETH Zurich, Switzerland

The impact of space on teaching - exploring ways to investigate teaching from a spatial perspective

Keywords: Attitudes and beliefs, Higher education, Qualitative methods, Teaching approaches

Presenting Author: Rie Trolsen, SDU Center for Teaching and Learning, Denmark

Space works on its occupants and so both students and teachers are influenced by the physical contexts in which learning occurs. However, so far focus on the furnishing of classrooms (and built environment as a whole) in universities as being of importance to student learning experience has not been overwhelming: in this paper findings from a small scale research project are presented aiming at investigating the influence of spatial conditions on teachers' views on teaching and learning. The research project for this book builds on Latour's((1991) spatial field: the perceived, the conceived and the lived space. Semi-structured interviews with four teachers on their expectations, intentions and experiences with a certain learning space were conducted and as part of the interviews, the teachers were asked to describe the learning space by sketching it. Additionally, teaching situations in the learning space concerned was observed. The results show teachers including considerations on space in their planning and conduction of teaching. The four teachers interpret, however, the possibilities and limitations of the spaces in very different ways. Some focus on the distribution between floor space and tables in the learning space while others focus on the space's technical devices as opposed to its whiteboards. The findings point to recommendations of creating ownership for teachers and students of a learning space and its resources in order to enhance teaching that uses the full potential of a given space.

Developing Students' Understandings of Graduate Student Attributes aligned with Academics' Understandings?

Keywords: Attitudes and beliefs, Higher education, Qualitative methods, Student learning

Presenting Author: Heather Kanuka, University of Alberta, Canada

Co-Author: Bamira Ekaia, University of Alberta, Canada

Co-Author: Summer Cowley, University of Alberta, Canada

Co-Author: Annette Heighton, The University of Alberta, Canada

The purpose of this study was to gain insights on: (a) how academics and undergraduate students understand graduate student attributes and (b) the extent of agreement between undergraduate students and academics on attributes that are available in a university education. Using qualitative data collection techniques, this study conducted an open-ended interview with academics and students at a Canadian university (n=40). The results suggest that both students and academics have varied understandings of graduate student attributes. Academics in this study tended to believe that student attributes are useful in articulating the value of a university education, though most do not believe they can be measured as outcomes. Without evaluation and assessment data, most academics consider student attributes outside the scope of their mandate and expertise. Alternatively, the students tended to enthusiastically embrace the notion of attributes, believing their attributes are acquired as they progress through their undergraduate programmes. The differences observed between students and academics is important to note: (1) there is a rather wide range of differences in understandings of what student attributes are significant to an undergraduate programme and (2) whether students acquire these attributes through the course of their programmes of study. Based on the findings of this study, future research needs to begin addressing the issue of measuring and assessing GSAs in Canada. Such a process might begin with a shared understanding of institutionally initiated GSAs with constructs that have clearly defined meaning and units of measurement. As such, one does not have a curriculum.

Multi-drafting and procrastination in online learning among L1 and L2

Keywords: Higher education, Student learning, Technology, Writing / Literacy

Presenting Author: Miriam Sand, Western Galilee College, Israel

Co-Author: Yehuda Peled, Western Galilee College, Israel

Co-Author: Vered Vaknin, Western Galilee College, Israel

The aim of the current research was to examine L1 and L2 college students' attitudes toward web-based method of learning (based multi-drafting) and the procrastination of academic assignments among Israeli Arab students for whom Hebrew is a second language (L2), compared with those of Israeli students for whose first language is Hebrew (L1). We assumed that on-line Multi-drafting would be more meaningful for students who study in a second language and are likely to have problems in the organization of discourse

Two hundred eighty-four college students participated in the study. Attitudes toward multi-drafting and procrastination were measured using self-report questionnaires.

Unexpectedly, results indicated that L1 are more likely to perceive on-line multi-drafting as a reasonable way of learning than L2 are, mainly in first-year of studies while L2showed more positive attitudes toward on-line multi-drafting than did L1 in the second/third year. L2 procrastinated in the completion of tasks during their first year of study more than L1 did.

The results that suggest in the first year of study L2students face a different language barrier and must adapt themselves to the new academic requirements of the college. Therefore, they cannot take advantage of on-line assistive devices (extra time or repeated submission of papers) to improve their grades.

Active learning methods in higher education (STEM): Systematic literature review

Keywords: Engineering, Higher education, Student learning, Teaching approaches

Presenting Author: Susanna Hartikainen, Tampere University of Technology, Finland

Co-Author: Heta Pinta, Tampere University of Technology, Finland

Co-Author: Pasi Nokelainen, Tampere University of Technology, Finland

This systematic literature review provides a current overview of the empirical research concerning active learning in the context of higher education. The study focuses on the EARLI domain of Learning and Instruction in higher education (SIG04) in the field of science, technology, engineering and mathematics (STEM). Active learning is a constructivist learning approach in which, instead of only absorbing knowledge, students construct new knowledge (Michaels, 2006; Tytela, 1999). Teaching thatAnimating the research of students construct new knowledge (Michaels, 2006; Tytela, 1999). Teaching that

Session B 52

29 August 2017 15:15 - 16:45

Library 103

Single Paper

Assessment and Evaluation
As a learning process, feedback is substantially dependent on what students do. Despite an extensive literature on feedback, including research into the effects of different types of feedback information on student performance, there is limited evidence on the student role in effective (or ineffective) feedback. We undertook a large-scale survey into student experiences in two Australian universities and asked them to give examples in their very recent studies of feedback that was effective or ineffective. Responses were analyzed using a framework derived from desirable roles of students identified in existing conceptual models of feedback. Most features of effective feedback were present to some extent in our data; however, ineffective feedback was often characterized by poor quality feedback information or designs that inhibited students from taking on these effective roles. This study provides empirical support to existing conceptual models, such as Feedback Mark 2 and sustainable feedback.

Examining Dimensionality in Word Problem Performance and Difficulty of Word Problem Types

Keywords: Cognitive skills, Mathematics, Problem solving, Quantitative methods

Presenting Author: Normanus Puungosak, University of Turku, Finland

Co-Author: Anu Kajemies, University of Turku, Finland

Co-Author: Koen Veermans, University of Turku, Finland

Co-Author: Minna Hannula-Sormunen, University of Turku, Finland

Co-Author: Kaiju Leltta, University of Turku, Finland

Co-Author: Marja Vauras, University of Turku, Finland

Co-Author: Emri Lehtinen, University of Turku, Finland

For many students, word problems are notoriously challenging to solve. In attempts to understand students’ difficulties in solving word problems, several cognitive models that identify (required) processes that explain successful performance have been proposed. These models indicate that the processes of solving regular word problems require students to use not only mathematical skills, but also other cognitive skills such as reading and comprehension. In some of the most challenging word problems, students also need to apply realistic reasoning in the modeling process. Based on these models, it seems reasonable to assume that students’ performance on word problems can be considered as multidimensional constructs, and difficulty level of word problems depends on how complex the cognitive skills required to use. The aim of the present study was to (1) test hypotheses concerning dimensionality of students’ performance on word problems, and (2) assess (order of difficulty) of three types of word problems: routine, non-routine, and application word problems by using item response theory (IRT) modeling. Surprisingly, tests of unidimensionality indicate that students’ performance on word problems can be explained by one-dimensional construct. Moreover, the results of IRT models do not show a clear distinction among word problem types, and reject the hypothesis that the application word problems, theoretically demanding more complex solution processes, have a higher difficulty level than routine word problems.

Assessment and feedback in Higher Education: Findings from an empirical study in Portugal

Keywords: Assessment methods and tools, Higher education, Learning approaches, Self-regulation

Presenting Author: Diana Pereira, University of Minho, Portugal

Co-Author: Maria A. Flores, University of Minho, Portugal

Co-Author: Ana Veiga Simão, Faculty of Psychology, University of Lisbon, Portugal

Co-Author: Alexandra Barros, University of Lisbon, Portugal

This paper draws upon a broader piece of research on assessment in higher education, particularly focusing on issues regarding the fairness and effectiveness of the assessment methods and their impact on the learning process and the student methods and self-regulation of learning. In total, 624 students participated in this study in five Portuguese Public Universities in different areas of knowledge and programmes. Data were collected through questionnaires. Findings suggest that assessment is seen as more difficult by students when it is through the use of learner-centred assessment methods rather than by traditional assessment (e.g. written tests or exams). The students also claim that they devote more time to study when assessment is performed through learner-centred assessment methods than by traditional ones. The most used assessment methods are written tests and oral presentations in groups. Regarding feedback, the most revealing feedback approach was through written feedback. Moreover, participants who are assessed through learner-centred methods claim to be more effective in all phases of self-regulation learning than students who are assessed through traditional methods. Implications of the findings regarding assessment and feedback in Higher Education are discussed.

Session B 53

29 August 2017 15:15 - 16:45
Pinus-B - B316

Single Paper

Teaching and Teacher Education

Paper Presentation: Teacher Professional Development - C

Keywords: Developmental processes, Emotion and affect, Mathematics, Motivation and emotion, Pre-service teacher education, Qualitative methods, Social aspects of learning and teaching, Teacher Effectiveness, Teacher Professional Development, Teaching / instruction

Interest group: SIG 11 - Teaching and Teacher Education

Chairperson: Ronald Reinhardt, University of Northern Iowa, United States

Teacher who perceives low student engagement use for fear appeals prior to a high-stakes examination

Keywords: Emotion and affect, Mathematics, Teaching / instruction, Motivation and emotion

Presenting Author: Dave Paukiew, Liverpool John Moores University, United Kingdom

Co-Author: Laura Nicholson, Edge Hill University, United Kingdom

Prior to high-stakes examinations teachers use messages that focus on the importance of avoiding failure (fear appeals). Previous studies have examined those factors that influence the appraisal of fear appeals and the educational outcomes. However, studies have yet to examine the possible reasons why teachers might use fear appeals. One possibility is that teachers believe their students are engaged with their learning. The present study examined whether teacher use of fear appeals was related to their perceptions of student engagement, followed by students’ interpretation of fear appeals, and how they related to the students’ reported engagement. Data were collected from 3061 students in their final two years of secondary schooling and 49 teachers responded for mathematics instruction. A structural equation model showed that teachers used more frequent fear appeal in the mathematics lessons when they perceived student engagement to be low. More frequent fear appeals resulted in stronger challenge and threat appraisals. A challenge appraisal was associated with greater, and a threat appraisal with lower, behavioral and emotional engagement. Indirect relationships were shown from teachers’ perception of behavioural engagement to subsequent student-reported engagement mediated by fear appeals frequency and student appraisal. Student appraisal seems to determine the effectiveness of fear appeals. This makes them a risky strategy for teachers who may not be able to accurately determine which students might appraise them as a challenge.

The effects of generic and profession-specific teacher variables on instructional quality

Keywords: Pre-service teacher education, Teacher Effectiveness, Teacher Professional Development, Teaching / instruction

Presenting Author: Franziska Baier, Goethe-Universität Frankfurt, Germany

Co-Author: Mareike Kunter, Goethe-Universität Frankfurt, Germany

Co-Author: Anna-Theresa Deckert, Goethe-Universität Frankfurt, Germany

There is still research lacking on the question of what traits, skills and qualifications teachers must bring to the job in order to provide their students with high quality instruction. Only few studies have investigated several cognitive as well as non-cognitive generic and profession-specific variables at the same time. In the present study we investigated general personal characteristics (personality and cognitive ability) as well as profession-specific aspect such as knowledge and job-related motivation of 209 mathematics teacher candidates. After 14 months of teaching experience 4,672 students of these teachers from grades 7 to 10 rated their instructional quality in terms of adaptive facilitation, emotional support, classroom management and discursive treatment of different student solutions. Multilevel structural equation modeling showed a positive effect of extraversion on adaptive facilitation, emotional support and discursive treatment of different student solutions. Conscientiousness had a positive effect on classroom management. Emphasis for teaching had positive effects on all measures of instructional quality but discursive treatment of student solutions. Teacher candidates’ pedagogical knowledge had
a positive effect on adaptive facilitation and emotional support whereas unexpectedly pedagogical content knowledge had a negative effect on adaptive facilitation. The results point to the importance of taking into consideration teacher candidates’ non-cognitive characteristics such as personality traits as well as fostering teacher knowledge and motivation through high quality teacher education programs.

On the road to teachership: Student teachers’ identity negotiations in the pedagogical studies

Keywords: Pre-service teacher education, Qualitative methods, Social aspects of learning and teaching, Teacher Professional Development

Presenting Author: Maarit Arvaja, University of Jyväskylä, Finland
Co-Author: Anneli Sarja, University of Jyväskylä, Finland
Co-Author: Matti Taajamo, University of Jyväskylä, Finnish institute for educational research, Finland

This study, which is situated in the context of yearlong pedagogical studies for subject student teachers, explores how the students develop their professional identity in making sense of the pedagogical studies. The focus was also interested in how the students negotiate the past, the present and their future in becoming a teacher, and how the self and others are negotiated in the becoming teachers’ identities. The group of five university students from different disciplines (biology, languages, mathematics and history) was selected as a focus group for the study. Data were gathered through semi-structured interviews briefly after the pedagogical studies had ended. Taking a dialogical approach to narrative self-construction the study investigated the relationship between different I-positions of the self and between the self and others in the student teachers’ identity negotiation. Especially, this relationship was analyzed with reference to the process of positioning as evidenced in the interviews. The study demonstrated how students’ biographical history strongly contributed to their perceptions of future work, and played a pivotal role in building and renegotiating their identities as becoming teachers. The study also proved the importance of pedagogical studies in contributing not only in building one’s I-position as a subject teacher but also in building one’s identity as an educator. It can be said that the students found their ‘authenticity’ as a teacher learning on values and purposes that transcend their own subjectivity and also (morally) relates to an inner commitment to certain values.

Teacher Students’ and Mentors’ Orientations – How Differences Influence Professionalization

Keywords: Developmental processes, Pre-service teacher education, Qualitative methods, Teacher Professional Development

Presenting Author: Julia Kosinar, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland
Co-Author: Anna Laros, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

In a first step, the project ‘Challenges for future primary teachers in their field studied (School of Teacher Education, Switzerland 2014-2017)’ pursues the goals to 1. analyse the process structure of professionalization during traineeship and 2. to identify types of professionalization. The study using an occupational-biographical perspective is based on the theory of experiential learning (Combe 2010) which allows tracing steps from perceived critical incidents through to their (eventual) solutions. The empirical data consists of narrative-style interviews with teacher students at the end of their three-years study. 14 cases were reconstructed with the qualitative approach of the documentary method (Bohnack 2010, Nihr 2013): The analyses were guided by three comparative dimensions aimed to four different so called relational types, labelled as “Personal fulfillment”, “Avoidance”, “Development” and “Projection”.

In a second step, the relation between the student’s orientations concerning their field experiences (taking it e.g. as an option for their professional development or as an examination period) and the role they attribute their mentors (e.g. as supporters, assessors or experts) was further analysed. The results show that different meanings given to the mentor’s role by teacher trainees and their school-mentors, may lead to tensions. It tensions occurred, processes of professionalization were hindered. In our contribution, we present our typology as well as two case studies to give further insights in specific dynamics.

Session B 54
29 August 2017 15:15 - 16:45
Venue:
Single Paper
Learning and Social Interaction

Personalized Learning: Computerized Learning and Social Interaction

Keywords: Cognitive development, Cooperative / collaborative learning, Educational Psychology, Informal learning, Knowledge creation, Out-of-school learning, Secondary education, Social aspects of learning and teaching, Social development, Social interaction, Student learning
Interest group: SIG 10 - Social Interaction in Learning and Instruction
Chairperson: Susan Goldman, University of Illinois at Chicago, United States

Academic help seeking: The case of French lower secondary students

Keywords: Educational Psychology, Secondary education, Social interaction, Student learning
Presenting Author: Minna Piispanen, INS HEA, France
Co-Author: Christine Bezin, University of Picardie Jules Verne, France

Student academic help seeking has been studied intensively since the publication of Nelson-Le Gall’s (1981) eminent paper. However, most research has focused on elementary and university students. Our aim was to collect data on French lower secondary students’ help-seeking behavior. More specifically, our aims were to (1) identity the reasons that push lower secondary students to seek help (or not) for their schoolwork; (2) verify whether mathematics, which has been shown to be one of the disciplines that trigger the most help seeking in elementary classrooms, triggers the most help seeking at the lower secondary school level; and (3) investigate which distant communication devices lower secondary school students use for their academic help seeking outside the classroom. One hundred students attending two French rural lower secondary schools participated in this study. They completed a questionnaire tapping their academic help-seeking behavior both in and outside the classroom. The most frequently cited reasons for help seeking in the classroom included getting an explanation for something one has not understood and allowing one to make progress. The discipline that was cited the most often for help seeking in the classroom was mathematics; the second most cited discipline was French, and the third one was history geography. The results further showed that most students declared using phone calls and SMS for help seeking outside the classroom; the other distant communication devices cited were Facebook, Skype, specialized sites, and email. Gender differences were observed. The implications of our results for future research are discussed.

Transformative agency as warping: Expanding on Vygotsky’s principle of double stimulation

Keywords: Cooperative / collaborative learning, Informal learning, Social aspects of learning and teaching, Knowledge creation
Presenting Author: Annapina Sannino, University of Helsinki, Italy

Under pressures of the capitalist mode of production, ‘learners’ activities are faced with increasing difficulties and uncertainties. Drawing and expanding on Vygotsky’s principle of double stimulation, this study develops a concept of transformative agency understood as a dynamic anchoring process similar to the navigation procedure called “warping.” This is a process of step-by-step material grounding accomplished with the help of mediating tools and enabling actions which subsequently gain momentum and allow movement out of imprisoning and paralyzing developments in everyday activities. Examples from different three settings of empirical inquiries are used as illustrations of how transformative agency comes about in a warping manner. Warping is a special mode of anchoring consisting in throwing the anchor onto the surface, pulling it for moving the vessel toward the desired direction. Medialional means constructed and mobilized to face pressing conflicts of motives in the learners’ activities in the three examples are similar to the warping anchors. Potentially they can activate knowledge and actions transcending troubled activities toward novel but at the same time grounded perspectives.

Controversy mapping: Navigating and mediating issues of concern

Keywords: Cognitive development, Cooperative / collaborative learning, Social development, Knowledge creation
Presenting Author: Anne Solli, University of Gothenburg, Sweden
Co-Author: Mark Elam, University of Gothenburg, Sweden

Controversy mapping (CM) is a research and teaching method derived from the field of Science and Technology Studies. It is adopted to explore and represent current sociotechnical controversies such as hydraulic fracturing or vaccines (Vendrus & Lattu, 2010). As a teaching method it can be used to observe and explore such controversies, as they appear online in all their complexity/through the extraction and analysis of digital data the methods provide means to display complex knowledge in condensed and readable form. In this study, we followed how CM was introduced and used in two upper secondary classes working with socio-scientific controversies (Sadler, 2011). What we found was that the students were challenged in mapping anew as representing controversies. To be able to discuss and navigate the complexity, the controversy needs to be visually readable and comprehensible. The method offers algorithmic means which reduce complexity by visually suggesting how different sites online are related and how they can be sorted and ordered as having more or less influence. However, cataloging stakeholders also becomes an act of re-presenting the controversy – and hence needs to be justifiable. In line with Vygotsky (1978) the maps mediate action and support students’ agency as they account for and explain the controversy to their peers. In this manner the very methods and tools employed in the CM activity will be transformative in the sense that they reconfigure the students as well as the issues they are working on.

Temporal and spatial artifacts for formative agency and expansive learning in a food cooperative

Keywords: Cooperative / collaborative learning, Out-of-school learning, Social aspects of learning and teaching, Knowledge creation
Presenting Author: Yrjo Engström, University of Helsinki, Finland

Although double stimulation is a foundational aspect of expansive learning, empirical studies of steps of double stimulation and analyses of expansive learning actions have thus far remained separate. The first task of the paper is to bring together these two lines of analysis. The second task is to examine the dynamics of temporal and spatial artifacts in double stimulation and expansive learning. The paper analyzes learning in the Hietisniemi Food Cooperative facing the persistent problem of securing sufficient income to continue functioning. This conflict is seen as the first stimulus. We conducted an intervention in which two artifacts were offered as potential second stimuli for the board of the cooperative: an interactive electronic timeline (temporal artifact) and an interactive electronic map (spatial artifact). We analyzed the transcripts of the intervention and subsequent 13 meetings of the board. Before the intervention, the board members were paralyzed by their conflict of motives, repeatedly questioning their mode of activity (the first action of expansive learning). The introduction of the artifacts triggered a process in which expansive learning actions – modeling, examining, and implementing the model - occurred already in the intervention session. The artifacts were appropriated as second stimuli.
However, after the intervention, reference to the artifacts was made only sporadically. It seems that double stimulation went only half way. However, a closer analysis is needed to determine whether the participants constructed their own second stimulus and carried forward the process relying on those rather than on the artifacts offered to them.

Session C 55
30 August 2017 08:30 - 10:00
Vita: 114
Poster Presentation
Lifelong Learning, Motivational, Social and Affective Processes

Poster Presentation: Motivation, Emotion and Self-regulation
Keywords: Achievement, Assessment methods and tools, At-risk students, Content analysis, Developmental processes, Doctoral education, Educational attainment, Educational Psychology, Educational Technology, Emotion and affect, Higher education, Motivation, Motivation and emotion, Qualitative methods, Secondary education, Self-regulation
Interest group: SIG 08 - Motivation and Emotion, SIG 19 - Religious and Spiritual Education, SIG 24 - Researcher Education and Careers
Chairperson: Erhan Siray, Toronto District School Board, Canada

Perception of the Contribution of the Mindfulness Program to Class Climate in Elementary School
Keywords: Developmental processes, Educational attainment, Self-regulation, Motivation and emotion
Presenting Author: Esther Grotgold, Achva Academic College, Israel
Co-Author: Shirley Gelman, Achva Academic College, Israel
Co-Author: Aretla Tseich-en-Weinberg, Achva Academic College, Israel

Mindfulness is the awareness that arises out of paying willful attention, at the present moment, and in a non-judgmental manner. The present study examined the perception of the contribution of the Mindfulness Program to class climate in elementary school. Semi-structured interviews were held with fifth and sixth graders who have been practicing mindfulness for the past two years. The students perceive the mindfulness language as a tool that enables them to delay their reaction, cope with conflicts in a non-violent manner, cooperate and feel efficacious and safe. These skills contribute to the creation of a pleasant and safe climate for the students in the class.

Mediating Role of Need Satisfaction between Classroom Goal Structures and Educational Functioning
Keywords: Educational Psychology, Higher education, Motivation, Motivation and emotion
Presenting Author: Ayasun Alp, Middle East Technical University, Turkey
Co-Author: Alkatekin Mithou, Bilkent University, Turkey

The goal-related messages in a classroom are associated with students' experiences and functioning in learning. In the present study, we investigated in a sample of 171 Turkish university students (60% females; \( M_{\text{age}} = 19.79, \text{SD} = 1.68 \)), the relation of classroom goal structures to students' educational satisfaction and state flow through their experience of need satisfaction. Hierarchical regression analysis showed that mastery-approach (MaP) goal structures (i.e., classroom environment focuses on learning and self-improvement) and performance-approach (PaP) goal structures (i.e., classroom environment focuses on normative success) were positively and negatively related to need satisfaction respectively. Hierarchical regression analyses also showed that need satisfaction was related to educational satisfaction and flow in class-related tasks. Bootstrap analyses, finally, indicated the mediation of need satisfaction in the relation of MaP and PaP goal structures to educational satisfaction and state flow.

Understanding need satisfaction as a mediator of classroom goal structures and educational outcomes help teachers to reconsider their goal-related messages in the classroom.

Quality of motivation in Japanese secondary school: The first in a three-year cohort study
Keywords: Achievement, Developmental processes, Motivation, Secondary education
Presenting Author: Quinl Oga-Baldwin, Waseda University, Japan
Co-Author: Luke Fryer, University of Hong Kong, Hong Kong

Background
While the literature internationally and in Japan suggest negative or flat trajectories across the rest of compulsory education, recent studies in Japan have shown positive trends in quality of motivation to learn foreign languages in upper elementary school. However, the question remains whether this trend continues across the transition into secondary school.

Aims
In this longitudinal cohort study, we investigate the antecedents and relationships between three different school subjects (Math, Japanese, and English) as well as students' perceptions of their classroom climate in order to create a model of school motivation in Japan.

Methods
Students quality of motivation and perceptions of the classroom climate for Japanese, Math, and English were measured at two time points during the 2016 school year. Longitudinal structural equation modeling and person-centered profile analyses will be used to analyze changes over time.

Results
Preliminary results show acceptable internal validity and reliability for the scales. Final results will be presented in light of achievement results at the end of the school year.

Studying the Role Depictions of Academic Information Play in At-Risk Students’ Motivation to Succeed
Keywords: At-risk students, Educational Psychology, Educational Technology, Motivation
Presenting Author: Stephen Aguilar, University of Southern California, United States
Co-Author: Neil Jacobson, University of Southern California, United States

Spurred on by the growth of data analytics technologies designed to detect, predict, and/or intervene on student learning (i.e., learning analytics), students are increasingly being presented with performance-related information in graphic form. In contrast to traditional modes of academic feedback (e.g., grades), such information is designed to be both personal and information rich. Yet, is more information always better, or can it pull students toward understanding their progress in ways that are motivationally counterproductive? The research on student motivation largely emphasizes detecting the relationships between students’ motivational beliefs and their academic outcomes, and suggests that beliefs centered around mastering tasks are more beneficial to learning when compared to those which emphasize peer comparisons. Yet, few studies have examined the role depictions of academic information play in shaping motivational beliefs—especially for students who are academically at risk.

This paper addresses the gap in the literature by examining the various sense-making practices utilized by at-risk students when presented with depictions of academic information. Results of our mixed-methods study found, indeed, that students with higher achievement goal orientation predicted they would perform at lower levels when presented with visually presented information that compared their performance to class averages. No relationship was found between achievement goals and graphs depicting only individual performance. Thus more information is not necessarily better, which has implications for how achievement-related graphic information should, or certainly for some individuals, should not be provided.

Academic stressors and ways of coping: a qualitative approach
Keywords: Assessment methods and tools, Content analysis, Qualitative methods, Motivation and emotion
Presenting Author: Maria Teresa Gonçalves, Polytechnic Institute of Viana do Castelo, Portugal
Co-Author: Fritz Mendes, University of Porto, Portugal
Co-Author: João Leite, University of Porto, Portugal
Co-Author: Mário Carvalho, University of Porto, Portugal
Co-Author: Marina Lemos, University of Porto, Portugal

Besides negative major life events people have to cope regularly with critical normative developmental stressful events within the various life domains.

Within a research project on academic motivational resilience the present study used a qualitative approach to identify, within a specific cultural context: i) the main stressors that children and adolescents face in everyday life and more specifically to obtain their descriptions of stressors in the academic context; and ii) the most typical ways of academic coping.
Participants were 30 Portuguese students from 6th, 7th, and 8th grades. A semi-structured interview was used to gather descriptions and meanings of children experiences of everyday stressors and more specifically of academic stressors. The interview was based on the principles of the cognitive interviewing using verbal probing techniques and consisted of a set of open-ended questions and a concurrent verbal interviewing while students answered the Multidimensional Measure of Coping (Skinner, Pitzer, and Steele, 2013).

Findings confirm the centrality that children attribute to stressors in the academic domain, and contribute to the categorization of types of stressful events in the academic domain, their differential frequency, and the emotional reactivity and perceived controllability associated to the various stressors. The study also contributes to a conceptual analysis of stress and coping in a specific cultural context based on the cognitive interviewing.

**Starting a PhD: significant events and the role of the associated emotions along PhD trajectories**

**Keywords:** Doctoral education, Educational Psychology, Emotion and affect, Higher education

**Presenting Author:** Crista Weise, Universitat Autònoma de Barcelona, Spain

**Co-Author:** Manuela Aguayo, Universitat Ramon Llull, Spain

This research contributed to the understanding of the role of the emotions in the process of becoming a PhD, suggesting that focusing on both in negative and positive emotions in the context of the PhD trajectory is possible to understand better the engagement and involvement of the students.

In the sample, the emotions are quite variable, they change along the trajectory, even though some of them remains and appears repeatedly in different SE. The most important are related to specific research factors.

The findings showed that students have a positive experience when doing their PhD courses. Most of them associate their experiences with positive emotions rather than negative ones, although they faced challenges with high levels of emotional intensity.

It was used a qualitative approach, based on the analysis of 10 semi-structured interviews applied to PhD students from Catalan Universities. Also were used episodic interviews and a journey plot identifying the main significant events they went through during their PhD.

Becoming a researcher is an enormous challenge that requires accumulation of experience, specific skills, and formation. People who decide to follow an academic career should consider that higher cognitive, emotional, personal competences are needed to deal with a Ph.D. The objectives of the study are to identify the emotions that SE embraces, along with PhD trajectories, highlighting the aspects they relate to the dynamics of the PhD’s students emotions along their trajectory and the role they play when facing the required tasks.

**Session C 56**

30 August 2017 08:30 - 10:00

**Vita - 112**

**Poster Presentation**

**Cognitive Science, Learning and Instructional Technology, Teaching and Teacher Education**

**Poster Presentation: Comprehension of Text and Graphics**

**Keywords:** Cognitive development, Cognitive skills, Competencies, Comprehension of text and graphics, Computer-assisted learning, Cooperative / collaborative learning, Early childhood education, Educational Psychology, Engineering, Experimental studies, Informal learning, Instructional design, Mathematics, Multimedia learning, Numeracy, Pre-service teacher education, Professions and applied sciences, Quantitative methods, Reading comprehension

**Interest group:** SGS 02 - Comprehension of Text and Graphics

**Chairperson:** Man Ching Esther Chan, The University of Melbourne, Hong Kong

**Investigating the integration of multimedia information by means of eye tracking**

**Keywords:** Comprehension of text and graphics, Educational Psychology, Experimental studies, Multimedia learning

**Presenting Author:** Anne Schuler, Leibniz-Institut für Wissensmedien (IWiM), Germany

The aim of the reported study was to investigate whether learners integrate information conveyed across different slides of a multimedia presentation with each other, i.e., the learning phase, subjects (N = 60) were presented with information about the development of a tornado. In the control group, all information conveyed through the eight pages of the learning environment was consistent. In the experimental group, the third slide of the presentation contained information that was inconsistent to the information presented on the second slide. During learning, eye-movement behavior of learners was measured. Analysis revealed that the eye movement behavior of the control and experimental groups did not significantly differ regarding fixation counts in both conditions. However, groups differed regarding the third slide containing consistent information in the control, but inconsistent information in the experimental group: Here, learners of the experimental group had longer fixation times on text and picture, and more transitions between text and picture.

These data show that learners of the experimental group detected the conflict, indicating that they tried to integrate the information of consecutive slides with each other.

**Efficiency to process finger configurations predicts initial math performance**

**Keywords:** Cognitive development, Early childhood education, Mathematics, Numeracy

**Presenting Author:** Joseu Oriantos, University of Salamanca, Spain

**Co-Author:** Rosario Sánchez, University of Salamanca, Spain

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**Co-Author:** Javier Rosales, Universidad de Salamanca, Spain

**Co-Author:** David Munez, National Institute of Education / Nanyang Technological University, Singapore, Singapore

**Co-Author:** Lieven Verschaffel, KU Leuven, Belgium

Previous research has shown that finger-based strategies play an important role in learning and understanding arithmetic. However, little research has examined young children’s ability to process finger configurations, and its significance for emerging math abilities. In this study, we aimed at examining whether efficiency to process finger configurations is a unique predictor for initial math competences before formal math instruction starts. We controlled for influence of domain-specific numerical precursor competencies and domain-general cognitive ability. Results from 102 Spanish kindergarteners showed that efficiency to process finger configurations predicted a unique and relevant part of the math performance. These results suggest that educational practices encouraging the use of finger configurations could be a bridge between numerical quantities and their symbolic representation, which would support the development of number and arithmetic.

**Detecting errors in program flow diagrams: Comparing novices and advanced programmers**

**Keywords:** Competencies, Comprehension of text and graphics, Engineering, Professions and applied sciences

**Presenting Author:** Markus Nixia, University of Göttingen, Sweden

**Co-Author:** Florian Hauser, Ostbayerische Technische Hochschule (OTH) Regensburg, Germany

**Co-Author:** Helen Jossberger, University of Regensburg, Germany

**Co-Author:** Markus Reiss, Ostbayerische Technische Hochschule (OTH) Regensburg, Germany

**Co-Author:** Juergen Mottke, Ostbayerische Technische Hochschule (OTH) Regensburg, Germany

**Co-Author:** Hans Graber, University of Regensburg, Germany

One of the key competences for a software engineer is the ability to understand visual representations of software, and to understand their correspondence to source code. Our aim is to study how programmers read and understand program diagrams and source code.

The participants (N = 33) were novice (n = 23) and intermediate (n = 10) programmers. The experiment consisted of 12 stimuli, which included visual software diagrams and corresponding source codes. Half of the stimuli had an error in the code that caused a discrepancy between the code and the diagram. The participants were asked indicate whether code and diagram were identical in functionality. If not, they had to identify the error. Eye movements and performance were recorded. The preliminary analysis of the data focuses on performance, strategies and distribution of fixations.

On average, the novices answered 82 per cent of the multiple choice questions correctly. The eye movements revealed three different reading strategies. The most common strategy was to start immediately comparing the diagram with the code. However, there were five novices who read either the code or the diagram first in its entirety. Furthermore, the novices spent slightly more time fixating on the source code than on the diagrams, which may indicate that they find it more difficult to understand. Unveiling the developing strategies and their expert counterparts helps us to understand what are the areas in which novices need the most support.
The Effects of Reading Goals on the Comprehension of Argumentative Text and Belief Change

Keywords: Cognitive skills, Comprehension of text and graphics, Informal learning, Reading comprehension

Presenting Author: Irene-Anna Daliadis, University of Cyprus, Cyprus
Co-Author: Melina Isamoou, University of Cyprus, Cyprus
Co-Author: Stelios Christodoulou, University of Cyprus, Cyprus

Abstract

Argumentative text is a primary medium of learning and belief formation, often providing the basis for decisions that range from trivial to critical. Past research has documented the high persuasive impact of argumentative text in the absence of a critical evaluation of its arguments and regardless of comprehension. The present study examined the extent to which readers will focus more on the argument line and apply critical evaluation processes when their goal is to evaluate the text as opposed to comprehend. Students were protested on their initial beliefs and prior topic knowledge before reading one of two versions of two argumentative texts promoting claims on the basis of arguments varying in terms of a specific fallacy inclusion. Half of the students were instructed to read the texts for comprehension while the rest were instructed to read with the goal of evaluating their argument lines. After reading, all students evaluated the texts according to the degree to which they agreed with the main claim they promoted. Comprehension measures included text recall and number of valid inferences generated in recall. The results indicated that students who read to evaluate recalled more text information and were less likely to change their initial beliefs as a result of reading than students who read for comprehension. However, the absence of any effects of argument quality on evaluation and belief change indicated a lack of critical evaluation. Findings are discussed in relation to their theoretical and educational implications.

Learning by teaching, improving teacher students’ reading strategy skills

Keywords: Cooperative / collaborative learning, Pre-service teacher education, Quantitative methods, Reading comprehension

Presenting Author: Nadine Spörer, University of Potsdam, Germany
Co-Author: Helvi Koch, Universität Potsdam, Germany
Co-Author: Jennifer Lambrecht, University of Potsdam, Germany
Co-Author: Thorsten Henke, University of Potsdam, Germany

Educational studies about reading instruction in regular classrooms indicated that teachers spend too little time instructing reading strategies. Moreover, teachers often have only limited knowledge about reading strategies and they do not know exactly how to implement reading strategy programs. Therefore, there is a need to provide future teachers with knowledge about the effective application of reading strategies and about methods how to teach these effectively.

In this intervention study, we taught first semester students of teacher training how to instruct primary school students in using reading strategies. The aim of the study was to analyze whether and to what extent students benefit from the intervention within their own reading strategy skills. The sample consisted of N = 74 students who took part in one of two conditions: (a) a reciprocal teaching intervention and (b) a control group with an alternative training. Both conditions were designed as an introduction to scientific working techniques and one of the seminar’s topics dealt with effective reading strategies. In the intervention condition teacher students additionally learned to use reciprocal teaching in the classroom. Training success was assessed in a pre/posttest design with a standardized reading comprehension test. The results reveal a significant increase in reading comprehension tasks measuring students’ declarative and procedural knowledge about strategy use. To compare the development of the students in the two conditions, repeated measures ANOVAs were estimated. At posttest, intervention students outperformed control students in reading strategy knowledge but not in reading comprehension.

Prerequisite Knowledge and Time of Testing in Learning with Animations and Static Pictures

Keywords: Comprehension of text and graphics, Computer-assisted learning, Instructional design, Multimedia learning

Presenting Author: Tim Köhli, University of Mannheim, Germany
Co-Author: Sabrina Navratli, University of Mannheim, Germany
Co-Author: Stefan Münzer, Universität Mannheim, Germany

Animations can possess an informational advantage compared to static pictures. This informational advantage is assured for the used animations of the current study. Thereby, it will be investigated whether the corresponding informational disadvantage of static pictures can be compensated when learners possess adequate prerequisite knowledge to be able to correctly infer this missing information. When correctly inferring the information with static pictures, learners are supposed to be more actively engaged. This higher engagement might especially pay-off in the long run. Hence, it will moreover be examined whether this supposed higher engagement will lead to a better lasting knowledge representation for learners with static pictures, meaning that learners with adequate prerequisite knowledge receiving static pictures might even outperform their counterparts receiving animations in a delayed test. To examine these assumptions, a 2x2x2 Between-Subject-Design with visualization format (static picture vs. animation), prerequisite knowledge (conveyed vs. not conveyed) and time of testing (immediate vs. after one week) as independent variables will be used. It is planned that 32 participants will serve in each condition, making in total 256 participants. Data collection is still in progress and the results will be presented and discussed at the conference.

Session C 57

30 August 2017 08:30 - 10:00
Penzil A : A1081
Poster Presentation

Assessment and Evaluation, Lifelong Learning, Teaching and Teacher Education

Poster Presentation: Teacher Education

Keywords: Assessment methods and tools, Attitudes and beliefs, Competencies, Higher education, In-service teacher education, Lifelong learning, Pre-service teacher education, Professional education, Qualitative methods, Reflection, Science education, Secondary education, Social interaction, Teacher Professional Development, Video analysis

Interest group: SS11 - Teaching and Teacher Education

Chairperson: Sue Bennett, University of Wollongong, Australia

Teachers’ growth or fixed mindsets and the appraisal of achievement in the context of feedback

Keywords: Attitudes and beliefs, Qualitative methods, Secondary education, Video analysis

Presenting Author: Emmie de Kraker-Pauw, VU University Amsterdam, Netherlands
Co-Author: Lydia Krabbendam, Vrije Universiteit Amsterdam, Netherlands
Co-Author: Nienke van Auvelaat, VU University Amsterdam, Netherlands
Co-Author: Floyt Van Wesel, Utrecht University, Netherlands

Abstract

The pedagogical beliefs (e.g., beliefs or ‘mindsets’ concerning the malleability of intelligence) that teachers hold may have a far-reaching impact on their teaching behaviour. In general, two basic mindsets can be distinguished with regard to the malleability of intelligence: fixed (entity) and growth (incremental). In this proposal we present two studies investigating the associations between teachers’ mindset and 1) their appraisal of students’ achievements and 2) the feedback they provide. Study 1 focuses on the associations between mindset and appraisal. The findings reveal an association between growth mindset and the appraisal of increasing student achievements. Study 2 investigates the impact of teachers’ mindset on the amount and type of oral feedback they provide to their students. Contrary to expectations, the findings reveal no such association. In this study, the authors also showed an association between mindset and the amount of growth-oriented feedback. Additional, the findings reveal that gender affects both mindset and appraisal.

Using self-evaluation in post-observation conferences between museum educators and museum docents

Keywords: Assessment methods and tools, Reflection, Teacher Professional Development, Lifelong learning

Presenting Author: Mark Schep, University of Amsterdam, Netherlands
Co-Author: Carla Van Boeijel, University of Amsterdam, Netherlands
Co-Author: Julia Noorbragat, University of Amsterdam, Netherlands

In this study we investigated how a self-evaluation instrument contributed to a post-observation conference of museum docents (tour guides) and museum educators. First, out of a list of 45 competencies (organized in four categories), defined in a previous study, a self-evaluation instrument and an observation instrument were constructed. Fifteen museum docents, working in an art museum or a history museum, filled in the self-evaluation questionnaire in which they had to rate themselves on all competencies. The docents could use these scores to answer subsequent questions about their strengths and points for improvement, for all four main categories of competence. In the same period an educator observed two tours of the docent, using an observation instrument that focused on the same competencies. Next, the educator and the docent engaged in a (video-recorded) post-observation conference. During the conference the docent was asked to put forward his/her strengths and points for improvement, which deviates from the educator (observation) directed conferences that are prevailing in the participating museums. Afterwards, all participants were interviewed about their experiences with the instruments and the post-observation conference(s). Analysis of the interviews and preliminary analysis of the video-recordings show a perceived agency by the docents, the perceived equality between the participants of the
Teacher-student relationships: comparing Dutch academic and non-academic primary school teachers  

**Keywords:** Pre-service teacher education, Primary education, Social interaction, Teacher Professional Development  

**Presenting Author:** Sanne Dijkema, University of Groningen, Netherlands  

**Co-Author:** Simonne Doordijk, University of Groningen, Netherlands  

**Co-Author:** Roel J. Bosker, Rijksuniversiteit Groningen, Dept of Education and GION, Netherlands  

In the Netherlands an academic Bachelor's degree program was developed, in 2008, preparing for the profession of primary school teacher. This Bachelor's degree program integrates the traditional higher vocational education program and the academic program of educational sciences and pedagogy. Teachers graduating from this academic trajectory hold a double Bachelor's degree in both higher vocational education and university. Establishing this new degree resulted in primary school teachers with different educational backgrounds working in the field. This study compared teacher interpersonal behavior, in terms of agency and communion, of beginning academic and nonacademic Dutch primary school teachers. Teacher interpersonal behavior was measured using the Questionnaire on Teacher Interaction for Primary Education (QTI P/E). Both student (N=1162) and teacher perceptions (N=74) were collected. Since data collection is ongoing (to be finalized in May 2017), preliminary results provide a first exploration of the development of teacher interpersonal behavior in primary education for teachers with different educational backgrounds.

 Profiles of Teachers’ Conceptions of the Purposes of Assessment  

**Keywords:** Assessment methods and tools, Attitudes and beliefs, In-service teacher education, Teacher Professional Development  

**Presenting Author:** Helenrose Fives, Montclair State University, United States  

**Co-Author:** Nicole Barnes, Montclair State University, United States  

**Abstract**  
Teachers’ conceptions about assessment influence their classroom assessment practices. In this investigation, we examined 179 K-12 teachers’ conceptions of the purposes of assessment from a person-centered perspective. An exploratory factor analysis of teachers’ responses to the Conceptions of Assessment Instrument yielded a three-factor model: assessment as valid for accountability, assessment as irrelevant, and assessment improves teaching and learning. Next, we used cluster analysis to identify belief profiles of teacher groups: Cluster-1: Moderate, Cluster-2: Irrelevant, Cluster-3: Teaching and Learning. Within and across cluster comparisons revealed significant differences indicating that these are distinct belief profiles thereby suggesting that teachers can, and do, hold multiple beliefs about assessment simultaneously.

 Exploring reflective practice in mentor teacher and teacher trainee relationship  

**Keywords:** Higher education, Pre-service teacher education, Reflection, Teacher Professional Development  

**Presenting Author:** Kinga Kaplar-Koçaci, ELTE University, Faculty of Education and Psychology, Hungary  

**Co-Author:** Helga Domer, Central European University, Hungary  

This paper outlines findings from a research project on mentor teachers’ conceptualizations and strategies of mentoring pre-service teachers for reflective practice. The study was conducted with the aim to explore the qualitatively different ways in which mentor teachers conceive of mentoring for reflective practice and also how they translate this into actual mentoring strategies. We interviewed 6 senior mentor teachers who are certified mentors at Hungarian primary and secondary schools. The transcripts were analysed using a phenomenographic approach. Mentor teachers were found to oscillate between fragmented and cohesive conceptions of mentoring for teaching with varying levels of integrating the notion of reflective practice. Based on the results a system of conceptualisations and strategies was created. These findings provide directions for designing a survey tool that will be used in a large-scale research study scheduled for 2017-18.

 Evaluating Professional Competencies of Science Teachers Pertinent to Elementary Particle Physics  

**Keywords:** Competencies, Pre-service teacher education, Science education, Teacher Professional Development  

**Presenting Author:** Michaela Dettli, Pädagogische Hochschule Freiburg, Germany  

The project aims at designing an instrument suitable for assessing professional competences of science teachers pertinent to elementary particle physics. Motivated by the huge discrepancy between the planned incorporation of particle physics in scholar curricula and the previously lacking effort in exploring the corresponding domain-specific professional competences required by science teachers, the study seeks to give deeper insight into possible issues arising when the topic becomes firmly established in school classes. By portraying the level and nature of those competences, the project targets to establish the status quo as well as an in-depth look into the preconceptions teachers might have themselves. In order to conceptualize the relevant categories subject matter knowledge and pedagogical content knowledge, two different strategies were pursued: the subject matter was modeled by an acquisition of expert knowledge through an online survey and follow-up interviews. The results were analyzed in terms of qualitative explorative and quantitative aspects and provide the basis for the construction of performance test items. The pedagogical content knowledge was conceptualized pursuing a theory-based strategy relying on well-established models in science educational research. The combined results provide the basis for a testing instrument for teachers who have addressed particle physics within their school classes. The research focuses initially on the German-Speaking world. The study design and results on the modelling of the competence fields are being presented and discussed. We expect to define well distinguished categories in the subject matter and pedagogical content knowledge field as well as design testing items accordingly.

**Session C 58**  
30 August 2017 08:30 - 10:00  
Main Building A - A06  
Poster Presentation  
Cognitive Science, Instructional Design, Learning and Instructional Technology, Lifelong Learning, Teaching and Teacher Education  

**Poster Presentation:** Metacognition  

**Keywords:** Attitudes and beliefs, Cognitive skills, Computer-assisted learning, Computer-supported collaborative learning, Goal orientation, Instructional design, Mathematics, Metacognition, Peer interaction, Primary education, Quasi-experimental research, Reflection, Self-regulation, Student learning, Teacher Effectiveness, Teaching / Instruction, Writing / Literacy  

**Interest group:** SIG 16 - Metacognition  

**Chairperson:** Visa Välimäki, University of Helsinki, Finland  

**Metacognitive control in a memory task in elementary school children**  

**Keywords:** Cognitive development, Cognitive skills, Metacognition, Primary education  

**Presenting Author:** Natalie Guggisberg, University of Bern, Switzerland  

**Co-Author:** Martina Steiner, University of Bern, Switzerland  

**Co-Author:** Manrietie van Loon, University of Bern, Switzerland  

**Co-Author:** Claudia Roobes, University of Bern, Switzerland  

In elementary school children are more and more required to self-regulate their learning, and in order to do so effectively, they have to be able to recognize their errors and correct those to ensure effective learning and good performance. This research examined metacognitive control in elementary school children, and addressed whether children are able to recognize their errors, and control learning by withdrawing incorrect responses and maintaining correct responses. Three age groups were tested: 2nd, 4th and 5th graders learned the meaning of Japanese characters (Kanji), and afterwards they took a recognition test. At the end the children had the possibility to control their own learning. On the basis of traffic lights, they could press the green traffic light to maintain their answer or the red traffic light to withdraw their answer. Findings show a positive relation between response accuracy and control (maintenance or withdrawal) in all three age groups, such that the children accurately adapted their control behavior to their test responses. There were no age-related differences in the metacognitive control, suggesting that 2nd grade children are already capable to accurate control their learning when given the chance to withdraw incorrect answers.

 Investigating implicit theories of ability and its relationship to students self-regulated learning  

**Keywords:** Writing / Literacy, Goal orientation, Self-regulation, Student learning, Teacher Effectiveness, Teaching / Instruction, Writing / Literacy  

**Presenting Author:** Yves Karlen, University of Zurich, Switzerland  

**Co-Author:** Carmen Het, Institute of Education, University of Zurich, Switzerland  

**Co-Author:** Katharina Maag Merki, University of Zurich, Switzerland  

**Co-Author:** Francesca Suter, Institute of Education, University of Zurich, Switzerland  

Implicit theories of ability highly impact our actions, emotion, motivation, and how we perceive knowledge and ourselves in everyday situations. Research showed that implicit theories about the stability (entity theory) and the malleability of abilities (incremental theory) are of particular relevance (Dweck & Master, 2008). In school and academic contexts, they are especially important in situations where students have to self-regulate their learning (SRL). This study explores the role of implicit theories of writing ability in cognitive, metacognitive, and motivational SRL processes of students who write their first academic paper. N = 1290 students from the upper secondary education level completed an online self-report inventory that included measures on implicit theories of their ability in academic writing, achievement goal inventory, and strategy use. Results indicated that the students’ individual implicit theory of their writing ability is an important predictor for strategy use. The effects held stable after including achievement goals as moderators. The implications of these findings for research and instruction are discussed.

**Outcome Feedback and Reflection to Improve Calibration of High School Students: A Longitudinal Study**  

**Keywords:** Instructional design, Metacognition, Reflection, Self-regulation
Presenting Author: Maarten Nederhoed, Erasmus University Rotterdam, Netherlands
Co-Author: Hub Tabbers, Erasmus University Rotterdam, Netherlands
Co-Author: Reinouw (Remy) Rikkers, UCR / Utrecht University, Netherlands

In this longitudinal study we investigated whether calibration accuracy of high school students could be improved by providing them with outcome feedback and encouraging them to reflect on the (mis)match between their estimated performance and actual outcome. Students of four experimental groups were compared. First a group of students who only had to estimate their performance on each exam (Practise group). Second, a group of students who needed to estimate their performance on each exam just as the Practice group. However, after receiving outcome feedback (how well they performed on the exam) students also had to write down the difference between their estimation and actual exam score (Bias group). The third group of students followed the same procedure as the Bias group, but besides only writing down the difference between their estimation and actual performance, these students also reflected on causes for their mismatches (Reflection group). These three groups were compared to a control group with students who only estimated their performance on the first and the final exam during the experiment. Data are being gathered at the moment and results will be discussed during the symposium.

The effectiveness of journals in educational settings. A review study
Keywords: Metacognition, Quasi-experimental research, Self-regulation, Student learning
Presenting Author: Sabine Fabrizi, Goethe-University Frankfurt, Germany
Co-Author: Charlotte Dignath, Institute of Psychology, Germany
Co-Author: Franziska Perels, Saarland University, Germany

In a literature review of 52 studies, the effectiveness of learning journals as tools to foster self-monitoring in learning is explored. The literature search included records from 2000 to 2016 from several databases (e.g. PsycARTICLES; PsySINFO) and with different denominations (e.g. learning diaries, learning journals). After screening the records and assessing for eligibility criteria (including pre-post design, control group and a minimum group size of 10), 52 studies remained. We developed a coding scheme to assess the study characteristics and allow for the identification of possible predictors for the effectiveness of the Intervention. The poster will present the developed coding scheme used for the review and a meta analysis to follow as well as the results of the review and their implications.

Development of tools for identifying teacher metacognition
Keywords: Mathematics, Metacognition, Teacher Effectiveness, Teaching / instruction
Presenting Author: Emine Erikin, Bogazici University, Turkey
Co-Author: Selcuk Universities, Turkey

Teachers’ metacognition is principal for both developing students’ metacognitive knowledge and skills, and to apply metacognition to their own instruction. In order to develop metacognitive skills and use these skills effectively in educational settings, teacher training needs to focus on three aspects of teachers’ professional description: the use of metacognitive skills in teachers’ professional development, in teachers’ teaching processes, and how to metacognitively coach students to improve their learning.

This study is an attempt on the development of assessment tools to examine teacher metacognition underlying the instructional practice in mathematics. To this end we have planned to develop three instruments each corresponding to a different aspect of teacher metacognition. 1) For teachers’ general metacognitive habits a self-report questionnaire is developed. 2) An observational tool that allows for a systematic examination of a teacher’s instruction in the classroom is designed. The observation tool is in a checklist format, which allows researchers to assess both the frequency of metacognitive acts and the quality of metacognitive actions during the instructional process. 3) An observation tool for examining the students’ metacognition will be the final step. The methodology of the study is based on a design-based research and development of the observation checklist is considered as to be a starting point for the improvement of teachers’ metacognition. The data will be collected through observing instructions of middle school math teachers and their students.

Socially Shared Regulated Learning with MetaTutor
Keywords: Computer-assisted learning, Computer supported collaborative learning, Peer interaction, Self-regulation
Presenting Author: Jolique Kielstra, Radboud University Nijmegen, Netherlands
Co-Author: Inge Molenaar, Radboud University Nijmegen, Netherlands
Co-Author: Michelle Taylor, North Carolina State University, United States
Co-Author: Roger Rezende, North Carolina State University, United States

This poster describes a new study to be executed this winter into how pedagogical agents in MetaTutor can support socially shared regulated learning through reciprocal peer tutoring. In this 2-day study students will be working together in dyads on a shared assignment in a computer based learning environment. The first day students will be trained and informed about the assignment they will be working on. In MetaTutor the second day. During the second day the dyads will each execute the role of tutor and tutee while working together on the assignment. Data will be collected through multiple datachannels, such as pre- and posttest measurements, logfiles, eyetracking, video- and audio recordings. This data will provide more understanding on the influence of socially shared regulated learning within a computer based learning environment with and without pedagogical agents. Based on current literature expectations are that reciprocal dialogues between tutor and tutee on the shared assignment will stimulate metacognitive processes. The influence of pedagogical agents within computer based environments on reciprocal dialogue is missing and from this data study will provide more insight on these interactions within such a computer based learning environment.

Session C 59
30 August 2017 08:30 - 10:00
Main Building A - A07
Poster Presentation
Cognitive Science, Learning and Social Interaction, Lifelong Learning, Teaching and Teacher Education
Poster Presentation: Learning and Professional Development
Keywords: Attitudes and beliefs, Cognitive development, Cognitive skills, Competencies, Higher education, Lifelong learning, Mathematics, Meta-analysis, Pre-service teachers education, Primary education, Professions and applied sciences, Quantitative methods, Reasoning, Reflection, Teacher Professional Development, Vocational education, Workplace learning
Interest group: SIG 14 - Learning and Professional Development
Chairperson: Debora Valcin, Murdoch University, Australia
Instructional preferences and learning (transfer) in further education - a longitudinal study
Keywords: Quantitative methods, Vocational education, Workplace learning, Lifelong learning
Presenting Author: Michael Goller, University of Paderborn, Germany
Co-Author: Christoph Fischer, University of Paderborn, Germany
Co-Author: Christian Hansen, University of Paderborn, Germany

This contribution analyses determinants that predict learning in formal training courses as well as the potential transfer of the learned knowledge and skills into the workplace. A main focus lies on the effects of a fit between individuals’ instructional preferences and the instructional methods that are actually applied in the training courses. A good fit between both is assumed to predict high learning outcomes by being positively related to an increased subjective engagement of the training course as well as a higher perceived usefulness of the training as such (matching hypothesis). An increased knowledge gain is then assumed to predict learning transfer at work as long as the individual is sufficiently supported by both colleagues and supervisors. These theoretically and empirically grounded hypotheses were translated into a mediated and moderated path model. To test this model a two-wave longitudinal study was conducted. Over a time frame of one year each employee of a German university that participated in an in-house training course filled in two separate questionnaires (one directly after the course and one four month after the first one). This contribution presents and discusses the core findings of this study. Practical implications for the implementation of training courses will be given.

Innovative mathematics curriculum and its influences on teachers’ knowledge and beliefs
Keywords: Attitudes and beliefs, Mathematics, Primary education, Teacher Professional Development
Presenting Author: Laurinda Lomas, Australian Catholic University, Australia
Co-Author: Doug Clarke, Australian Catholic University, Australia

Research focused on the classroom application of a teacher’s mathematical knowledge and beliefs and the effect of this on student understanding has highlighted the need for further investigation into professional development strategies which promote deep and flexible teacher understanding of curricular content. As teaching is a cultural activity embedded in a unique context, such opportunities for teachers may be best placed amid the relevance of everyday classroom practice, and supported by curriculum which promotes such change. This paper reports on data collected as part of a doctoral study aimed at observing the changes in mathematical knowledge and beliefs of three Grade 5/6 teachers as they implemented a four-week, innovative curriculum unit based on the tenets of Realistic Mathematics Education (RME). Case study methodology within a constructivist epistemology and an interpretivist theoretical perspective promoted deep understanding of complex classroom interactions. The International Mathematical Teachers Professional Growth (Class & Hollingsworth, 2000) supported interpretation of growth and change mechanisms. Analysis of the teachers’ implementation of this Fraction unit revealed the pivotal influence of teacher’s stated and inferred beliefs about mathematics and mathematics teaching on classroom practice. The foregrounded content and pedagogical content knowledge evident in the teachers’ pre and post-intervention lessons, their reflections on practice, and the vagaries of didactic contracts in a change environment have the potential to contribute to current research on professional learning in mathematics. Emergent themes about curriculum fidelity, authority and task implementation promote further consideration of the support needed to sustain teacher learning.

Knowledge restructuring through case-processing; a review study of three in professional domains
Keywords: Cognitive development, Meta-analysis, Professions and applied sciences, Reasoning
Presenting Author: Elis Bochum, Open University, Netherlands
Co-Author: Hans Gruber, University of Reginberg, Germany
Co-Author: Josef Strasser, University of Augsburg, Germany

With increasing levels of expertise development work and learning become more and more intertwined. Processing of cases is the core of much expert work; it heavily depends on activating and applying
relevant prior knowledge, and seeking new knowledge when prior knowledge is not sufficient. It was conjectured that this case processing plays a crucial role in connecting working processes and learning.

The concepts of knowledge encapsulation and (illness) script development, brought together in a theory of Knowledge Restructuring through Case Processing, emphasize the importance of these processes that would result in a knowledge base that is better tuned to case processing and allows better and faster reasoning problem solving. This theory was developed for the medical domain, but researchers in other fields also apply the concepts in their work.

We did a review study in which we investigated whether similar effects of case processing can be found in other fields that are also characterized by working with cases, i.e., counselling, business and law. We found 30 studies in counselling, 8 in business and 12 in law. Many studies concerned the quality of the diagnosis or decision, its relation with experience, associated difficulties with information processing and/or knowledge acquisition. In all domains indications for script development and knowledge restructuring were found. Deliberation, reflection and not seeing work as routine had positive effects on present and future decision quality.

Entrepreneurial failure: Is it possible to prevent it?

Keywords: Cognitive skills, Competencies, Vocational education, Workplace learning
Prenting Author: Fritz Oser, Université Fribourg, Switzerland
Co-Author: Susan Müller, University of St. Gallen, Switzerland
Co-Author: Lara Forasti, University of Fribourg, Switzerland

Based on the fact that the number of start ups in European countries is quite substantial (especially in Switzerland with more than 40'000 a year) we were looking on failure rates of companies, the psychological meaning of failure and the possible/likely possible rescue from failure. Our research project aims to make a contribution to overcome the danger of failure, or to initiate a recovery. In a fine-tuned intervention study we work with a randomized field design, treating four groups of secondary-school-students, namely a) one with entrepreneurial techniques and failure cases, b) one with entrepreneurial techniques and success cases, c) one with entrepreneurial techniques and no cases, and d) a control group without any pedagogical influence. Since the intervention study lasts until August 2017, we would like to present here the measurement instruments with the respective validation results and their hidden treatment relationships.

Alumni Perspectives on Entrepreneurial Success in Vocational HE

Keywords: Cognitive skills, Competencies, Higher education, Workplace learning
Presenting Author: Timo Nevalainen, Tampere University of Applied Sciences, Finland
Co-Author: Patri Nikolaen, Tampere University of Technology, Finland
Co-Author: Pia Hautamäki, Tampere University of Applied Sciences, Finland

In our paper, we present the preliminary analyses and findings from a qualitative study based on narrative interviews conducted with alumni members (n = 15) of a degree programme in entrepreneurship, Proakatemia. Proakatemia is an entrepreneurship education unit and a learning community in Tampere University of Applied Sciences (TAMK) in Tampere, Finland. The study focuses on the experiences of Proakatemia alumni members before, during and after their studies. We were particularly interested in those experiences that the alumni members saw as meaningful in connection with their later success as entrepreneurs.

Collected data was analysed collaboratively by using the methods of narrative analysis (Andrews et al., 2013) and descriptive phenomenological analysis developed by the psychologist Amedeo Giorgi (2009). Narrative analysis was done to study events that were experienced as moments of significant change, while the participants and descriptive phenomenological analysis was used to inquire into the structure of those experiences. We also contrasted the findings with the 3-P model of workplace learning (Työä, 2012).

Feedback as a starting point for teacher reflection – First results of an empirical study

Keywords: Higher education, Pre-service teacher education, Reflection, Teacher Professional Development
Presenting Author: Corinna Wyser, Zurich University of Teacher Education, Switzerland
Co-Author: Simon Biaggi, Zurich University of Teacher Education, Switzerland

Feedback from students is essential, yet rarely used method for teaching development (Kämäräinen, 2009). However, the ratings of students are significant since they represent an internal view of the teaching and can thus be very valuable for the reflection of teaching, the teaching quality and the professional competence of the teacher (Hattie, 2009).

The intervention project “Student feedback to support teachers’ reflection” at Zurich University of Teacher Education investigates the effectiveness of student feedback for promoting pre-service and in-service teachers’ quality of and attitude about reflection of their lessons. During two terms 200 – 240 students aspiring to become teachers for the first level of secondary education (grades 7 to 9) are advised to give student feedback during their practical training and to work with it in three different ways: The first intervention group a) uses the student feedback to reflect about its own teaching together with a peer the second group b) uses it to reflect together with an experienced teacher/teacher a third group c) uses the student feedback to reflect by writing a reflective journal. The oral and written reflections are analysed with respect to the three different settings of reflection. In addition, the changes of motivation and volition to work with student feedback were measured pre-post using a written test. The findings of the study can give valuable inputs for teacher education and teacher professional learning concerning the use of student feedback and teacher reflection.

How to arouse the interest of all the students in the intercultural EFL classroom:

Keywords: Cultural diversity in school, Language (Foreign and second), Teaching / instruction, Multicultural education
Presenting Author: Svenja Viefhu, German Institute for Internat. Educational Research, Germany
Co-Author: Kerstin Giebel, University of Duisburg-Essen, Germany

The present study aims at contributing to our knowledge base on intercultural teaching and learning in EFL classrooms. Taking account of the importance of motivational processes in this context, it examines which kinds of intercultural EFL lessons are evaluated by students as being interesting. Analyses are based on data from a German video-study of EFL teaching with a sample consisting of 93 EFL classrooms with 2.047 students. Videos were rated by experts with regard to three broad dimensions of teaching quality (classroom management, motivational support, and cognitive activation) including 11 sub-dimensions. Associations of those ratings with students’ evaluations of the lesson were analyzed by means of two-level regression analysis, including interactions between lesson features and student competencies. Findings suggest that students judged those lessons as being more interesting in which a positive social climate was realized. The quality of classroom management did not appear to be relevant in this context. The lesson’s potential for cognitive activation depended on students’ prior level of intercultural sensitivity: Students at higher stages of intercultural sensitivity development evaluated lessons in which a reflection of cultural differences was initiated as being more interesting than less reflective lessons, whereas no such links were observed for all other students.

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Opportunities and challenges for a STEM interdisciplinary agenda

Keywords: Educational policy, Interdisciplinary. Mathematics, Science education
Presenting Author: Russell Tyler, Deakin University, Australia
Co-Author: Vaughan Prain, Deakin University, Australia

There is increasing global concern about the engagement of students with the STEM subjects, and the need for students to acquire the STEM skills necessary for participation in 21st century societies. Calls have been made to augment the contribution of secondary schools to STEM advocacy, this paper investigates the nature of drivers of a strong STEM interdisciplinary agenda, and the implications for school systems and for the STEM disciplinary subjects. An analysis of integrated STEM innovations in Australian schools raises questions about the relationship between authentic interdisciplinary STEM tasks and the nature of STEM subject epistemises. It is argued that the STEM subject disciplines in schools need to remain the basis of STEM learning, but need to be significantly re-thought if they are to answer the call for critical and creative thinking that underpins STEM advocacy.

Between Two Worlds: Identity Construction Among Haredi University Students in Israel

Keywords: Case studies, Culture, Ethnicity, Social interaction
Presenting Author: Naamí Peri, Mandel Leadership Institute, Israel

This study investigates the integration of a social minority group in Israel within a mainstream academic institution, exploring processes of integration and identity. It focuses on the case Jewish Israeli Haredi (ultra-orthodox) students who are attending the specialized Haredi Leadership Development Program within a multicultural, secular university and examines the effects of academic studies and culture on Haredi students’ construction of complex identities.

The study applies ethnographic tools to explore student experiences of the cultural clash between their community identity and the academic institution. The research seeks to map tensions and challenges that the students face; shifts in student self-concepts over the course of their studies; and students’ strategies for coping with the tensions that arise as a result.

Data were collected and triangulated by: Observing classes that were designed especially for students in the program; analyzing students’ writing assignments and digital communications at crucial points in their study program; and interviews with the students.
Preliminary analysis revealed four main categories of response to tensions between students’ conservative religious identity and their emerging academic and civic identity:
1. Compartmentalization,
2. Conversion,
3. Cynicism,
The final category – complexity – may indicate the emergence of a threshold site group with the potential to contribute to broader streams of social and civic integration of this minority group within mainstream Israeli society.

**Exploring learning of Mathematics among immigrant youths in Vestfold Norway**

**Keywords:** Cultural diversity in school, Learning approaches, Mathematics, Motivation and emotion

**Researcher and Author:** Sikander Ali, Institute of Mathematics and Science Education, Southeast University College, Norway, Norway

Main purpose of this project is to understand the complexities of youths with different cultural backgrounds and how they are engaged in the processes of forming their futures through their engagements in educational acts (in schools and outside schools) with special focus on their engagement with learning of Mathematics in Norway. In specific, through this research project I wish to:

- To explore socio-cultural dimensions responsible for the formations of foregrounds of youths (and their engagement with learning of Mathematics) in Norway.
- To find out the dominant social representations that shape the lifeworld of these immigrants and subsequently their learning of Mathematics.
- To explore the kinds of symbolic resources that immigrant youths or their parents/families use in order to enhance their educational and subsequently life possibilities in Norwegian society.
- To draw implications for teacher education (especially learning and teaching of Mathematics) from working on the notion of formation of foregrounds of youths in Norwegian society.

**Session C 61**

30 August 2017 08:30 - 10:00

Pens B - 84115

**Poster Presentation**

Instructional Design, Learning and Social Interaction, Teaching and Teacher Education

**Poster Presentation: Instructional Design and Collaborative Learning**

**Keywords:** Cognitive skills, Collaborative Learning, Computer-supported collaborative learning, Cooperative / collaborative learning, Design based research, E-learning / Online learning, Educational Psychology, Game based learning, Instructional design, Lifelong learning, Mathematics, Peer interaction, Primary education, Secondary education, Social interaction, Student learning, Teacher Effectiveness, Teacher Professional Development, Teaching / instruction

**Interest group:** SIG 06 - Instructional Design

**Chairperson:** Bridget Deve, Lehigh University, United States

**Students' textbook strategy use: Effects of utilizing textbooks in mathematics class**

**Keywords:** Collaborative Learning, Educational Psychology, Mathematics. Teaching / instruction

**Presenting Author:** Mari Fukuda, The University of Tokyo, Japan

For self-regulated learning, it is important to use textbooks when an impasse is encountered. However, it has revealed that students do not use textbooks spontaneously and only use superficial information.

This study investigated the effects of utilizing mathematics textbooks in class on students’ spontaneous use of textbooks and quality of textbooks strategy use.

Thirty-seven 8th-grade students were assigned to either an experimental group, in which they were shown which parts in a textbook were beneficial for overcoming misunderstanding and participated in collaborative learning using textbooks, or a control group (regular math instruction).

The results showed marginally significant increase of the frequency of spontaneous textbook use when an impasse in experimental group. The results also revealed that students in the experimental group showed improvement on concept knowledge to acquire deep understanding.

The result suggested that students’ quantity and quality of textbooks use was improved through experimental class. In both classes, teacher taught the effectiveness of textbooks use. It implied that instruction of effectiveness is not sufficient and teacher should utilize textbooks in the class to make students internalize textbooks use strategy.

**Involving elementary and secondary school students in co-design: A systematic literature review**

**Keywords:** Design based research, Instructional design, Primary education, Secondary education

**Presenting Author:** Andria Agelagias, Cyprus University of Technology, Cyprus

**Co-Author:** Elieni Kyza, Cyprus University of Technology, Cyprus

This study presents a systematic review on the merits of co-designing with elementary and secondary school students. Co-design is an approach to designing and developing innovations that are tailored to the end users’ preferences and needs, by involving them in various phases of the design process. Despite the fact that children have been reported to have been involved in various studies during the last twenty years, the literature lacks studies which systematically investigate students’ involvement in co-design, including how this can be achieved and what benefits and challenges this process entails.

The present study seeks to fill that gap by reviewing empirical studies of elementary and secondary school students, conducted during the last twenty years. Out of the sixty-eight retrieved publications, a total of thirty-three studies met the inclusion criteria. This review reports on: research areas and questions that are being pursued in co-design studies; participation structures and roles; how the co-design process is organized and supported, and what lessons are learnt. Literature review leads to the conclusion that children’s participation in co-design activities has the potential to: improve the current instructional practice; develop technologies that meet children’s needs and improve children’s collaboration, communicational, emotional and cognitive skills. The present review effort bears significant implications to the process of co-designing with children, as it draws on empirical evidence. Such a framework can contribute to the existing literature and provide implications and practical guidelines to instructional researchers and teachers who want to transform the top-down structures of education.

**Do dyads increase the chances of coherence formation with multiple representation material?**

**Keywords:** Collaborative Learning, Cooperative / collaborative learning, Peer interaction, Social interaction

**Presenting Author:** Christopher Williams, Ulm University, Germany

**Co-Author:** Tina Sauter, Ulm University, Germany

When learning with multiple representations, coherence formation is considered an essential cognitive process, which involves learners’ attempt to make sense of various written and visual learning materials.

Working in dyads has shown to affect such cognitive processes such as coherence formation, because group learners have to externalize their comprehension processes and come to an overall common, hence coherent shared representation in a process of grounding. The question to be examined is what effects do dyads working with multiple representation learning materials have on the learners’ coherence formation process. We assume better performance for recall and comprehension as well as for local and global coherence formation and we also expect longer time-on-task of dyads. In our experiment, 25 participants were either assigned to learn individually or in a dyad. They were asked to think aloud and were also video-recorded. Results showed that there is an effect of learning in dyads with better scores for almost all learning outcomes and longer time-on-task. Based on these initial results, a closer examination of the social interaction processes in dyads based on thinking aloud protocols and video data will be conducted. We will particularly focus on the learners’ grounding process and their co-regulatory occurrences.

**Fostering Teachers’ Ability to Develop Learning Tasks and Establish Learning Tasks in their Lessons**

**Keywords:** Student learning, Teacher Effectiveness, Teacher Professional Development, Teaching / instruction

**Presenting Author:** Gregor Darnik, TU Dresden, Germany

**Co-Author:** Antje Proske, TU Dresden, Germany

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**Game-based learning arrangements in financial education: A design-based research approach**

**Keywords:** Cognitive skills, Design-based research, Game based learning, Instructional design

**Presenting Author:** Carmela Aprea, Friedrich Schiller University Jena, Germany
Qualifying Asynchronous Digital Dialogue for Collaborative Knowledge Building in Higher Education

Keywords: Collaborative Learning, Computer-supported collaborative learning, E-learning / Online learning, Lifelong learning

Presenting Author: Elisabeth Korsgaard Sørensen, Aalborg University, Denmark

Abstract

Many flexible designs of online learning offer no possibilities for interaction and collaboration among students. Others do so, but have problems - even when interaction occurs – in qualifying a truly collaborative knowledge building dialogue. This paper deals with the question of how to qualify a knowledge building dialogue as a result of providing meta-awareness around the functions of comments in the dialogue. The paper suggests that meta-awareness around this actually contributes to qualifying a knowledge building process in online collaborative learning. The data and methodology used are hermeneutic-phenomenologic content analysis of student-generated knowledge building comments in evolving tapestries of dialogue. Wittgenstein's notion of language games is used as framework to capture and identify the analytical units of the dialogic threads.

Keywords: collaborative learning, knowledge building, dialogue, meta-communication, reflection, inclusion, digital

Session C 62
30 August 2017 08:30 - 10:00
Main Building E - E222
Poster Presentation
Assessment and Evaluation, Higher Education, Learning and Instructional Technology

Poster Presentation: Online Measures of Learning Processes

Keywords: Collaborative Learning, E-learning / Online learning, Educational Psychology, Experimental studies, Higher education, Informal learning, Learning analytics, Learning approaches, Learning Technologies, Metacognition, Mixed method research, Motivation, Problem solving, Reading comprehension, Self-regulation, Student learning, Survey Research, Technology, Video analysis

Interest group: SIG 27 - Online Measures of Learning Processes

Chairperson: Daphne van Weijen, Research Institute Child of Development and Education, Netherlands

Predicting learners’ motivation from their typing behaviour in web based learning environments

Keywords: Learning analytics, Learning Technologies, Metacognition, Self-regulation

Presenting Author: Bettina Hörmann, TUM School of Education, Germany

Co-Author: Maria Bannert, Technical University of Munich, Germany

Adaptive learning systems support learning by fitting the presented environment to learners’ diverse prerequisites. To make reasonable adaptations, valid sources should give us relevant and accurate information about learners. Capturing the typing behaviour while learners work on exercises offers an unobtrusive, non-reactive real-time source that could contribute such information. In a field study, we analysed the typing behaviour of 38 undergraduates who learned about programming with a web-based environment for 60 minutes. Typing behaviour was recorded while writing program-code (six coding-tasks) and regular text (recall-task). We linked different indices of typing behaviour (e.g. frequency of corrections or pauses) with measures of motivational states. Initial motivation was assessed before learning using the Questionnaire of Current Motivation (QCM, Rheinberg, Vollmeyer, & Burns, 2001) and current motivational state before each of the typing tasks using a short measure of three items. Results reveal significant correlations between different typing-indices and the motivational measures. Correlations were positive for typing in recall-tasks and initial motivation (r = .374). In addition, negative correlations were found for writing program-code and current motivation (r = -.540 to -.354). This indicates that typing behaviour has to be interpreted task-specifically. Following the indications of this study, mining the keyboard data could be used to assess different learner states and hence to offer a range of possibilities to support learners in future adaptive learning environments.

The Relationships between Exploration and Learning Strategies in a Problem-Solving Environment

Keywords: Higher education, Learning approaches, Motivation, Problem solving

Presenting Author: Gyongyöri Molnár, University of Szeged, Hungary

Co-Author: Enikő Bás, University of Szeged, Hungary

Co-Author: Bened Csapó, University of Szeged, Hungary

Co-Author: Erzsébet Komor, University of Szeged, Hungary

In this paper, we examined the relationships between exploration strategies and different learning styles in a problem-solving environment. Throughs of the study were to determine (1) qualitatively different exploration strategies by analysing log files and investigating the number of latent profiles into which first-year university students could be meaningfully divided and (2) the relationships between the quality and effectiveness of the exploration strategy used and different learning styles, including different learning strategies (memorization, elaboration and control), and levels of mastery motivation (task persistence, preference for challenge, task-related pleasure, self-efficacy, task absorption and motivation level during testing). The samples for the study were drawn from first-year university students (N=1729, M_age=19.5, sd_age=1.87). The instruments were a complex problem-solving test (20 items) anda learning style questionnaire (45 items, including questions on learning strategies and mastery motivation) Latent class analyses, ANOVA, factor analyses and bivariate correlations were used for the analyses. The reliability of the instruments is high (α_CPS=80; ω_learning, style=90). Four qualitatively different class profiles were identified: proficient explorers (65.6%), low-performing explorers (13.7%), rapid learners (9.9%) and non persistent explorers (10.8%). Students who often use memorization strategies in their learning proved to be less developed explorers and problem-solvers (n=20, p<0.01). Mastery motivation was found to be less important (n=11, p<0.01) as motivation toward testing at the beginning of and during testing. The results confirmed our hypothesis that different profiles of exploration and problem-solving behaviour indicate different learning styles and motivation levels toward learning, suggesting the need for different types of support and intervention.

Electrodermal Activity Arousal throughout a Full Physics Course: A Cue for Learning Regulation?

Keywords: Collaborative Learning, Learning analytics, Self-regulation, Technology

Presenting Author: Héctor Javier Plevia Díaz, University of Oulu, Finland

Co-Author: Paul A. Krischner, Open University, Netherlands

Co-Author: Hendrik Drachter, Open University of the Netherlands, Netherlands

Self-regulated learning (SRL) research has been searching for data which is complementary to self-reports and simple digital traces, techniques recognized for their limitations in reliability and representative sufficiency. One approach gaining attention is physical information. Electrodermal activity (EDA) is a physiological response indicating cognitive, affective and/or physical arousal (i.e., states of activation such as stress or anxiety). Peaks in EDA might indicate perceived challenges which are known to inverse self-regulation activities. Although extensively used in psychophysiology, studies have rarely focused on EDA in authentic learning situations. This paper reports on one student (of 12) who was tracked in the 19 collaborative learning sessions of a regular high school advanced physics course, known to be cognitively demanding. EDA peaks showing arousal were detected. The number of peaks ranged from 12 to 337 per session and the amplitudes from 1.78 to 11.13 µS/mm across sessions. Lower session values might indicate boredom or lack of interest while higher ones might show stress, engagement and/or high cognitive/emotional load in the respective sessions. These results point to a potential for teacher intervention and a more balanced instruction design across lessons.

Reading on Paper or on Tablet: An Eye-tracking Study

Keywords: Educational Psychology, Experimental studies, Learning Technologies, Reading comprehension
While a wide spread assumption considers that reading on digital mediums induces shallower processing than on paper (e.g. Ackerman & Lauterman, 2012), previous literature reveals inconsistent results regarding the effects of medium on text comprehension. For instance, we analyzed the on-line reading processes on the different mediums. We tested two complementary hypotheses. (1) Strategic hypothesis: Participants will show less strategic reading on tablet than on paper, specially when reading the structurally relevant parts of the texts, e.g. titles (Hyönä, Lorch, & Kaakinen, 2000); and (2) Ease-of-processing hypothesis: Participants will show a higher global reading rate on tablet than on paper (e.g. shorter fixation times, less number of fixations). In a within-subject study, 35 undergraduates read three expository texts on paper and three on tablet, while their eye-movements were tracked. For each text, they rated their expected comprehension scores and answered a set of multiple-choice questions. Even though eye-tracking data revealed no differences when looking at participants reading the text paragraphs, results indicated that participants first-pass fixation time, first-pass number of fixations and lookback fixations on textual titles were longer and higher when reading on paper than on tablet. We also found longer first-pass fixation duration when participants read the last sentence of each paragraph on paper. This pattern of results supports the strategic hypothesis. Nevertheless, no differences between mediums were found in the scores in comprehension questions or in the metacognitive judgements.

### Session C 63

**Online learning students in Russia: who are they?**

**Keywords:** E-learning; Online learning, Higher education, Student learning, Survey Research

**Presenting Author:** Polina Pilkina, Lomonosov Moscow State University, Russian Federation

**Co-Author:** Lyudmila Popova, Lomonosov Moscow State University, Russian Federation

Massive open online courses (MOOC) have become popular around the world because they provide access to education to students from different social groups. Russian National platform Open edx started to work in September 2015 and eight leading Russian universities downloaded 47 courses (107 courses in October 2016). We analyzed the reasons, why students choose online-courses and also identified average characteristics of Russian online students (Case of Russian online students). This study was based on quantitative research, a self-report survey used to collect data about the students’ background, experiences and perceptions. The main objective of this study was to analyze students’ motivation and satisfaction with the online education. We used a self-report survey. To analyze our data we used descriptive statistics, the chi-square test.

**Comparision of Finnish and German teacher students' motivations for choosing teacher career**

**Keywords:** Arts, Assessment methods and tools, Attitudes and beliefs, Case studies, Comparative studies, Design based research, E-learning / Online learning, Educational Psychology, Educational Technology, Higher education, Interdisciplinary, Lifelong learning, Pre-service teacher education, Professions and applied sciences, Student learning, Survey Research, Teacher Professional Development, Video analysis, Vocational education

**Interest group:** SSG 14 - Learning and Professional Development

**Chairperson:** Telle Halikainen, University of Helsinki, Finland

**Presenting Author:** Christian Harries, University of Paderborn, Germany

**Co-Author:** Jani Urtin, University of Jyväskylä, Finland

**Presenting Author:** Katja Vähäsaarten, University of Jyväskylä, Finland

**Co-Author:** Michael Goller, University of Paderborn, Germany

**Co-Author:** Dagmar Festner, University of Paderborn, Germany

The entrance into teacher education programmes differs widely between Finland and Germany. Whereas Finnish universities apply strong selection, the access to most German teacher education programmes does not bear any serious barriers. The aim of this study is to explore Finnish and German undergraduate students’ motivations for choosing teaching as a career. A questionnaire including the intrinsic and extrinsic motivation scale (10 items) and ISV profile (210 items) and a Gender role scale (10 items) was used to check the translated instrument and ANOVAs (or non-parametric equivalents) to test the differences between Finland and Germany. The expected findings of the study will reveal if the differences in the access to teacher education programmes between the countries are congruent with the differences among gender and students. As for educational significance, the study is to provide information to policy making in both countries and also universities informed decision making regarding teacher training. A theoretical contribution of the study is that it will further validate the FIT-Choice instrument in a new country (Finland) from a comparative perspective.

**Career guidance of students in secondary vocational education for life long learning**

**Keywords:** Adult learning, Survey Research, Vocational education, Lifelong learning

**Presenting Author:** Marina Kujipers, Open University, Netherlands

**Co-Author:** Sharon T. Levy, University of Haifa, Faculty of Education, Israel

In order to deal with the effects of the changing demands on the labour market and emergence of an unpredictable career, individuals are expected to develop career competencies. Career competencies are developed in a learning environment that stimulates real-life experiences with work and a dialogue about these experiences. A professionalization program for teachers was developed aiming to help them to conduct a career dialogue. The development of the program was accompanied by research.

**Computationally Enhanced Simulators of Professional Practice to Improve Proportional-Reasoning**

**Keywords:** Design based research, Educational Technology, Higher education, Professions and applied sciences

**Presenting Author:** Ilaria Duboni, University of Haifa, Faculty of Education, Israel

**Co-Author:** Sharon T. Levy, University of Haifa, Faculty of Education, Israel

In this study, we investigate the effect of using digital simulators to teach proportional reasoning, a critical component of medicine and related fields. The study was a quasi-experimental controlled pre-test-post-test design. Participants were nursing students (N=168): 72 students in comparison group who learned with a lecture based approach and 96 in experimental group who learned with XiMath environment.

**Main findings reveal that learning with XiMath is most efficient in maintaining of intensive quantities – concentration and drip-rate, which demands formal operations, a multiplicative thinking. Moreover, we have shown that through situated simulations the abstract proportional reasoning can be enhanced.**

**Paramedics’ technical/non-technical skills and the role of knowledge, self-assessment and attitude**

**Keywords:** Situation awareness methods and tools, Attitudes and beliefs, Individual psychology, Video analysis

**Presenting Author:** Michael Scheumann, Department of Educational Science, University of Regensburg, Germany

**Co-Author:** Helen Jossberger, University of Regensburg, Germany

**Co-Author:** Hans Gruber, University of Regensburg, Germany

**Co-Author:** Bernhard Graf, University Hospital Regensburg, Germany

**Co-Author:** York Zauß, University Hospital Regensburg, Germany

Focusing on attitude and self-assessment knowledge and technical/non-technical skills in simulation and critical situations is important in the education of healthcare professionals. The study is to evaluate the necessity of increasing knowledge on computer simulations and nursing critical situations. The motivation of the participants was also analyzed in the project. Internal motivation (informal learning activities) and external motivation (classroom learning) were correlated with the self-assessment knowledge and self-assessment technical skills.
High quality cardiopulmonary resuscitation (CPR) is a key factor in improving cardiac arrest survival. Technical skills (TS; e.g. chest compression) and non-technical skills (NTS; e.g. team work) play a crucial role for patient’s safety and care. The aim of the present study was to investigate TS and NTS of paramedics CPR performance. 22 paramedics participated. Their CPR performance using a simulation mannequin was video-taped to analyse TS and NTS. In addition, prior knowledge, self-assessment and attitude regarding the role of NTS during CPR performance were assessed with a questionnaire. Data collection will be completed in January 2017. We expect that poor self-assessment leads to weaker CPR performance. A positive attitude towards NTS as well as prior knowledge about the importance of NTS is expected to lead to superior NTS performance. Poor NTS performance is expected to correlate with weak technical performance. The results of this study sheds light on how technical and non-technical factors influence CPR performance. This research plays a role in the advancement of public good as it helps us to identify weaknesses in CPR that can be diminished in training.

How HE educators learn to teach Massive Open Online Courses. A case study

Keywords: Massive open online courses, E-learning, Online learning, Teacher Professional Development, Lifelong learning

Presenting Author: Tina Papathoma, The Open University, United Kingdom, United Kingdom
Co-Author: Alison Littlejohn, Open University, United Kingdom
Co-Author: Rebecca Ferguson, The Open University, United Kingdom, United Kingdom

People working within HE institutions need to learn new forms of teaching and learning practice, to transform the ways they work. This study explores the types of knowledge gained by those working in HE when they teach massive open online courses (MOOCs). Data were gathered through a case study involving interviews with six people with teaching roles on one MOOC. Data analysis used Tynjälä’s model of integrative pedagogy to identify the different types of theoretical, practical, sociocultural and affective knowledge needed in order to teach in a MOOC. The analysis shows that individuals did not engage in formal training (theoretical knowledge); they learned by experience; by (re)running the MOOC and from learners’ feedback (practical knowledge). They also reflected on their learning experience, on their contact with different cultures, on engaging with ideas from other MOOCs and people (sociocultural regulation). They worked collaboratively, sharing expertise, but sometimes found communication with colleagues was difficult (sociocultural knowledge). When they faced challenges they integrated theoretical, practical and self-regulative knowledge to solve problems (mediating processes).

Professional Development in Sculpting: Analysis of Social Interactions and Activities

Keywords: Arts, Educational Psychology, Professions and applied sciences, Lifelong learning

Presenting Author: Helen Jossberger, University of Regensburg, Germany
Co-Author: Linda Puppe, Universität Regensburg, Germany
Co-Author: Birgit Esgjø-Jørgensen, University of Regensburg, Germany
Co-Author: Hans Strüber, University of Regensburg, Germany

The myth of the artist as a gifted genius goes way back and is still present today. Talent looms large in visual arts. Our theoretical starting point, however, is expertise research, in which talent plays hardly any significant role. Expertise is explained as the result of a long-term endeavour to achieve advancement. The aim of the present study was to identify factors relevant for professional development in the domain of sculpting. 29 experts (sculptors with at least ten years of experience) and 24 semi-experts (university or academy students) participated in our survey study. A questionnaire was developed to examine the role of social interactions, artistic activities, and deliberate practice. The results reveal that colleagues were the most helpful persons for experts’ professional development, while semi-experts identified classmates as the most important persons. Feedback about content specific elements related to their artworks was essential for experts’ and semi-experts’ professional development. Artistic activity was more individualistic for experts, while students emphasised the importance of collaborative work and exchange. The majority of participants tried to improve their skills continuously and they indicated to practice deliberately. The results shed light on professional development of artists and help us to better understand what factors are perceived to be relevant to advance. This knowledge is important to improve teaching in the domain of sculpting at academies and universities.

Session C 64
30 August 2017 08:30 - 10:00
Main Building - C - C7
Poster Presentations
Learning and Instructional Technology, Learning and Social Interaction

Poster Presentation: Social Interaction in Learning and Instruction

Keywords: Assessment methods and tools, Case studies, Cognitive development, Collaborative Learning, Computer supported collaborative learning, Content analysis, Design based research, Language (Foreign and indigenous), Language (L1/Standard Language), Learning Technologies, Mathematics, Out of school learning, Peer interaction, Pre-service teacher education, Qualitative methods, Reasoning, Second language acquisition, Social aspects of learning and teaching, Social interaction, Student learning

Interested Group: SIG 10 - Social Interaction in Learning and Instruction

Chairperson: Kyrktal Doumas, Linnaeus University, Greece

Personal English Learning Ecologies and Meaningful Input with Digital and Non-Digital Artefacts

Keywords: Language (Foreign and second), Out-of-school learning, Qualitative methods, Second language acquisition

Presenting Author: Michel Cabot, Western Norway University of Applied Sciences, Norway

This paper analyses students’ self-perceived personal English Learning ecologies (PELE) in relation to written EFL input. Ecological perspectives are integrated with language development theories. Data from in-depth and member checking interviews of twelve students (an upper secondary school in Norway) were presented. The findings indicate a generally low exposure to written input outside school and scarce extensive reading in the past at lower secondary school. Most cases of screen reading are found to involve intensive reading. The representations of the students’ PELE are similar to X-ray photographs, which gives a straightforward summary of the interviewees’ ecological transitions and agentic triggers on one learning trajectory viewed in a temporal and locational perspective. It is particularly interesting to show a link between different ecological pushed input transitions, more meaningful agentic triggers, when artefacts are used repeatedly, and intensive and extensive reading. Schools serve an important complementary function in the case of intensive versus extensive reading.

Teachers’ decision-making and reasoning: how consistent are their planned and interactive decisions? A longitudinal case study on classroom management

Keywords: Classroom management, Lesson planning, Qualitative methods

Presenting Author: Bas Agriks, Utrecht University, Netherlands
Co-Author: Frans Prins, Utrecht University, Netherlands
Co-Author: Marike van der Schaaf, Utrecht University, Netherlands
Co-Author: Jan van Tuit, Utrecht University, Netherlands

Supervision meetings between teachers and key persons are to support teachers’ process of writing an undergraduate dissertation and offer opportunities for supervisor-student interaction. Supervisors’ judgments about the students’ knowledge and skills to make decisions they make. This study aimed to investigate the decisions supervisors make before and during supervision meetings of the undergraduate dissertation and which reasons supervisors have for their decisions. An exemplary multiple case study with seven supervisors was conducted. A pre-active interview to determine planning decisions was held with each supervisor. Each supervision meeting was videotaped with a head mounted camera. After the meeting, a video simulated interview was held to determine interactive decisions and reasons. Content and comparative analyses were conducted on the transcribed video data. Analyses showed that the supervisors made three main decisions: giving feedback, explaining, and eliciting input. The main reason for giving feedback and explaining was increasing student understanding. The main reasons for eliciting input were increasing student involvement and motivation, checking student understanding, and increasing student understanding. Analysis showed an acceptable consistency of the content between planned decisions and the interactive decisions during the supervision meeting. Supervisors, who elicited input from their students, applied a student centred approach, and created opportunities to check and diagnose student’s understanding. However, these eliciting suggestions were not accompanied with students unexpected questions and found it hard to give adapted support to increase students’ understanding.

Enhancing connected learning through OpenForest: First-year teacher education students’ design ideas

Keywords: Learning Technologies, Out-of-school learning, Pre-service teacher education, Social aspects of learning and teaching

Presenting Author: Henrikka Vartenainen, University of Eastern Finland, Finland
Co-Author: Patrini Vanninen, University of Eastern Finland, Finland
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The 21st century challenges to develop adaptive learning environments and social practices that connect people from various backgrounds to work together, and collectively construct, organise and develop information around multifaceted phenomena. To meet these challenges, an open wiki-based learning environment, OpenForest (www.openforest.fi), has been build on three educational pillars: (1) participatory learning in extended and generative communities as a vital concept for learning, (2) use of diverse technological resources and infrastructure as social and personal tools, and (3) co-development of information resources that offer multiple perspectives on forest related phenomena. For further development of the portal and related social practices, this study aims to examine what kinds of learning systems were mediated when first-year teacher education students (N = 160) were given an open-ended task to design a field trip to forest and/or forest museum with the support of OpenForest portal. The data was collected at the beginning of their studies in the autumn of 2014 as an online questionnaire. A preliminary content analysis of the students’ design ideas indicated that OpenForest was used in adaptive manner, when designing learning and teaching activities situated in extended learning environments. Yet, the pedagogical design ideas for connecting the extending network of subjects, objects and resources showed a need for further development. OpenForest portal and representation of MOOC. The findings provide grounds for designing participatory practices and extended learning networks in teacher education, and for developing OpenForest portal further to meet these challenges.

From experimental research to educational and psychological practices: “IDIOME” a computerized tool

Keywords: Assessment methods and tools, Cognitive development, Language (L1/Standard Language), Social aspects of learning and teaching

Presenting Author: Janina Hattouli, CNRS - University of Poitiers, France
Co-Author: Sandrine Gill, University of Poitiers, France
Co-Author: Virginia Lavali, University of Poitiers, France

Drawing on experimental research, we have created an original tool that allows education and psychology professionals to better understand children’s and adolescents’ language skills. Our tool is designed to investigate pragmatic abilities, which play a crucial role in social communication and interaction (Gibbs, 1991; Levato & Cacciari, 1999). Pragmatic abilities determine what we say, why we say it, and how we
say it, and whether it is appropriate in a given situation. However, although the ability to make sense of different cues in a communication situation is a fundamental mechanism for navigating the social world, professionals have so far been without a satisfactory tool for assessing this ability. Nonliteral language seems to be widely used to investigate pragmatic abilities in psychology research. It is defined by a gap between what is said and what is meant, according to the context. Bridging the gap between these two meanings requires the contribution of pragmatic skills. We have created and tested in a large population of children and adolescents (9-13 years) a computerized system for assessing nonliteral comprehension that satisfies the previously unmet need for a tool to measure the pragmatic abilities underlying communication.

Case-based portraits of micro-interaction patterns during online collaborative problem solving

Keywords: Case studies, Computer-supported collaborative learning, Peer interaction, Social aspects of learning and teaching

Presenting Author: Johanna Pöysä-Tarhonen, University of Jyväskylä, Finland
Co-Author: Estrin Care, The Brookings Institution, United States
Co-Author: Natasia Aweal, University of Melbourne, Australia
Co-Author: Päivi Häkkinen, University of Jyväskylä, Finland

This study recognizes the role and the nature of social dynamics in collaborative problem solving (CPS) processes and outcomes. The aim of this study, relying on multiple data and phases of analysis, is to explore and visualise, through contrasting case-based portraits, how micro-interaction processes at peer level evolve during CPS assessments in an online environment. The assessment is designed for a student pair in STEM domain. The results show that in spite of students' comparable CPS performance measures, variations in micro-interaction patterns occurred across pairs. It is expected that these patterns at peer level may provide new insights into CPS processes and so advance teaching these skills.

Effects of Task Design during Collaborative Problem Solving using the Knowledge Constructive Jigsaw

Keywords: Collaborative Learning, Design based research, Mathematics, Student learning

Presenting Author: Miro Kawasaki, Shizuoka University, Japan
Co-Author: Hyouki Masukawa, Shizuoka University, Japan
Co-Author: Ruo Endo, Tajima Junior High School, Japan

This study examines the effects of task design on learning during collaborative problem solving. Effective learning through collaborative problem solving depends on the varied ideas presented, and how those ideas are compared and related. Task design was deemed an important factor that affected the variety of ideas proposed, compared, and related. Thus, we conducted four mathematical lessons as a design research using the Knowledge Constructive Jigsaw method to examine effective task design for collaborative problem solving. Altogether 94 sixth-graders from a public school in Japan participated in this study. We designed the four mathematical lessons using the Knowledge Constructive Jigsaw (KJG) method. KJG is a framework of collaborative learning, based on research findings on how people's conceptions change. KJG consists of three phases of learning activities (Miyake, 2013): expert, jigsaw, and crosstalk. In this study, we primarily changed the tasks assigned to the children during the group activity that was conducted between the four lessons, and observed if they influenced the outcome of the lessons. The results suggest that the effectiveness of KJG depends on how the tasks are divided. It appears that dividing the tasks complementarily not correspondingly might be a design principle that can evoke varied ideas to compare and integrate.

Session C 65
30 August 2017 08:30 - 10:00
Pays-B - 47
Postner Presentation
Teaching and Teacher Education
Poster Presentation: Teaching and Pre-service Teacher Education
Keywords: Assessment methods and tools, At-risk students, Competencies, Literacy, Mixed-method research, Pre-service teacher education, Primary education, Qualitative methods, Quantitative methods, Special education, Teacher Professional Development, Teaching / instruction, Teaching approaches, Technology, Video analysis
Interest group: SIS 11 - Teaching and Teacher Education
Chairperson: Omid Noroozi, Iran
Estonian pre-service teachers' evaluations on their knowledge areas according to TPACK framework

Keywords: Competencies, Pre-service teacher education, Quantitative methods, Technology
Presenting Author: Pirret Luik, University of Tartu, Estonia
Co-Author: Merle Taimalu, University of Tartu, Estonia

In this presentation we discuss about the pre-service teachers evaluations on their knowledge areas according to TPACK framework, which integrates content, pedagogy and technology. Longitudinal study was last 4 years, in total 381 first year pre-service teachers, who filled in their sample of the study consists of participants started their second year studies. 123 students answered twice. CPA correlated on three-factor model: integration of technology, pedagogy and content. Data was analyzed using MANOVA and t-test. Both the TPACK framework and this study help to develop teacher training curricula and indicates, that pedagogical knowledge needs to be enhanced in teacher education in Estonia.

Teachers' Professional vision and its effect on their classroom management

Keywords: Mixed-method research, Qualitative methods, Teacher Professional Development, Video analysis
Presenting Author: Saskia Brand-Grewel, Open University, Netherlands
Co-Author: Johan van Strien, Open University of the Netherlands, Netherlands
Co-Author: Shanise van Driel, Open University of the Netherlands, Netherlands
Co-Author: Charlotte Wolf, Open University, Netherlands
Co-Author: Halszka Maria Jarodzka, Open University, Netherlands

Classroom management is challenging for many teachers, yet crucial for pupils' learning. Important for classroom management is teachers' professional vision, including noticing/seeing and interpreting of relevant events. Previous studies showed that student and expert teachers differ largely in their professional vision with respect to classroom management. However, in these studies, teachers' professional vision was investigated by watching videos of other teachers. Thus far, little is known about teachers' professional vision with respect to their own classroom management and how this relates to their teaching in practice. This proposal describes the set-up and co-collected data (i.e., a data paper) of a research project which seeks to investigate how the professional vision of teachers in training differs from beginning and expert teachers, and what is the longitudinal development of in training-teacher's professional vision. Four studies will be conducted among 60 teachers (20 teachers in training, 20 beginning, 20 experienced teachers): two in teachers' actual classrooms, in which teachers conduct a 1-hour lesson while wearing mobile eye-track glasses. After the lesson, teachers will select four events from their recordings that they consider as having been crucial for their classroom management. During retrospective verbal reports teachers will watch each event and report on what they see and why it is relevant for classroom management. Two other studies will use video recordings of other teachers' lessons. Eye-tracking data, verbal data, video recordings, and teacher characteristics will be collected and analyzed. Together, these studies will provide more insight into the development of teachers' professional vision.

Study about School Career: Generation 2012-2016

Keywords: Assessment methods and tools, Competencies, Pre-service teacher education, Primary education
Presenting Author: Edith Arvalo Vázquez, Normal "Miguel F. Martinez", Mexico
Co-Author: Hilda Alicia Guzmán Elizondo, Secretaría de Educación Pública, Mexico
Co-Author: Nancy Bernardino Moya González, Secretaría de Educación Pública, Mexico
Co-Author: José Luis Domínguez Aguirre, Escuela de Graduados de la Escuela Normal Superior “Prof. Moisés Sáenz Garza”, Mexico

In the present study we explore the school career of the first generation of graduated from the Study Plan 2012 implemented in Mexico for the Normal Schools of the Country.

The generation is made up by 288 students of the Bachelor Degree in Primary Education and of 96 students of the Bachelor Degree in Pre school education.

This research is part of this analysis is a public opinion poll applied to teachers, documentary review on the academic career of the graduated students and statistical information on their insertion to the professional educational service. According to the statistical results on the academic behavior is observed that the initial educational formation that the students received during his professional career is coherent with the expected profile of the graduate, due to 95.77 % of the graduated students is incorporated in the Professional Educational Service, getting a job at basic education by means of examination of opposition.

This research takes part of an investigation about the evaluation of the Curriculum 2012, in its first generation. The results will offer useful information for the taking of decisions and the strengthening of the curriculum.

Key words: Initial educational formation, school career, curriculum.

Inclusive teaching practice - A theoretical review

Keywords: Autism spectrum disorder, Special education, Teaching approaches
Presenting Author: Teija Koskela, UEF-University of Eastern Finland, Finland
Co-Author: Hanna-Maija Sirkiönen, University of Tampere, Finland, Finland

The purpose in this theoretical paper is to create a framework to develop further the idea of teaching practice for more multiprofessional meaning in inclusive context. The national core curriculum in Finland underlines multiprofessional co-operation and listening to students. The issue is current in teacher education.

Making full participation possible for all students is the meaning of our reconsideration of the concept of teaching practice. Especially the role of class assistant seems to be crucial. When teachers organize their work listening to students own voice is important. In everyday school work the assistant is the person who has tight relation to students considering their special educational needs. On that account, there is need to create more dialogic interaction between teachers and assistants.

In this paper we transform the model of prerequisites for inclusive teaching practice, as a tool of meeting all students' educational needs. Strengthening the position of school assistants as a part of teamteaching is an issue we scrutinize in our theoretical review. We focus on working methods which best enable utilizing assistants knowledge of students’ abilities and needs in teamteaching. We present a model which includes collaborative approach to planning, awareness of guidance, effective use of learning methods and teaching arrangements.
Introducing an Instrument for Measuring Academic Integration in Pre-Service Teachers

Keywords: Assessment methods and tools, At-risk students, Pre-service teacher education, Teacher Professional Development

Presenting Author: Sandra Dietrich, University of Leipzig, Germany

Low retention rates in teacher training for secondary schools are a challenge of the German educational system. Finishing rates are as low as 50% and even lower in the high demand STEM-subjects. Failed academic integration could be a predictor for drop out from teacher education.

Hence, this presentation aims at introducing and discussing a new instrument for measuring academic integration in pre-service teachers.

Academic integration is defined by the extent to which a student engages in social interactions with fellow students (Social Belonging) and whether she is putting effort into education related activities (Achievement). The instrument was developed and reliability on a sample of 140 students (female = 103; mean age = 21; SD = 3.54) in an online survey. Unfortunately, only the scale Social Belonging showed adequate reliability and could be used for further preliminary analysis. For the scale Academic Determination further adjustments are needed, for one increasing the number of items. Further directions and ways to improve the scales will be discussed.

Session C 66
30 August 2017 08:30 - 10:00
Pensio B · B3110
Poster Presentation
Motivational, Social, and Affective Processes

Poster Presentation: Motivation and Achievement

Keywords: Achievement, Arts, Assessment methods and tools, Attitudes and beliefs, Conceptual change, Developmental processes, Emotion and affect, Goal orientation, Intelligence, Mathematics, Motivation, Motivation and emotion, Parental involvement in learning, Self-regulation, Student learning

Interest group: SIG 08 · Motivation and Emotion

Chairperson: Barbara Roosken, Fortys University, Netherlands
Co-Author: Csaba Csiszar, University of Szeged, Hungary

The place for music education among school subjects in students' views

Keywords: Arts, Assessment methods and tools, Attitudes and beliefs, Emotion and affect

Presenting Author: Tünde Pintér, University of Szeged, Hungary
Co-Author: Csaba Csiszar, University of Szeged, Hungary

The aim of this study was to assess the current prestige of music education among students in Hungary, as well as to reveal their opinion about the quality of music lessons. Data were obtained from questionnaires filled out by 501 elementary school students aged 7–14 from one school. Questionnaires focused on the attitudes and satisfaction of students regarding school subjects.

It can be concluded from these results that music is rarely selected by students as their favourite school subject. Furthermore, younger students reported more positive attitude towards music, but with increasing age their attitudes decreased. Many students complained about the unicity of music lessons, and they considered the quality of teaching inappropriate.

Goal theory and impostor phenomenon during surgery residency: Does self-doubt make me a fraud?

Keywords: Achievement, Goal orientation, Motivation, Self-regulation

Presenting Author: Michael Dempsey, Boston University, United States
Co-Author: Douglas Kaufman, Boston University, United States

Impostor phenomenon characterizes persons who feel like intellectual frauds, and for whom achievement tasks can elicit anxiety and emotional distress. Empirical research related to the phenomenon is scant in Graduate Medical Education, though it is often referenced indirectly in studies of personality traits across diverse medical fields. We sought to better understand how residents experience impostor phenomenon during residency training. We conducted in-depth qualitative interviews with 16 resident physicians from two tertiary-care academic medical institutions. Participants were asked to reflect on team leadership experiences in a trauma setting, which we anticipated would elicit rich descriptions of cognitive and emotional behavior. An interdisciplinary team subjected transcriptions to phenomenological thematic analysis through an iterative, rigorous process. Analysis revealed three major themes related to impostor phenomenon in residents' experiences with team leadership: Transition Events, Achievement-Related Competence and Coping Strategies. A modified member-checking strategy confirmed these themes were consistent with surgical residents' experiences.

Implicit beliefs about giftedness and intelligence among Finnish high achieving students

Keywords: Achievement, Conceptual change, Intelligence, Motivation

Presenting Author: Elina Kuusisto, University of Helsinki, Finland
Co-Author: Sonja Laine, University of Helsinki, Finland
Co-Author: Kirsi Tori, University of Helsinki, Finland

This paper presents the results of a study in which a Finnish high achieving upper secondary school students' (N=151) implicit beliefs about giftedness and intelligence were examined. The theoretical background of the study lies in Carol Dweck's theory of implicit beliefs, and accordingly the study utilized Dweck's instrument. The results indicated that the students saw intelligence as malleable (M=4.24, SD=0.96), but giftedness more as fixed (M=3.21, SD=1.31). The study identified potentially vulnerable group of high achieving students, having fixed orientation toward both intelligence and giftedness. One fourth of the students had this orientation and might be at risk of avoidance of challenges and even underachievement. The research highlights the importance of future research about how implicit beliefs affect students learning success during challenging upper secondary school years.

Effects of a Gender Stereotyped Math TV Show on Girls' and Boys' Math Achievement and Attitudes

Keywords: Achievement, Attitudes and beliefs, Mathematics, Motivation

Presenting Author: Eike Wille, University of Tübingen, Germany
Co-Author: Hanna Gaspard, University of Tübingen, Germany
Co-Author: Kerstin Oszchatz, University of Tübingen, Germany
Co-Author: Benjamin Nagengast, Eberhard Karls Universität Tübingen, Germany
Co-Author: Ulrich Trautwein, University of Tübingen, Germany

Women are underestimated in mathematically-intensive STEM domains, which can be linked to early emerging gender differences in math motivation. Based on expectancy-value theory, there is ample research on how socialization influences girls' and boys' math motivation differently (c.f., Wigfield et al., 2015). Furthermore, there is extensive work on stereotype threats, indicating that negative math stereotypes affect females' math perceptions, motivation, and achievement (c.f., Steele et al., 2002). Television shows are a central factor in children's socialization, which contain also specific gender stereotypes. However, it is unclear to what extent television influences children's motivation and achievement in math. We therefore conducted an experimental study with a pretest-posttest control-group design to investigate differential effects of a gender stereotyped math television show on girls' and boys' math achievement, motivation and attitude as well as their stereotype endorsement. To this end, 335 9th graders watched a television show about math either with or without an explicit gender-stereotyped section. We specified multiple regression analyses and tested main effects of gender and experimental condition as well as their interaction on all outcomes. Results indicate that watching a gender stereotyped television show affected girls' attitudes in math as well as their stereotype endorsement negatively. Positive effects were found on boys' attitudes in mathematics. Results offer first insights on how television shows influence girls' and boys' motivation and achievement for math, and how they may constitute one contributing factor to gender differences in the STEM fields.

The nature of students' pride and its interplay with motivation and learning

Keywords: Achievement, Parental involvement in learning, Student learning, Motivation and emotion

Presenting Author: Karolin Heker, RWTH Aachen University, Germany
Co-Author: Judith Fraenken, RWTH Aachen University, Germany
Co-Author: Marisol Wosnitza, RWTH Aachen University, Germany

Teaching their subject-specific language awareness in technical vocational education

Keywords: Literacy, Qualitative methods, Teaching / Instruction, Technology

Presenting Author: Ely Wildeman, Fontys University of Applied Sciences, Netherlands
Co-Author: Maaike Koopman, Eindhoven University of Technology, Netherlands
Co-Author: Douwe Beiaard, Eindhoven University of Technology, Netherlands

Teachers' Language Awareness (TLA) is essential for improving students' subject-specific language development. This study focuses on the development of instruments to investigate Teachers' Subject-specific Language Awareness (TSLA) in technical vocational education. For this purpose, interview data were collected about teachers' general knowledge and beliefs about TLA, their learning objectives of lessons they taught, their interactions with students through classroom observations, and video-stimulated interview data to capture their knowledge underlying fragments of their observed teaching behaviour. Based on these data sources, portraits were constructed to see if these data, in their combination, could provide a rich picture of technical teachers' TSLA in terms of their knowledge, beliefs and behaviour concerning language development of their students when teaching their subject. The study concludes that these portraits provide a comprehensive and coherent insight into technical teachers' Subject-specific Language Awareness. The instruments made it also possible to discriminate among teachers' level of TLA. Teachers appeared to differ in their knowledge about relevant subject-specific language skills and functions, in their responsibility concerning their students' language development and in the way their instructional behaviour supports student subject-specific language learning. This indicates that, in their combination, the data sources underlying the portraits are not only comprehensive and coherent, but that they are also detailed in the picture they provide.
Pride as a positive activating emotion is thought to promote both extrinsic and intrinsic motivation. Prior research has shown that students’ pride in the school context mainly focuses on task- and school related topics. Based on this, the present study focuses on the interplay between students’ pride and motivation and the effect on academic performance. Furthermore, it is examined if there are different types of students with regard to their pride and if there are further differences between them.

Pride statements of 42 school students were collected over a whole school year (i.e., 40 weeks) and were coded into an emerging category system. Additionally, students filled a survey about inter alia their responsibility, aspirations, motivation, test anxiety, sense of competence and whether they felt they were fulfilling their parents’ expectations. In another survey, students’ parents were asked inter alia to rate their child’s ability and parents’ expectations for their child.

Results show that there are two types of students in the light of what they state to be proud of. One of them focuses more on outcomes and achievement and furthermore feels competent and good in math. Additionally the parents of this type of student expect their children to be good in math and find parent involvement important. In contrast, the other type of students focuses more on the learning process. Those students have to try hard to get good grades in math and have bigger test anxiety. Their parents also think that their children have to exert themselves in math.

Dual trajectory of academic motivation and perceived competence: a longitudinal study

Keywords: Achievement, Attitudes and beliefs, Developmental processes, Motivation

Presenting Author: Nadia Leroy, Université Grenoble Alpes, France

The aim of this study is twofold: exploring the evolution of the different components of motivation during junior high school and analyzing the relationships between motivational trajectories and students’ perceived competence trajectories in a dual model.

Based on the recent development of group-based trajectory model (Jones & Nagni, 2007; Jones, Nagni & Roeder, 2001; Nagni, 1999; Nagni & Tremblay, 2001), we address the role of perceived competence trajectories in motivational trajectories variations.

First, we will examine how the different kinds of academic motivation in mathematics fluctuate during junior high school. Second, we explore whether perceived competence trajectories might be influential for the motivation trajectories. In other words, the objective consist of (a) identifying trajectories of motivational profiles using a group-based approach (b) studying the relationship between the probability membership to each profile and students’ perceived competence (c) combining the patterns of change in motivation and in perceived competence within a dual model.

The analysis will address several questions:

- Might students be autonomously motivated even if they report low level of perceived competence? and with which probability?
- Might students display low level of autonomous motivation even if they report high level of perceived competence?
- Might students simultaneously report high level of autonomous motivation while having low level of perceived competence?

Session C 67

30 August 2017 09:30 - 10:00
Pent 8 - B3199
Poster Presentation
Cognitive Science, Motivational, Social and Affective Processes

Poster Presentation: Neuroscience and Motivation

Keywords: Cognitive skills, Collaborative Learning, Conceptual change, Educational Psychology, Educational Technology, Emotion and affect, Experimental studies, Higher education, Learning Technologies, Mathematics, Mixed-method research, Motivation and emotion, Neuroscience, Numeracy, Professions and applied sciences, Quantitative methods, Science education

Interest group: SIG 98 - Motivation and Emotion, SIG 22 - Neuroscience and Education

Chairperson: Rebecca Edwards, University of Victoria, Canada

Analysis of Motivational and Cognitive Processes in Collaborative Learning

Keywords: Collaborative Learning, Educational Psychology, Mixed-method research, Motivation and emotion

Presenting Author: Eisuko Tanaka, Nagoya University, Japan

Co-Author: Emmanuel Manate, Kyoto University, Japan

Previous studies point to the influence of collaborative learning on motivation and cognition but the processes involved remain to be fully elucidated. The purpose of this study was to examine the changing process of interest and its relationship with cognition by analyzing participants’ change in interest and self-efficacy every 5 minutes, and their speech and behavior during collaborative learning. Twelve pairs of 24 undergraduate and graduate school students participated in the experiment. They learned about JavaScript by reading a textbook individually for 25 minutes and then were asked to solve an applied problem collaboratively for another 25 minutes. During collaborative learning, students evaluated their interest and self-efficacy pertaining to the applied problem every five minutes, and their speech and behavior were recorded. Collected data were analyzed qualitatively. The results indicate that interest is enhanced by sharing thoughts and understanding with each other at the beginning of collaborative learning. When they are stuck and their self-efficacy decreases, conversation focusing not only on superficial procedures for generating an answer but understanding of each meaning of protocol leads to new awareness and maintenance of interest levels. By analyzing change of motivation during learning, and speech and behavior which reflect their cognition together, we can gain insight about motivational and cognitive processes involved in collaborative learning.

Examining Learners’ Physiological Activation during an Interaction with a Mobile AR App for Learning

Keywords: Educational Technology, Emotion and affect, Learning Technologies, Motivation and emotion

Presenting Author: Susanne Lapo, McGill University, Canada

Co-Author: Jason Harvey, University of Alberta, Canada

Co-Author: Amanda Jaffrey, McGill University, Canada

Co-Author: Tara Tressel, McGill University, Canada

Co-Author: Laura Pipe, McGill University, Canada

Co-Author: Chayse Haldane, The University of Alberta, Canada

Understanding the physiological component of emotion and its relationship with learning is critical, but also challenging given the diversity of available approaches to measure it and the paucity of guidance from theories of emotion regarding physiological-specific assumptions. The authors contribute to addressing this gap by examining the relationship between learners’ physiological activation and their random assignment to one of two different learning conditions during an interaction with a mobile augmented reality application for history learning. Physiological activation was captured using a bracelet that recorded learners’ electrodermal activation (EDA). EDA data was processed and analyzed from a subsample of six out of 44 participants collected in an ongoing study. The two conditions varied based on the nature of the historical reasoning prompts provided by a human guide to users of the mobile AR application. The control condition provided shallow, comparison-based prompts while the extended prompt and feedback (EPF) condition drew on a broader and deeper set of historical reasoning prompts to foster more active learning, cognitive engagement, and deeper levels of historical reasoning. Preliminary results revealed that learners tended, across conditions, to experience moderately elevated mean levels of physiological activation during their interaction with the mobile AR app. Self-reported emotion data revealed that mean EDA levels likely reflected instances of positively-valenced activation (e.g., enjoyment) rather than negatively-valenced activation (e.g., frustration). These findings provide converging support that the mobile AR app and guide interaction fostered positive emotions as well learning about history.

The role of inhibitory control in learning counterintuitive science and math concepts in adolescence

Keywords: Cognitive skills, Conceptual change, Mathematics, Science education

Presenting Author: Annie Brookman-Byrne, Birkbeck, University of London, United Kingdom

Co-Author: Andy Talmac, UCL Institute of Education, United Kingdom

Co-Author: Denis Marcashal, Birkbeck, University of London, United Kingdom

Co-Author: Iroise Dumonthier, Birkbeck, University of London, United Kingdom
The civic engagement of future generations is a crucial element in democratic societies. Therefore democratic countries attach much importance to the civic education of young adolescents in school. This paper aims to measure school influences on the social development of young adolescents. To create civic consciousness and engage secondary school students, teachers not only transfer civic knowledge. We increasingly assume schools to be a mini-polity, in which students can learn to interact with the society and where they learn to value their participation. It is by reaching these civic competences that students can become engaged citizens.

To measure social school influences, this paper compares the results of the Flemish ICSS 2016 data with the Flemish educational effectiveness and evaluation survey. Both surveys measure civic knowledge and attitudes and are administered parallel in Flemish schools. The first study is administered among eight grade students, the latter among twelfth graders. Comparing the results of these studies reveals a growth of civic competences (civic knowledge, reported participation levels and students' self-efficacy) over age. And parallel to this higher critical consciousness, older students seem to perceive good citizenship more often as engaged citizenship. The relationship between students' engagement and their civic competences can be confirmed by a regression analysis and visualized in two structural equation models. Both path models then illustrate the dependency between students' perceptions of good citizenship and students' civic competences.

Categorizing student, Categorizing texts. Will Plagiarism Detection leave Blood on the Tracks?
Keywords: Morality, Social Interaction, Technology, Writing / Literacy
Presenting Author: Lars-Erik Nilsson, Kristianstad University, Sweden
Co-Author: Anders Böld, Kristianstad University, Sweden
Co-Author: Tina Kullenberg, Kristianstad University, Sweden
Within research on examination cheating, a common assumption is that plagiarism in the context of examination is increasing epidemically. A uniform definition of plagiarism does not exist, but plagiarism is the category most frequently used when students at Swedish universities are notified and sanctioned for deception. Text Comparison is frequently presented as an effective technology for addressing plagiarism. Plagiarism Detection Services (PDS) are used for detecting text overlaps, particularly in higher education. While Higher Education Institutions in some countries appear to have unilaterally accepted the use of text comparison technology, the reception in other countries have been ambivalent or even critical.

The present project studies consequences of the use of text comparison through teachers meaning making regarding the pedagogical task to grade students and the moral task, to report students that try to deceive. We hypothesise that teachers’ epistemological views are contingent on technology and textuals, Text comparison/technology, therefore, runs the danger of introducing consequential biases to the assessment of student performance. The material has been gathered in five focus group conversations. Focus has been introduced through the presentation of reports from a Plagiarism Detection System. A topical analysis has been performed on the transcribed conversations. From our results, we conclude that teachers’ epistemological views are contingent on technology and discourses on technology. Text comparison, therefore, runs the danger of introducing a consequential bias to reassessment of student performance leading students open to the accusation about deception.

Policy formation in times of transition; What education policy research can tell us.
Keywords: Attitudes and beliefs, Conceptual change, Content analysis, Educational policy
Presenting Author: Catherine Simon, Institute for Education, Bath Spa University, United Kingdom
Policy research offers useful insights into the formation of policy narrative. This conceptual analysis explores the intellectual antecedents which have informed Conservative Party education policy in England since 2010. It draws on an eclectic mix of liberal, conservative, radical and socialist discourse relating to notions such as citizenship, community, civil society and the role of the state in relation to these. Lévi Strauss’s (1962) theoretical model of bricolage, Hall’s (1998) agency of political ideas help uncover the inherent contradictions and limitations in current education policy and therefore may be used to inform policy implementation and development. This paper explores the formation of education policy at times of transition. Education has not been immune to the neoliberal project contained within globalisation. This is particularly so in England since the late 1980s. At a time when party politics in the West appears to be converging on the centre -right, a key question is how might education policy be constructed by newly elected governments in ways that appear original and distinctive to the electorate, whilst espousing the values and ideologies of the political party or parties in power.

The Economics of Ethics: The Logic of Moral Action and the Consequences for Education
Keywords: Developmental processes, Morality
Presenting Author: Karin Heinrichs, Otto-Friedrich-University Bamberg, Germany
Co-Author: Gerhard Minnemeyer, Goethe-Universität Frankfurt, Germany
In the context of economic experiments, giving in a "dictator game" is generally conceived as moral, while keeping the entire endowment is conceived as immoral. Similarly, in the "prisoners’ dilemma", cooperation is understood as the moral course of action, defection as the immoral or selfish one. However, this interpretation misses the point for two major reasons. One concerns the reality of moral action. The second concerns the notion of morality as such. Whereas moral philosophers and psychologists have come to see morality as a specific set of personal values, moral principles may also be understood as “institutions” in the economic sense.

Session C 69
30 August 2017 08:30 - 10:00
Virta - 113
Poster Presentation
Assessment and Evaluation, Learning and Instructional Technology
Poster Presentation: Assessment
Keywords: Achievement, Assessment methods and tools, Cognitive skills, Comprehension of text and graphics, Educational Technology, Higher education, Intelligence, Learning approaches, Mixed-method research, Problem solving, Quantitative methods, Second language acquisition, Secondary data analysis, Self-regulation, Social aspects of learning and teaching, Student learning
Interest group: SIG 01 - Assessment and Evaluation
Chairperson: Gabriela Gonzalez Olcampa, University Ramon Llull, Mexico
Tracing the student journey through the feedback landscape
Keywords: Higher education, Learning approaches, Social aspects of learning and teaching, Student learning
Presenting Author: Rola Ajlai, Deakin University, Australia
Co-Author: Margaret Beaman, Monash University, Australia
Co-Author: Elizabeth Molloy, Monash University, Australia
Co-Author: Charlotte Rees, Monash University, Australia
There has been a palpable shift in the feedback literature emphasising the role of students in feedback. Indeed, the shift suggests that information not resulting in student action is not actually feedback. Yet students tell us still that feedback is something done to them rather than with them. They are typically positioned (by self and teachers) in a passive role within feedback interactions. Synthesising recent research into students’ judgments, expectations and actions in feedback interactions, we reposition the student within the feedback discourse and highlight some of the tensions that students face in navigating the feedback landscape. We do this by tracing a fictitious medical student journey through a number of networked systems described in Bronfenbrenner’s ecological systems theory. Ecological systems theory posits that individuals are influenced by five interdependent (networked) environmental systems: micro-, meso-, exo-, macro- and chronosystems (Neal & Neal, 2013). This analysis identifies the need to support students in improving their feedback literacy and helping them make sense of their experiences so that future curricula and workplace encounters build on realistic expectations and healthy feedback practices. Further, this analysis highlights the need to reframe understandings of feedback from rules about content and delivery to more nuanced appreciations of the role of relationships and content in feedback encounters.

Left to their own devices; using tablets to enhance student engagement in a flipped EFL classroom
Keywords: Educational Technology, Mixed-method research, Second language acquisition, Social aspects of learning and teaching
Presenting Author: Nicholas Bovee, Kyushu Sangyo University, Japan
Aims
This ongoing study examines how iPads might be leveraged to support student engagement and autonomy in a “flipped” English language oral communication course. Findings will be used to formulate a preliminary set of best practices in regards to tablet use in this and similar contexts.

Methodology
The subjects were 254 students in a compulsory course at a Japanese university in three conditions: flipped/textbook, flipped/IPad, and traditional (control condition). Engagement and autonomy support questionnaire data and objective outcomes were modeled (ANOVA/SEM). Qualitative evidence regarding engagement was obtained from class observations and interviews.

Preliminary results
Engagement increased greatest over the semester in the iPad condition. Engagement in the flipped and iPad conditions was higher than in the traditional condition at the end of the semester. Contrary to expectations, perceptions of autonomy support were the lowest in the iPad condition. Proficiency test scores did not differ between conditions. Completion rates for the textbook review e-learning homework was highest in the traditional condition, suggesting that higher engagement did not extend beyond the classroom. Class observations revealed that although the patterns of interactions were similar in both flipped conditions, the iPads did not seem to foster higher quality interactions.

Implications
The overall similarity in engagement patterns between the iPad/flippped and textbook/flippped conditions suggests that the flipped approach itself plays a greater role in affecting engagement than the introduction of iPads. Future development of iPad-based activities should focus on minimizing their "footprint" in terms of mediating interactions so that students are communicating more directly.
Computer-based assessment of thinking skills in China: a pilot study

Keywords: Assessment methods and tools, Cognitive skills, Problem solving, Quantitative methods

Presenting Author: Hao Wu, University of Szeged, Hungary
Co-Author: Györgyvár Mohar, University of Szeged, Hungary

The objectives of the study is to explore the applicability of online reasoning tests for detecting the component skills of problem solving and defining background factors which impact the developmental level of student's problem solving skills in China. The sample of the pilot study was drawn from six grade students (age 11-13, N=50). The instruments of the study were conducted by four tests measuring problem solving (3 items), inductive reasoning (5 items), visual memory (12 items) and creativity (6 items), and a questionnaire, which focused on participants' demographic data, learning strategies (13 items), test-taking motivation (15 items) and ICT familiarity (9 items). The tests were carried out by means of the eDIA platform. The internal consistencies of the online instruments were high, Cronbach's alpha varied between .74, and .90. Participants' score distribution confirmed the applicability of the test. The bivariate correlations between problem solving and both inductive reasoning (r=.44, p<.05) and visual memory (r=.62, p<.05) were moderate signaling that they are different, but related constructs. Students' level of creativity did not influence their problem solving achievement while students learning strategies had a significant effect on their achievement. Students who preferred control strategies in their study got significantly higher performance on problem solving, inductive reasoning and creatively than their peers.

Findings support the view that computer-based tests are applicable to measure students thinking skill and the component skills of problem solving China at the age of 11-13.

The interplay of g and mathematical abilities in large-scale assessments across grades

Keywords: Achievement, Assessment methods and tools, Intelligence. Secondary data analysis

Presenting Author: Nele Nicole Kamp, Leibniz Institute for Science and Mathematics Education (IPN), Germany
Co-Author: Stefan Sassi, Leibniz Institute for Science Education and Mathematical, Germany

The study investigates the interplay of general cognitive abilities and domain-specific mathematical ability applying three different models that represent, math-ability and GI as well as math-specific ability and g. Furthermore, we analyze the relation between the student characteristics like self-concept in mathematics, gender, SES, and grade in mathematics. Using data from six different German LSAs of the three cohorts Grade 5, 9 and 13 (sample sizes range from NGrade 5 = 730 to NGrade 9 = 3,893) and two different frameworks (i.e., literacy and curriculum) the data confirmed that LSAs do test math ability beyond g. The two cognitive factors correlated differently with the considered student characteristics which calls for future longitudinal approaches to the question.

Deeper learning and Assessment in 7th graders reading comprehension processes

Keywords: Assessment methods and tools, Cognitive skills, Comprehension of text and graphics, Self-regulation

Presenting Author: Wanke Mork Rogn, Volda University College, Norway
Co-Author: Stine M. Gamlem, Volda University College, Norway

The aim of this study is to investigate 7th graders' (N=30) text processing in reading multiple, partly contradictory texts. Further, we investigate to what extent pupils seek internal feedback and process information from such texts. In the current project we adopt a comprehensive definition of the concept "Deeper learning" as it is explained as heuristics by Winneburg (1991). Moreover, pupils with prior high scores on standardized reading tests elaborated and evaluated more, and paraphrased less, on contradictory information than pupils with low prior reading scores. These pupils seem to seek internal feedback on a task, process and self-regulation level, while the pupils with low prior reading scores were seeking feedback related to a task- and self-level. This illustrate how reading strategies may vary across individuals with respect to both reading skills and ability to detect contradictory information when pupils work with multiple conflicting documents. While the less-skilled readers ignored the contradictory information, the skilled readers showed a strong will to resolve the dissonance and struggled to clarify through using deeper strategies and questions during reading. Results demonstrate that less-skilled readers need more support during problem solving tasks.

Assessment for learning in Higher Education: Potential and constraints from the students’ view

Keywords: Assessment methods and tools, Higher education, Learning approaches, Self-regulation

Presenting Author: Diana Pereira, University of Minho, Portugal
Co-Author: Patricia Santos, Institute of Education - University of Minho, Portugal
Co-Author: Maria A. Flores, University of Minho, Portugal

Pedagogical innovation is a key issue in Higher Education (HE), in a context where the educational priorities point out to the need to strengthen the teaching quality levels. With the Bologna Process, the renewed framework in the curricula has brought about changes with implications for teaching, learning and assessment methodologies. considered key issues to achieve pedagogical excellence in HE. Since it emphasizes assessment and continuous feedback mechanisms between teacher and student for adjustment of strategies and learning activities, the Assessment for Learning (AfL) approach has been pointed out as a pedagogical innovation where the priority is to enhance students’ learning. Literature highlights that AfL practices stimulate students' engagement in the learning process in a more active way, providing them with more positive formative experiences. This paper draws on data from an ongoing PhD project aimed at investigating AfL in Sciences, Engineering and Social Sciences in two public universities in Portugal. With three different research phases, the study combines the development of focus groups, a survey and the development of an intervention project with students. Data reported in this paper were collected through the development of the intervention project focused on AfL, namely with the development of a survey and the monitoring strategies of teaching, learning and assessment. In total, 70 students enrolled at an Engineering programme participated in this phase. Findings reflect about AfL potentialities and implications in the teaching, learning and assessment processes, as well as in the academic outcomes in HE.

Session C 70

30 August 2017 08:30 - 10:00
Virta - 120
Poster Presentation
Learning and Instructional Technology
Poster Presentation: Learning and Instructional Technology

Interest group: SIG 07 - Learning and Instruction with Computers
Chairperson: Sara Sirmim, University of Padua, Italy

Effects of usability and organization on students' learning from instructional hypertext
Keywords: Educational Technology, Learning Technologies, Multimedia learning, Primary education, Problem solving, Qualitative methods, Quantitative methods, Reading comprehension, Science education, Self-regulation, Student learning, Technology

Presenting Author: Álvaro Jáñez, University of Salamanca, Spain
Co-Author: Javier Rosell, Universidad de Salamanca, Spain
Co-Author: Jean-François Rouet, University of Poitiers, France

Hypertext structure and usability have been identified as key variables to be comprehended and navigation performance in hypertext. However, there is currently very little data on the potential interactions of both variables. In the present study, twenty-four undergraduate students were recorded while navigating two hypertexts (one structured hierarchically, the other one structured as a network). The two hypertexts assumed the same level of difficulty for students to comprehend. Another twenty-four students were recorded navigating the same two hypertexts, but with a lower usability design. Results showed an interaction between hypertext structure and usability on comprehension scores. Also, navigation recordings showed how participants navigated differently across hypertext structures. Differences in comprehension are analysed through navigation differences, trying to explain how both variables interact.

Supportive hints in a digital environment foster students’ motivation to read informational text
Keywords: Computer-assisted learning, Motivation, Reading comprehension, Self-regulation

Presenting Author: Marlies ter Beek, Rijksuniversiteit Groningen, Dep of Education and GION, Netherlands
Co-Author: Leonie Brummer, GION - University of Groningen, Netherlands
Co-Author: Anouk Donker-Bergstra, Rijksuniversiteit Groningen, Dep of Education and GION, Netherlands
Co-Author: Christine Opdenakker, University of Groningen, Netherlands

Students’ motivation to learn increases when they can autonomously decide what to do or when they can regulate their own need for help (e.g., self-regulated learning; Zimmerman, 2008). Self-regulated learning nowadays can be digitally facilitated, but although technological applications are believed to increase student motivation, little empirical research exists regarding the possible influence of digital support on reading motivation (Moran et al., 2008). This research project investigated whether self-regulated use of supportive cognitive and metacognitive scaffolds in a digital learning environment increases students motivation to read informational texts. Three different groups of 7th-graders worked in our digital reading environment to read geographical and historical materials. By using three different conditions we can determine whether providing supportive hints influences student motivation to read regardless of the subject of the text. Preliminary results on a usability questionnaire show that students enjoyed working in our digital environment, but statistical data analysis after semester 1 (December 2016) will reveal whether providing hints significantly influences student reading motivation.

Effects of Scaffolding Programs on Meta-Cognitive Skills Within Computerized Science Problem Solving
Keywords: Computer-assisted learning, Metacognition, Problem solving, Science education

Presenting Author: Zvi Fain, Bar-Ilan University, Israel

The current paper examines the effect of scaffolding programs on meta-cognitive skills in a computerized environment. This environment presents simulations of scientific laboratory experiments followed by qualitative problems that the students are required to solve.
Four scaffolding components were identified: structure, reflection, subject matter and environment, and used in different configurations to construct four support programs (based on human teaching), implemented by appropriate worksheets. The scaffolded groups were compared to one another and to a non-scaffolded control group as regards increasing effectiveness of three meta-cognitive skills: self-assessment problem solving process; assessing final answer; finding the error and its causes for incorrect solution.

Participants were 187 junior high school students, in five experimental groups, each of three academic levels. All groups worked within the same computerized learning environment. The treatments were conducted once every two weeks for a period of approximately 6 months. The students were interviewed at the end of the study, and their problem solving activities in the computerized learning environment were observed and transcribed.

The resulted protocols were then analyzed, each student being assigned an effectiveness score for each meta-cognitive skill. These scores were subjected to a 3x3 (groups by academic levels) ANOVA analysis. Results showed highly significant differences between the groups in all three skills, and different patterns of effectiveness, depending on treatment and academic level. Further contrast analyses showed strong effect of "structure + reflection" combination, and weak or even negative effect of subject matter, both are explained and elaborated upon in the paper.

List from scientific texts through constructing video-based explanations

Keywords: Learning Technologies, Science education, Student learning, Multimedia learning
Presenting Author: Stephanie Wassenburg, Erasmus University Rotterdam, Institute of Psychology, Netherlands
Co-Author: Böhm de Koning, Erasmus University Rotterdam, Netherlands
Co-Author: Fred Paas, Erasmus University Rotterdam/University of Wollongong, Netherlands

Video-based explanations are an increasingly popular educational method. As many studies have already indicated the advantages of learning from these videos, the present study focuses on the effects of creating video explanations on learning and transfer. It has been shown that creating a video-based explanation of a text encourages the messenger to actively engage in learning strategies. The present study investigates what it is about explaining aloud during video creation that helps participants learn. For example, recording a video allows you to imagine a non-present audience (i.e., other students versus future self). Presumably, the imagined audience influences what strategies are used. Furthermore, the multimodal nature of a video enables the speaker to gesticulate while explaining, which may decrease cognitive load.

In the present study, undergraduate students create a video explanation after reading a science text. Students are either instructed to explain the text to oneself or to non-present students, whereas a control group does not receive any instructions. All participants are tested on comprehension and knowledge transfer immediately after producing the video. Besides a main effect of gestures, we expect students in both explaining groups to outperform the control group. Furthermore, the non-present audience may influence self-efficacy and reported mental effort. Results are expected before the spring of 2017 and will be of relevance for educational practice.

The effect of computer game usage on absenteeism mediated by students' cognitive lesson avoidance

Keywords: Cognitive skills, Educational Technology, Quantitative methods, Technology
Presenting Author: Anvd Nagel, University of Teacher Education St.Gallen, Switzerland
Co-Author: Horst Biedermann, University of Teacher Education St.Gallen, Switzerland

In the past the phenomenon of lesson avoidance and school absenteeism of students has aroused an increasing interest both in science and in media. Nevertheless, research has failed to keep up with these developments in offering theoretical and empirical evidence for understanding students' lesson avoidance yet. This study aims to predict cognitive and physical lesson avoidance of students by (problematic) computer game usage. In this regard we pose the question whether we can identify effects of computer game use on cognitive and physical lesson avoidance behavior of students? The study was conducted based on a German student sample from grades 7 to 10 (N=578). Whereas research on school absenteeism generally describes students failing to attend school or their lessons, we take a broader perspective and investigate physical lesson avoidance as well - also address cognitive lesson avoidance.

Therefore, we developed a new four-scale. The psychometric properties of the EFA and CFA support the theoretically postulated factorial structure of cognitive lesson avoidance. Further we are able to show a mediation of computer game usage on physical lesson avoidance via cognitive lesson avoidance utilizing structural equation modeling.

How Tablets Can Improve Learning in Schools - An Exploratory Study

Keywords: Computer-assisted learning, Educational technology, Primary education, Qualitative methods
Presenting Author: Steff Zander, Bauhaus-Universität Weimar, Germany
Co-Author: Anne Behrens, Bauhaus-Universität Weimar, Germany

This contribution reports the results of a project that aimed in implementing tablets into a primary school and to examine perceived advantages and drawbacks of tablet use by teachers and students. The faculty was qualified to create own lessons of high media didactic quality in order to implement them afterwards in their own classes. In the project's empirical part, the possibilities were examined how tablet computers may support and increase the lessons' quality. The resulting insight was connected to existing theoretical and empirical evidence. Further, core categories for a sensible high-quality tablet-assisted curriculum were developed. The results show that the students and teachers were very excited to learn and teach with the tablet computers, also they are reflecting the frequency of usage on high level. These findings are illustrated in a subsequent study in secondary schools and continue to be reviewed.

Session C 71

30 August 2017 08:30 - 10:00
Pinni B - B3118
Poster Presentation
Learning and Social Interaction, Learning and Special Education, Teaching and Teacher Education
Posters Presentation: Special Educational Needs
Keywords: Assessment methods and tools, Attitudes and beliefs, Collaborative Learning, Early childhood education, Experimental studies, Instructional design, Learning disabilities, Mathematics, Technology, Method research, Peer instruction, Primary education, Self-efficacy, Social interaction, Special education, Teacher Professional Development, Teaching / instruction
Interest group: SIG 15 - Special Educational Needs
Chairperson: Ann Dewker, University of Oxford, United Kingdom

Does a differentiated instruction increase or decrease interactions between students? Kawasaki as a tool for developing and implementing instruction

Keywords: Teaching and instruction
Presenting Author: Steffie Bösse, University of Potsdam, Germany
Co-Author: Thorsten Henke, University of Potsdam, Germany
Co-Author: Katja Bogda, University of Potsdam, Germany
Co-Author: Nadine Sömpier, University of Potsdam, Germany

In inclusive classes the range of students' individual abilities is higher than in regular classes. Therefore, teachers are challenged to provide appropriate levels of instruction by, for example, using differentiated instruction. This study examined if Kawasaki, a web-based tool designed for implementing differentiated instruction, provides an excellent framework to study collaboration and to gain insight into the exchange of knowledge and expertise through social interactions in the classroom (Krill & Wierasz, 2011). However, empirical evidence of this assumption is still rare. The goal of our study was to analyze if there was a positive relation between differentiation in inclusive primary school lessons and the number of on-task student-student interactions. Participants of the study were N = 213 students during 6 weeks. Data were collected at three measurement points within a time span of two school years. To answer the research question, students' math and German lessons were observed 10 times at each measurement point by trained external observers. The observations were conducted with the help of a software. The results of our initial analyses were in line with our assumption. For the first two measurement points we found positive correlations between the amount of differentiation and the amount of on-task student-student interactions. The more a teacher used differentiation during a lesson, the more a student interacted with another student. In the next analysis steps, we will focus on differences between math and German lessons. Furthermore, the relation between the learning context and the student-student interactions will be analyzed.

Effect of disability cognitive bias modification task on attitudes towards people with a disability

Keywords: Attitudes and beliefs, Experimental studies, Misconceptions, Social interaction
Presenting Author: Varja Van Aarsen, KU Leuven, Belgium
Co-Author: Katja Petry, K.U.Leuven, Belgium

In the past decades, there has been a trend of including people with a disability into society. Despite this trend, people with a disability are viewed as differing from the norm and are discriminated against. It is often assumed that full inclusion of these people is hindered by negative attitudes about them held by the general population. According to the dual-attitude model, these attitudes can be explicit or implicit. Research has shown that implicit attitudes are a better predictor of behaviour when it concerns socially sensitive topics. Thus, improving the implicit attitudes of people towards people with a disability can enhance the chance of successful inclusion of people with a disability. For example, improving the attitudes of teachers towards students with a disability can enhance the chance of successful inclusion into the school community of these students. In this paper we developed an intervention aimed at changing attitudes towards people with a disability. We developed a cognitive bias modification task that targets the interpretation bias about people with a disability in everyday life situations. Our experiment was successful, as we found that our participants had more positive interpretations afterwards than they had at the start. However, we did not find an effect on implicit or explicit attitudes.

Development and validation of a social network analysis instrument to promote inclusive education

Keywords: Assessment methods and tools, Collaborative Learning, Social interaction, Special education
Presenting Author: Jesmien Sjaanen, KU Leuven (BE), Belgium
Co-Author: Katja Petry, KU Leuven (BE), Belgium
Co-Author: Nick Pietbuyt, Universiteit Antwerp, Belgium

A pivotal factor in realizing inclusive learning environments (ILE) is collaboration. One cannot expect that a single teacher, working alone, has all the knowledge and expertise to meet the diverse needs of all learners. The social network theory (SNT) and its corresponding social network analysis (SNA) provide an excellent framework to study collaboration and to gain insight into the exchange of knowledge and expertise through social relationships. To our knowledge, there is no research that has focused on the use of a social network approach on studying collaboration in order to create ILE. Therefore, the aim of the development and validation of a SNA-instrument that provides teachers, schoolteams and researchers insight in the social networks with regard to the creation of ILE. We will apply a whole network approach to create a picture of the network of the whole schoolteam and their external partners. Each of them will indicate who they ask for support and who they give support in the light of creating ILE. Accessible and inviting visualizations of social networks will be provided to support teachers and teams to better understand and strengthen their network. To validate the SNA-instrument the Social Network Educational and Psychological Testwill be used. By developing and validating an innovative SNA-instrument in the context of inclusive education which can be used both for research and for practical purposes, this study is of great theoretical, methodological and practical importance.

How to design educational material for inclusive classes

Keywords: Instructional design, Learning disabilities, Mathematics, Mixed-method research
Although pupils with disabilities are broadly integrated into mainstream schools, only few empirically based findings about inclusive lessons can be found. For example, little research has been conducted on how educational material used in inclusive classes should be designed. Furthermore, the few available studies are contradictory. This project investigates which design elements of work assignments positively influence the performance of students in inclusive classes. Within the framework of an empirical study, we will analyze whether the use of the easy-to-read guidelines or enriching text with symbols facilitates pupils’ comprehension. Students with and without learning disabilities participate in the study. With regard to content, the pre-study and the main study focus on introducing fractions. These are taught in activity-oriented manner with hands-on material. A qualitative preliminary study focuses on the benefits of using easy-to-read language as well as on the advantages of linking text and symbols by use of eye tracking and thinking aloud protocols. An adequate register, an appropriate use of symbols and convenient presentation styles should be identified. For the main study, a pre-post test design comprises two experimental and one control group. Before and after the conduction of the exercises, the pupils’ knowledge about fractions is determined by a test. Experimental group one works with a linguistically and pictorially simplified version of the tasks as the easy-to-read guidelines are applied and symbols are added to the test. The tasks of the second experimental group are linguistically simplified only. The control group receives a not simplified version of the tasks.

Italian preschool teacher’s opinion about their inclusive practices
Keywords: Early childhood education, Mixed method research, Special education, Teacher Professional Development

Presenting Author: Lucia Scipione, University of Modena and Reggio Emilia, Italy

For ensuring an inclusive school system, demanded by the UN Convention on the Rights of Persons with Disabilities, teachers’ attitudes and knowledge, as well as aspects of teacher professionalism, need to be considered as key factors. While national and international research findings are broadly inconclusive or even contradictory, a positive correlation between teacher self-efficacy and attitudes towards inclusion in schools is shown (Savolainen et al., 2012). For Germany recent research on these two aspects and comparative research with a leading country in matters of students’ performance, equal opportunities and inclusion like Finland is missing. In this study research questions concerned (a) Thuringian teachers’ self-efficacy, their attitudes towards inclusion and (b) the relation of these two concepts (c) compared to those of Finnish teachers. In 2010/2011 teachers from Finland (N=112) and Thuringia (N=362) were surveyed using online questionnaires. Previous analyses show, that while the Finnish teachers show definite positive attitudes towards inclusion, Thuringian teachers present quite negative and critical attitudes. Both groups ascribe a similarly neutral to positive professional self-efficacy to themselves. A significantly higher correlation between teacher self-efficacy and attitudes towards inclusion was found for the Thuringian teachers. Further analyses were done to examine potential explanations of these differences. Therefore, results of cluster analysis will be reported. At the end, based on the results, aspects of modified basic and advanced education of German teachers are addressed.

Session C 72
30 August 2017 08:30 - 10:00
Main Building A - A3
Poster Presentation
Learning and Special Education
Poster Presentation: Special Educational Needs and Primary Education

Presenting Author: Sascha Opalski, University of Education Freiburg, Germany

The present study investigated the influence of early oral language on two pathways towards reading comprehension in children with and without a family risk (FR) of dyslexia. The sample included 237 children (164 FR) from the Dutch Dyslexia Program (DDP). Longitudinal data covered seven occasions during development between 4 and 12 years. The effect of early oral language on reading comprehension was mediated by proficiency skills and word decoding ability for the first pathway and by later language abilities for the second pathway. FR was found to have an independent effect on general reading ability, proficiency skills and word decoding abilities, but not on the language pathway. FR was also found to have a direct influence on reading comprehension. Findings indicated that early oral language has a small effect on early literacy development, but effects are hard to trace on the long run.

Specific and general orthographic knowledge predicts reading and spelling skills

Keywords: Educational Psychology, Learning and developmental difficulties, Literacy, Primary education

Presenting Author: Marjolein Zee, University of Amsterdam, Netherlands

The role of orthographic processing for literacy development has become a focus of interest in recent years as empirical data suggest that orthographic knowledge can predict reading and spelling performance. Orthographic knowledge is considered to be a multi-dimensional construct with two subcomponents, the word-specific (sensitivity to the correct spelling of a specific word) and general (sensitivity to legitimate letter patterns) orthographic knowledge. The predictive value of orthographic knowledge, however, is not yet sufficiently verified and it remains unclear to which extent both subcomponents explain different amounts of unique variance. It is, hence, the aim of the present study to investigate the predictive value of word-specific and general orthographic knowledge more closely. Reading and spelling performance from 94 German elementary school children was assessed via standardized achievement tests. Furthermore, an orthographic choice task measuring word-specific orthographic knowledge and two nonword forced choice tasks measuring general orthographic knowledge, with regard to the sensitivity of frequency and legity position of letter patterns, were conducted. Results indicate that the orthographic choice task as well as one of the nonword forced choice tasks (with regard to the legitimacy of letter pattern position) significantly correlated with and significantly predicted reading and spelling performance. Squared semi-partial correlation analysis further indicated that word specific orthographic knowledge and general orthographic knowledge of legit letter patterns explained more unique variance for spelling than for reading. Hence, information about word-specific and general orthographic knowledge could be used for early identification of children at risk for reading and especially spelling difficulties.

Improving effective functions in pupils with specific learning disabilities (dyslexia, dysgraphia)

Keywords: Learning disabilities. Neuroscience, Quasi experimental research, Special education

Presenting Author: Chiara Bertolmi, University of Modena and Reggio Emilia - Department of Education and Human Sciences, Italy

Executive functions help us plan and organize activities, sustain attention and persist in completing tasks. Research showed that students with specific learning disabilities (SLD) also have difficulties with executive functions. It has been confirmed that executive functioning can compensate primary deficits of SLD. The aim of our study was to develop and evaluate an intervention program for improving executive functions in students with SDL (dyslexia and dysgraphia). Our research included 97 ten years old students who had diagnosis of severe dyslexia and dysgraphia. Students were assigned to experimental (EG) and control group (CG). Students in EG received regular help program and additional 30-hours executive functions training. Students in CG received only regular help program. The results of measurement of executive functions before and after intervention have shown a short term effect related to attention, however, after five months the effect is not significant any more. Teacher and parents
reported positive effects of different executive functions after five months, namely in inhibition, initiative, working memory, self-monitoring, behaviour regulation and metacognition. The results confirmed efficacy of intervention, although important changes in behaviour can be seen after a longer period.

**Key words:** dyslexia, dysgraphia, executive functions, intervention, specific learning disabilities

**Development of an orthographic knowledge test to differentiate reading and spelling skill levels**

**Keywords:** dittach; orthographic knowledge; Reading and Development; University of Wisconsin

**Presenting Author:** Jelena Zaric, German Institute for International Educational Research (DIPF); DfD Research Center, Germany

Word-specific and general orthographic knowledge (i.e. knowledge about the correct spelling of words and permitted letter patterns), play an important role in acquiring reading and spelling skills (Burt & Tate, 2002; Holmes, 1996). However, the most effective method assessing these two orthographic knowledge components is still unclear. The goal of this study was therefore to develop an adequate test to measure orthographic knowledge for German elementary school children on the word specific and general level. The child-oriented childlex database (Schroeder, Wurzner, Heister, Gayken & Kliegl, 2015) was used for developing test items. An orthographic choice task was designed to measure word-specific orthographic knowledge. To assess general orthographic knowledge, two tasks involving pseudo-word pairs with different violation types (i.e. sensitivity to frequency and to legal positions of letter patterns) were developed. A sample of 67 German children, divided into two groups (with and without reading and spelling difficulties) participated in this study. Reading and spelling skills were measured via standardized achievement tests and compared with the performance on the orthographic knowledge tasks. Analyses revealed significantly better performance of children without reading and spelling difficulties on the orthographic-choice task and on task comprising frequency of letter patterns compared to children with reading and spelling difficulties. Thus, these two tasks can be considered as an effective method to assess word-specific and general orthographic knowledge, and can be used to differentiate between children with and without reading and spelling difficulties. However, poor internal consistency indicates that the test items need further development.

**Early Mathematical Skills of Children in South Africa and in Finland**

**Keywords:** Achievement; Early childhood education; Mathematics

**Presenting Author:** Rikka Mononen, University of Oslo, Norway

co-Author: Johan Kornonen, Åbo Akademi University, Finland

Co-Author: Laura Ragnott, University of Joensu, Kokemaa

Co-Author: Elizabeth Hennings, University of Johannesburg, South Africa

Co-Author: Philip Åström, University of Oulu, University of Helsinki, Finland

**Abstract** (246 words)

This study compared the early mathematical skills of South African (N = 443, Mage 6.80 y) and Finnish children (N = 236, Mage = 6.23 y) in the beginning of their formal mathematics education. Children's mathematical skills were assessed using a test developed in Finland, and a translated version in English was used in South Africa. No statistically significant difference was found between the South African (SA) and the Finnish (FIN) children in mathematical relational and counting skills. However, the FIN children performed better in basic arithmetic skills (verbal word problems). Overall, girls and boys performed equally well, but boys outperformed girls in counting skills in the SA sample. Younger children performed somewhat weaker than older children. According to the results, when compared to each other, FIN and SA children seem to have little difference in their early mathematical skills in the beginning of the formal education. However, according to the international comparative assessments in mathematics, the students in these countries seem to perform in contrast to each other in the end of their compulsory school – Finland in the top and South Africa in the lowest performing countries. In future, it would be thus interesting to investigate how educational setting (e.g., teacher's pedagogical knowledge, group size, mathematics content taught and educational support), home language and socioeconomic status affect mathematics learning along the school years, and to find possible obstacles that could be improved in order to provide ingredients for better and equal learning of all children.

**What do MOOC providers think about accessibility?**

**Keywords:** E-learning; Online learning, Learning disabilities, Qualitative methods, Lifelong learning

**Presenting Author:** Francisco Iniesta, The Open University, United Kingdom

Co-Author: Patrick McAndrew, Open University, United Kingdom

Co-Author: Shalini Minocha, Open University, United Kingdom

Co-Author: Tim Couglan, Open University, United Kingdom

**Abstract**

Massive Online Open Courses (MOOCs) have become an accepted way to make learning opportunities available at large scale and low cost to the learner. However, only if these are made accessible will they be able to offer flexibility of learning and benefits to all, irrespective of disability. Experience in providing accessible online learning at distance universities suggests that this can be best achieved through understanding different roles and the options in planning for adjustments to be made. To effectively apply similar principles to MOOCs, it is necessary to understand the various viewpoints and roles of stakeholders and how these impact on accessibility. This includes educators who create materials and facilitate learning, and technologists who develop and maintain platforms. We report the results from a study involving 31 semi-structured interviews to investigate the perceptions and accessibility-related processes of MOOC platform accessibility managers, platform software developers/designers and MOOC accessibility researchers. Our results show awareness that MOOCs can be valuable for disabled learners, and indicate that legislation acts as a driver for accessibility. However, our investigations suggested limited progress to date in either providing universally accessible MOOCs, or tailoring MOOCs to the needs of individual learners with disabilities.

**Session C 73**

**30 August 2017 18:30 - 10:00**

**Main Building - D12**

**Poster Presentation**

**Cognitive Science, Developmental Aspects of Instruction, Learning and Social Interaction**

**Poster Presentation: Early Childhood Education**

**Keywords:** Achievement; At-risk students, Citizenship education, Cognitive development, Early childhood education, Educational attainment, Educational Psychology, Environmental education, Learning approaches, Literacy, Mathematics, Numeracy, Primary education, Quantitative methods, Social development, Student learning

**Interest group:** SIG 05 - Learning and Development in Early Childhood

**Co-Author:** Elisabeth Fischer, University of Kassel, Germany

**Learning patterns, personal factors and academic performance in students at Primary School**

**Keywords:** Educational Psychology, Learning approaches, Primary education, Student learning

**Presenting Author:** Jordi García-Omirós, Universitat Autònoma de Barcelona, Spain

**Co-Author:** José Reinao Martínez Fernandez, UAB Universitat Autònoma de Barcelona, Spain

**The aim of this study was to analyze the relationship between learning patterns and some personal factors and academic performance in students at primary education**

**Methodology:** 229 students of Primary Education from Spain completed an adapted version of ILS (Inventory of Learning Styles) (Vermunt, 1998). Findings: We found four patterns: meaning-oriented (MD), reproduction-oriented (RD); application oriented (AD) and undirected (UD) pattern; according to Vermunt. Regards personal factors differences according gender, effort and academic self-concept were found. Taking into account these findings, from a theoretical and Education significance of the research we support the accurate of Vermunt model (1998) based on four pattern. In addition, each one is influenced by and has a relationship between some personal factors and the GPA. Finally, a new challenger about education could be introduced, which must consider teaching and learning processes as a way of maximizing MD/AD patterns in students and caring for students with RD/UD patterns.

**Oral Language and Early Literacy skills in Brazilian preschool children**

**Keywords:** Achievement; At-risk students, Early childhood education; Literacy

**Presenting Author:** Rule Tomás, University of Luxembourg, Faculty of Language and Literature, Humanities, Arts and Educational Sciences (FLSHASE), Luxembourg

**Co-Author:** Pascale Engle de Abreu, University of Luxembourg, Luxembourg

**Co-Author:** Elizeu Macedo, Universidade Presbiteriana Mackenzie, Brazil

**Co-Author:** Carolina Nikaido, University of Luxembourg, Faculty of Language and Literature, Humanities, Arts and Educational Sciences (FLSHASE), Luxembourg

**In Brazil, many students perform below the expected levels on literacy. Children that fail to learn to read and write are at high risk of school failure and this risk is positively associated with low socio-economic status. Reading is a complex task that depends on a range of cognitive skills, latter sound knowledge, phonological awareness, oral language and rapid automatized naming are important predictors for literacy acquisition. Preschool children with difficulties in any of these abilities are at risk of low literacy levels in primary school. Recent studies suggest that individual differences in literacy acquisition are detectable before formal school enrollment and targeted early interventions can improve the reading outcomes of these children. These studies have, however, almost exclusively been conducted in developed countries and lack is known about individual differences in the cognitive processes of reading in children from countries with high levels of inequality. This study sought to fill this gap.**

**One hundred preschool Brazilian children, from public and private preschools (4-5 years of age) took part in the study. Children completed a battery of tests tapping into oral language, phonological awareness, letter knowledge, rapid automatized naming and non-verbal reasoning. Results will be analysed using an individual differences approach to explore the cognitive skills related to reading in a sample of preschool Brazilian children from a wide range of socio-economic backgrounds. This study has important implications in relation to the detection of children at risk of developing reading difficulties in a developing country.**

**Relationship between language and early numerical development in children at the age of kindergarten**

**Keywords:** Early childhood education, Mathematics, Numeracy, Quantitative methods

**Presenting Author:** Silvia Pinner, UMT, Institut of Psychology, Austria
Children’s ideas about participation and their effect on sociocognitive development

Keywords: Citizenship education, Cognitive development, Early childhood education, Social development
Presenting Author: Nadine Correia, University Institute of Lisbon (ISCTE - IUL), Portugal
Co-Author: Margarida Fialho, ISCTE-IUL, Portugal
Co-Author: Cecilia Aguilar, University Institute of Lisbon (ISCTE - IUL), Portugal

Children’s participation right has gained scale in the research field. The positive relationship between children’s participation and the quality of preschool contexts is documented and indicates that children who attend high-quality preschool settings report more opportunities to participate or exert influence (Sherraden, 2007). Because children’s participation is a criterion to be taken into account when evaluating preschool quality and there still exist few studies on this topic, we aimed to investigate the associations between children’s ideas about participation, self-concept, assertiveness, and self-control, classroom quality, and teacher’s perceptions about children’s participation. Specifically, classroom quality and teachers’ perceptions will be tested as moderators of the relationship between children’s ideas and children’s sociocognitive outcomes. Participants were (a) 60 preschool teachers, which filled in the questionnaire on “Teacher’s perceptions about the implementation of children’s participation right in preschool settings”; (b) 60 preschool classrooms of the Lisbon area, observed with the Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2008), and (c) 360 children attending those classes, assessed with the Portuguese version of the Social Skills Rating System (Gresham & Elliott, 1990), the Portuguese adaptation of The Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (Harter & Pike, 1984; Mata, Monteiro, & Peroto, 2008), and interviewed with “Choosing classrooms: A structured interview on children’s participation right? Associations between variables will be analysed and preliminary results will be presented.

Exploring the relationship between learning patterns, academic talent and GPA in primary school

Keywords: Early childhood education, Educational Psychology, Learning approaches, Primary education
Presenting Author: Laura Garcia Ravido, Universitat Autònoma de Barcelona, Spain
Co-Author: Jose Reinaido Martinez-Fernandez, UAB Universitat Autònoma de Barcelona, Spain
Co-Author: Juan Marin, Escola La Balut, Spain

The aim of this study was to analyse the relationship between learning patterns, academic talent and the grade point average (GPA) on students of primary school.Methodology: the participants were 54 students from 4th grade of primary education in a school of Barcelona (Spain). They complete the Inventory of Learning Styles (ILS) and the School and College Ability Test III (SCAT III). Data were analysed from a correlation tests, factor analysis and cluster analysis. There were two relevant findings: First, the results showed a relationship between learning patterns (Application-directed and Reproduction-directed) with the academic performance. Second, the academic talent is confirmed as an adequate predictor of academic performance; but it is not related with learning pattern. We consider that it is necessary to inquiry more in depth the role of assessment (GPA) as to what it measures.

The early home learning environment as a protective factor for early adolescent coping with life

Keywords: Early childhood education, Educational attainment, Educational environment, Quantitative methods
Presenting Author: Sabina Blaurok, University of Bamberg, Germany
Co-Author: Simone Lehrl, Bamberg University, Germany

The quality of the home learning environment (HLE) is widely recognized as a contributor to children’s competence development, social functioning and to their subsequent educational success (e.g. Bradley, 2015). The present study examined the relations between child and family risk factors (e.g. low maternal education etc.), the quality of the HLE in early childhood and adolescent’s educational attainment and problem behavior. All the data are based on the German longitudinal study BiKS and the follow-up study BiKSPlus[3-13], which final follow 229 children from preschool age till age of 13. A mediation model was hypothesized and tested using pathway analysis. The findings show that exposure to social risk in early childhood predicted educational attainment negatively and risk-taking behavior and conduct problems positively. Furthermore, the negative association between risk and educational attainment were substantially weakened when children have experienced high stimulation at home in early childhood and additionally in early adolescence. Results are discussed regarding the longer-term preventive potential of high stimulation at home for later coping with life.

Session C 74
30 August 2017 08:30 - 10:00
Petri A - A2099
Poster Presentation
Cognitive Science, Higher Education, Instructional Design, Learning and Instructional Technology, Learning and Special Education

Poster Presentation: Writing

Keywords: Attitudes and beliefs, Cognitive development, Cognitive skills, Educational Psychology, Higher education, Instructional design, Language (L1/Standard Language), Literacy, Peer interaction, Primary education, Quasi-experimental research, Secondary education, Teaching / instruction, Teaching approaches, Writing / Literacy

International guidelines: 12 - Writing
Chairperson: Saara Repo, University of Helsinki, Finland

The recursive nature of the writing process: editing strategies of professional literary authors

Keywords: Language (L1/Standard Language), Literacy, Teaching approaches, Writing / Literacy
Presenting Author: Susan Jones, University of Exeter, United Kingdom
Co-Author: Floor Buschkenhui, Huygens ING, Netherlands

Cognitive research into the writing process indicates that revision is a ‘cognitively complex and costly process’ (Changou 2001). But that expert writers spend more time on revision, make changes to the text which are more substantive, and have a stronger sense of how they want the text to be (Sharples 1999). In contrast, novice writers tend to make few changes or focus on surface features such as spelling. Theoretical understanding of revision distinguishes between pre-text revision, which includes evaluation and refinement of ideas at the planning stage; online revision which occurs during writing, and deferred revision, which happens when a draft is complete (Atal et al 2004). A further distinction is made between revision which focuses on error-correction and revision which transforms the text, including alterations to meaning. At the heart of revision is the capacity for the writer perceive a sense of dissonance between the text and the writer’s intention, but this is difficult for developing writers (Hollway and McCutchen 2004). We know that that professional writers revise more than developing writers; however, many empirical studies rely on self-report. This study was set up to explore the possibilities of keystroke logging for tracking the writing processes of literary authors. For the current presentation, the focus is on investigating the editing strategies observed in the four participants in our study, supplemented with interview data, and considering how this might inform the teaching of revision skills to less proficient writers.

Analysis of the strategy-focused instruction for improving writing competence

Keywords: Instructional design, Primary education, Teaching / instruction, Writing / Literacy
Presenting Author: Rut Sanchez, University of León, Spain
Co-Author: Paula Lopez, University of León, Spain
Co-Author: Alba Gonzalez, University of León, Spain
Co-Author: Raquel Fidalgo, University of León, Spain, Spain

Strategy-focused instruction has been considered the most effective approach for improving students’ writing skills. Nevertheless, this kind of instruction has been implemented specially in upper grades of Primary Education versus the instruction on transcription processes in the first grades of this scholar stage. Therefore, the current study explores the effectiveness of the strategy-focused instruction in students of 3rd grade of primary education and the specific contribution of the type of practice implemented in the strategy-focused instruction, individual or collaborative. Also, the students’ writing style will be take into account to explore its influence in the intervention effectiveness.

The sample comprised 72 students of 3rd grade of primary education divided in 3 classrooms within the same school. Two classrooms, randomly chosen, formed the experimental condition where it was implemented a strategy-focused program for the improvement of the writing competence focused on planning and drafting processes. Complementary, in one of the experimental groups students worked individually, and in the control group, students worked in a collaborative way, with the roles of writer and helper. Finally, the third group, in the control condition, received an instruction based on the promotion of motivation and creativity for the improvement of writing competence. The study followed a quasi-experimental design with three evaluation times: pretest-posttest-follow up (2 months after the intervention). Textual productivity, organization and quality measures were taken, as well as measures related to students’ writing style. Currently, analyses are being carried out, the results and conclusions will be showed in this context.

The SRSD + ICT model improves the writing skills of 4th grade students

Keywords: Instructional design, Primary education, Quasi-experimental research, Writing / Literacy
Presenting Author: Catarina Araujo, Institute of Education - University of Minho, Portugal
Co-Author: Ana Paula Loução Martins, Institute of Education, University of Minho, Portugal
Co-Author: António José Osório, Institute of Education, University of Minho, Portugal

Writing is an important, complex and demanding process, where students and teacher students show difficulties (Graham & Hall, 2016).The Self-Regulated Strategy Development (SRSD) model and some technological

Text quality, writing processes and students’ beliefs about writing at Secondary education in Chile

Keywords: Attitudes and beliefs, Language (L1/Standard Language), Secondary education, Writing / Literacy
Presenting Author: Magdalena Flores, University of Amsterdam, Netherlands
At the end of school age many Chilean students demonstrate deficiencies in their academic writing skills. With the aim of providing information for improving this situation, this study aims to establish relationships between text quality, writing processes and students' beliefs. Participants will be sixty 7th grade students and sixty 1st grade students, from three different public schools. The method of the study will include two writing tasks and replying to a questionnaire. First, students will write an argumentative text (Task 1). Data of their writing processes will be recorded through inputting, a keystroke logging program. Second, students will respond a questionnaire about their motivation and conceptualizations concerning the first task. Third, students will write a letter to a fictitious new classmate, explaining him what should be done to achieve a better text in Task 1. Data will be collected in August 2017. After the analysis, statistical operations will be applied to determine correlations between the three sources of the data.

Learning to be a good Reviewer: the effects of reviewing on one's own writing

Keywords: Educational Psychology, Higher education, Peer interaction, Writing / Literacy
Presenting Author: Marta Pardo Estruch, Universitat Ramon Llull, Spain
Co-Author: Albert Cattaneo, Swiss Federal Institute for Vocational Education and Training (SVIET), Switzerland

In this research we have developed and evaluated an intervention based on the use of collaborative review as a means of enhancing and overcoming difficulties during the writing process from the reviewers’ perspective. Our main goal was to explore what kind of comments promoted deep revision and how offering comments on peer’s drafts could help to improve reviewers’ own writing.

We adopted a longitudinal interpretive mixed method design that combined quantitative and qualitative data where 49 undergraduate students played two different roles: writers and reviewers (20.4% men - 79.6% women). We developed orientations and a writing guideline in order to help students during the revision process. Indeed, some specific instruments were developed to assess: a) final text quality (text assessment grid); b) reviewer’s comments regarding their type and function (comments assessment grid); and c) changes that student-writers made in their texts -after receiving comments from their peers- according to acceptance or rejection, quality of the introduced and studied changes and impact of changes in text (revision strategies grid).

Results confirmed that deep revisions enhanced writing performance and highlighted collaborative reviewing as a useful way to learn to write and as a means for learning disciplinary knowledge. Moreover, results also showed that deep revision was related to develop a position as an author in one’s own text, meaning dialoguing with others authors and establishing alignment with a particular position.

Keywords: reviewer; collaborative peer revision; deep revision; writing performance; academic writing

Delving into the subjective frequency estimates in Spanish. On what are the estimations based on?

Keywords: Cognitive development, Cognitive skills, Literacy, Writing / Literacy
Presenting Author: Mª Emma García Pérez, Universidad Pontificia de Salamanca, Spain

We collected subjective frequency estimates for 1,080 Spanish words of varied objective frequency. Specifically, 248 children (11-12 years) provided estimates of a sample of 615 words and 120 adults (20-26 years) estimated 465 words. Both groups rated the words on a 5-point scale from never encountered to encountered very often in four perceptual domains, that is, writing (FSE), reading (FSL), hearing (FSO) and speaking (FSF). ANOVA and regression analyses confirmed the results obtained in the English language for the adult population (Salvata, Pilatti and Costeix, 2001). We found that objective frequency estimates depend more on our knowledge of how many times we have spoken or heard a word rather than how many times we have written or read it. FSO (frequency of encounters in speaking) accounted for most of the variance in general subjective frequency (FSG). Added to this, the relevance of this work also depends on the kind of population employed for this study.

Session C 75
30 August 2017 08:30 - 10:00
Main Building A - A31
Poster Presentation
Motivation, Social and Affective Processes

Poster Presentation: Motivation and Educational Psychology

Keywords: Assessment methods and tools, Attitudes and beliefs, Collaborative Learning, Educational Psychology, Educational Technology, Emotion and affect. Higher education, Mathematics, Motivation, Out-of-school learning, Parental involvement in learning, Quasi-experimental research. Science education, Self-efficacy, Teacher Effectiveness, Teaching / Instruction, Video analysis, Vocational education
Interest group: SIG 08 - Motivation and Emotion
Chairperson: Joerg Tobias Kuhn, WWU Muenster, Germany

Does training to reflect on action foster reflection in action and finally on-the-job performance?

Keywords: Educational Technology, Quasi-experimental research, Video analysis, Vocational education
Presenting Author: Elisa Motta, Swiss Federal Institute for Vocational Education and Training (SVIET), Switzerland
Co-Author: Alberto Cattaneo, Swiss Federal Institute for Vocational Education and Training (SVIET), Switzerland

According to the experimental learning approach, reflection leads the transformation of experiences in learning and can be classified as reflection on action and action depending if happening after or during the professional’s performance. After a previous phase where we demonstrated the effectiveness of promoting reflection on action through instructional activities based on metacognitive prompts, we now present a study investigating 1. to what extent getting apprentices used to metacognitive prompts to reflect on action was also a way to promote their reflection on action; 2. to what extent reflection resulted in quality improvement within their professional performance; 3. if the exposition to reflective prompts during instructional activities at school promoted apprentices’ long-term attitude to reflect on action. Apprentices (9 belonged to the experimental group in the previous phase and 7 to the control group) were invited to perform a recipe and, when finished, to fill in a personal report to self-evaluate their performance. All the utterances were video-taped and the thinking aloud protocol analyzed. The experimental group outperformed the control group in the level of both reflection on action. The quality of the performance was also higher in the former group, according to experts’ evaluation. Qualitative data confirmed the approach had concrete consequences on apprentices’ professional daily life. Despite its limitations in sample size, the study represents an interesting premise to deepen the feasibility of our pedagogical approach in vocational education and training across professions.

Predicting teachers’ flow experience and job satisfaction from need satisfaction and frustration

Keywords: Educational Psychology, Motivation, Teacher Effectiveness, Teaching / instruction
Presenting Author: YoonJung Cho, Sungshin Women's University, Korea, Republic of
Co-Author: Sungock Siemens Kim, Ball State University, United States

Aimple evidence on the utility of students' need satisfaction has been documented, however, very few studies have addressed the importance of teachers' need satisfaction for their optimal functioning and psychological well-being. The present study focused on examining in what ways teachers' psychological needs for competence, autonomy, and relatedness are satisfied and/or frustrated and how teachers' need satisfaction and/or need frustration is related to teachers' optimal functioning as indicated by teachers' flow experience and job satisfaction. Person-centered analysis was conducted using six standardized variables (three need satisfaction scales and three need frustration sub-scales). K-means cluster analysis revealed three distinct groups: An average group with all six dimensions around the means, need-satisfied group with high need satisfaction scores but low need frustration scores, and a need-frustrated group with low need satisfaction scores and high need frustration scores. Results indicated that the need-satisfied teachers are less likely to leave the profession and furthermore, they tend to report more frequent flow experiences during teaching. Need-satisfied teachers showed most optimal functioning among the three groups that vary in terms of need satisfaction and need frustration. High need satisfaction accompanied by low need frustration will lay a foundation for teachers to flourish at work with high job satisfaction and less intention to leave.

The Effects of Private Tutoring on the Learning Context at Home

Keywords: Mathematics, Out-of-school learning, Motivation, Self-regulation, Learning context
Presenting Author: Barbara Otto, Ludwigshurg University of Education, Germany
Co-Author: Christian Müller, Institute of Psychology, Germany

The prevalence of private tutoring in Germany is rather high compared to other European countries. Particularly low-achieving students get enrolled in this kind of shadow education in order to enhance their academic achievement. Despite of the high prevalence of private tutoring in Germany the investigation of its effectiveness has been neglected so far. Only a handful of studies have been examined this research field in a methodologically adequate way. Moreover, most of these refer to academic achievement or students’ motivation as dependent variables. As empirical studies also revealed low academic achievement is also associated with conflicts at home suggesting that attending private tutoring should also enhance students’ learning climate at home. Therefore, the current study aimed at the investigation of the effects of private tutoring on students’ perceptions of their parents’ involvement and the parent-child relationship.
In this study we were interested in how medical students regulate their learning during the first 3 years in medical school and to what extent this regulation is connected with study success. Additionally, the functionality of a nine-point version of regulatory styles of the Inventory of Learning Styles (Vermunt, 1994) was analyzed in medical education context. The participants of the study were 162 medical and dental students, who answered the regulation scale at three measurement points. The analyses yielded a three-factor solution, which was reliable across time. Four profiles of regulation strategies were identified. Our results showed that those profiles were connected to study success. Students with lowest self-regulation and increasing lack of regulation performed worse than the other groups. Our longitudinal study is a valuable contribution to the field of research into academic learning. Using a person-centered approach along with more traditional variable-centered approach increases understanding of the complex nature of learning in higher education. Further, since the approach enables us to individualize students with different regulation strategy patterns, it could be used as a tool for supporting student learning and to help early diagnosing of learning difficulties.

Students' experience of interactive teaching by means of a digital response system

Keywords: Action research, Design based research, Higher education, Teaching approaches

Presenting Author: Pfennig, University of Bremen

Digital response systems, often labelled as SRS (Student Response Systems), enable interaction in the lecture situation by assigning subject relevant quizzes to the students and by providing immediate feedback to them. It also provides feedback to lecturers regarding the level of knowledge among their students. Hence, use of SRS has potential within the framework of Scholarship of Teaching and Learning (SoTL). This presentation shows how the students experienced utilisation of SRS. Students were assigned subject relevant quizzes during the lecture by means of a web-based SRS (Socrative) which they utilized by means of their own devices (e.g., smartphones, laptops, tablets). The participants were subsequently asked to report their satisfaction with use of SRS in terms of items reflecting motivation, learning style, and general interest in the lecture. The results also reported a high degree of satisfaction, in particular regarding the possibility to disclose limitations in their own knowledge of the subject matter. Students who expected relatively weaker exam performance reported a somewhat higher degree of usefulness of SRS compared to students who expected better performance. These results were discussed with respect to the requirements of self-regulated and thighs-esch negative consequences of students' self-assessment in terms of their experience and their performance in the examination.

In conclusion, this presentation highlights the importance of constructing quizzes beyond testing of students' remembrance of particular topics. In particular, it seems important to also test students understanding in terms of analysis, evaluation, application, and creation of new knowledge.

Relationship between conceptions of learning, teamwork conceptions and GPA among undergraduate students

Keywords: Conceptual Learning, Educational Psychology, Higher education, Learning approaches

Presenting Author: Raúl Encinar Prat, UAB Universitat Autònoma de Barcelona, Spain

Co-Author: Martín Martinez-Pons, UAB Universitat Autònoma de Barcelona, Spain

Co-Author: Raul Encinar Martinez-Fontanal, UAB Universitat Autònoma de Barcelona, Spain

The aim of this study was to analyse the relationship between conceptions of learning, teamwork conceptions and academic performance (GPA) during the first year of tertiary education in the specific domain of Educational Sciences. Methodology: Participants were 84 undergraduates in Educational Sciences from Spain. They completed the learning conceptions questionnaire (CONAPRE) and the Conceptions about Teamwork Questionnaire (CTQ). At the same time, their GPA average was obtained. Findings: The results show a significant relationship between different conceptions of learning and teamwork concepts, while only one team conception has a significant connection with GPA. Beyond these findings, it is worth to continue towards a theoretical discussion about the relationships between learning and teamwork conceptions in tertiary education and how their can influence in the academic performance.

Session C 77
30 August 2017 08:30 - 10:00
Main Building A - A05 Poster Session
Assessment and Evaluation, Instructional Design, Learning and Instructional Technology

Poster Presentation: Computer-assisted Learning

Keywords: Assessment methods and tools; Attitudes and beliefs; Comprehension of text and graphics; Computer-assisted learning; E-learning; Online learning; Early childhood education; Experimental studies; Game-based learning, Higher education, Instructional Design, Learning disabilities, Learning Technologies, Misconceptions, Neuroscience, Numeracy, Quantitative methods, Science education, Self-efficacy, Student learning, Survey Research, Teaching / instruction, Technology

Interest group: SIG 97 - Learning and Instruction with Technology

Chairperson: Rupert Higham, University of Cambridge, United Kingdom

Different visual patterns for game learners with high and low self-efficacy of game playing

Keywords: Game-based learning, Learning Technologies, Neuroscience, Self-efficacy

Presenting Author: Meng-Jung Tsai, National Taiwan University of Science & Technology, Taiwan

Co-Author: Chung-Yuan Hsu, National Pingtung University of Science and Technology, Taiwan

Co-Author: Guo-Li Chiou, National Taiwan University of Science and Technology, Taiwan

Co-Author: Ching-Yeh Wang, National Taiwan University of Science and Technology, Taiwan

Co-Author: Mei-Wei Wu, National Taiwan University of Science and Technology, Taiwan

This study aimed to explore the visual patterns for learners during a game-based physics learning environment, especially for the learners with different self-efficacy toward the game playing. A Shadow Game with a meta-cognitive scaffolding design for learning the concept of light and shadow was used in this study. A total of 47 college students participated in the game-based learning eye-tracking experiment during which their eye-movements were tracked and recorded by an ASL MiddleEye eye-tracker. At most ten minutes were allowed for each participant to play in this experiment. Participants' self-efficacy about game playing were assessed by a self-reported questionnaire right after the game playing. All eye-tracking measures on areas of interests were compared between the high and low self-efficacy groups. Sequential analyses were further analyzed for the two groups. The preliminary results showed that there were different visual patterns between the high and the low self-efficacy learners, in terms of visual attention distribution and visual attention transitions. The high self-efficacy players seemed to be able to focus on utilizing meta-cognitive tools. The low self-efficacy players might need to make more efforts on recalling the correlation between the sunlight schedule and the shadow length. This study provided some suggestions for future research and designs of physics game-based learning. All of the implications will be discussed in the conference.

Effects of a Training Intervention on Knowledge Integration in Physics

Keywords: Physics classroom; students' conceptual design; Misconceptions, Science education

Presenting Author: Markus H. Hettler, University of Bielefeld, Germany

Co-Author: Kristen Berthold, University of Bielefeld, Germany

In scientific domains such as physics, the naïve concepts learners bring to the classroom can be in conflict with the correct scientific concepts that are meant to be learned. Following the knowledge integration approach, our team should work on designing scientific learning activities and teaching designs that establish a deep scientific understanding. It seems feasible to develop and test appropriate instructional approaches to foster such knowledge integration of naïve and scientific concepts. Thus, our aim is developing a short-term training intervention on knowledge integration in the domain of physics. We plan to conduct a small-scale study with 86 German high school students in a between-subjects design composed of two conditions: (a) training intervention on knowledge integration, (b) no such training intervention. We will assess learning outcomes, such as domain-general knowledge (i.e., knowledge about principles of the knowledge integration approach) and domain-specific knowledge (i.e., knowledge about light and shadow), and the impact of knowledge integration training on learning outcomes. Furthermore, we will assess self-explanation quality to gain insights into learning strategies. Finally, we will assess self-explanation quality to gain insights into learning strategies. Finally, we will assess self-explanation quality to gain insights into learning strategies. Expecting positive effects of our training intervention on learning outcomes, we might show the potential of a short-term training intervention on knowledge integration. This could be a first promising step in developing more long-term and blended-learning interventions.

In this poster we characterize, compare, and contrast academic and learning management system (LMS) data from first year students enrolled in a School of Engineering and in a School of Education. Both schools, each of which has a different research culture in University, have constructed statistical models for understanding and predicting achievement. In this study, we expand those models with new sources of data and merge both school records. Thus, this study contributes several dimensions to our knowledge about learning analytics and academic performance. First, the study combines detailed academic records and different types of LMS operations in relation to first year courses. Second, since these data are collected at two types of institutions and from two professional disciplines, we are able to test how conceptual and statistical models behave across different but comparable learning environments. Finally, the poster will include key lessons obtained from merging sensitive data from multiple sources. In total, the data for this poster consists of 1,978 students from the 2013-2014 entry cohorts at both schools.

Students' expectations to and experiences of research based teaching

Keywords: Higher education, Learning approaches, Science education, Student learning

Presenting Author: Camilla Østberg Rump, University of Copenhagen, Denmark

Co-Author: Dorte Christiansen Elmeskov, Department of Science Education, University of Copenhagen, Denmark

Teaching and learning are often competing activities, and this leads to frustrations and may compromise the quality of teaching. As part of a university wide initiative, three modules were redesigned to engage students in research or research-like activities. In order to evaluate this, we developed an instrument asking students about their expectations to research-based teaching. This instrument can be administered pre and post instruction. The idea is, that we would expect an increase in students' expectations to research-based teaching if they have a good experience. The instrument is based on Healey's model (2005) of teaching for research-based learning. It was administered pre and post instruction to three classes in landscape architecture and biochemistry. Results show that for biochemistry the students' expectations did improve for instance. For landscape architecture the decline, however, decline. This can be explained by the students experiencing too little outcome in relation to time spent. A redesign has been made, and results from this will be reported. In our judgement, the instrument provided valuable input to the evaluation of the modules involved. A factor analysis identified four factors. We would have expected them to be close to the four factors in Healey's model. The factors were far from. Rather it seems that the students distinguish "ordinary teaching" from other types of teaching. We find that this is a quite striking result.

Where is the future? Identifying trends in educational technology using big data methodology

Keywords: E-learning / Online learning, Educational Technology, Higher education, Technology

Presenting Author: Attilio Ruscone, National Foundation of Sciences (ZNAM), Switzerland

Co-Author: Wilfried Siefert, Softwareentwicklung Siefert, Switzerland

Digital technologies are one of the key drivers of change identified by Ernst & Young (2012) in their study on the university of the future. In the field of educational technology new forms, trends, and hype arise. Universities have to decide which short and medium and long-term developments must be addressed and adapted and which can be ignored. We present a new methodology to identify educational technologies that become relevant for universities in 3 to 5 years. The method is based on a meta-analysis of different discourse spaces, each discourse
space representing a different part in the Gartner Hype Cycle. For 2016 the results of eight different trend reports, 1416 scientific articles from the field of educational technology and 1,000 tweets were systematically analyzed. On a medium time perspective (5 years) the following technologies become relevant:

- Bots / Robots/Affective Computing /AI
- Algorithms
- Virtual Reality / Augmented Reality
- Wearables

On a short time perspective (2 years) we can find the following trends:

- Mobile devices
- Big data
- MOOC

At EARLI 2017 these results from 2016 will be compared with results of the 2017 analysis.

How can Question Generation be implemented in the University Curriculum?
Keywords: Cooperative / collaborative learning, Experimental studies, Higher education, Student learning
Presenting Author: Roman Abel, University of Kassel, Germany
Co-Author: Matthias Mai, University of Goettingen, Germany

Generating questions is known as a solid learning strategy in order to enhance learning outcomes (Foa, Mora, & Tkcak, 1994; Rosenshine, Meister, & Chapman, 1996; Bug & McDaniel, 2012). This method was already applied in early and recent field experiments on university courses’ topics (Foa et al., 1994; Levin & Arnold, 2008) but never as an assignment for a course credit. In our study 87 students participated over four equal courses about Educational Psychology. They have been randomly distributed between ten timelasts with different topics and between three types of assignment for a course credit.

Two control groups were conducted: 1. writing a report as an alternative elaborative strategy and 2. preparing and holding a presentation about a related, but not a relevant topic in the current timelast. The final retrieval test contained a pool of items from each timelast in order to differentiate topic related and topic non-related items. The main question of this study is whether the learning strategy generating questions leads to gains in learning performance regarding the targeted items. The study did not only reveal main differences between groups concerning the targeted items but also of topic irrelevant items.

The type of assignment seemed to influence the degree of elaboration in the own as well as in other timelasts. In fact we could not confirm our hypothesis – not generating questions but writing a report revealed to be the favorable learning strategy.

Encountering Students in Disabling Conditions in Higher Education
Keywords: Higher education, Qualitative methods, Student learning, Teacher Professional Development
Presenting Author: Lotta Andersson, Malmö University, Sweden
Co-Author: Camilla Nordgren, Malmö University, Sweden

The aim of this paper is to discuss challenges for staff in Higher Education encountering students in disabling conditions. The study takes a point of departure in a series of workshops to strengthen the competence among staff at Malmö University to develop inclusive learning environments in their field of responsibility. The research questions concern the participants’ understanding of what constitutes an inclusive learning environment and their preparedness for acting in line with rights for people with disabilities to an education free from discrimination. Content analysis from field notes taken in dialogues with the participants showed that barriers exist e.g. due to procedures in order to get a statement qualifying to support as well as not having a statement meaning that the student becomes carrier of her/his own problems, responsible for telling each staff member about the disabling conditions and needs. Tension appeared in the analysis between giving support to the individual student and a proactive problem solving in a flexible learning environment to the benefit of all students. Principles of equal access and widened participation are not easily applied leading to the conclusions that further efforts need to be made to disseminate existing knowledge in the field and moreover to identify knowledge gaps by involving students, coordinators of support and other staff in different survey studies. The framework for coming studies is anchored in theory and practice developed in Universal Design for Learning focusing staff development and students’ sense of belonging when facing disabling conditions in higher education.

Assessment Preferences and Approaches to Learning of MBA and MPA students: A Comparative Study
Keywords: Assessment methods and tools, Educational attainment, Higher education, Student learning
Presenting Author: James Kwan, Lancaster University, Singapore

This pilot study seeks to examine the educational goals, learning approach, and assessment preferences among the part-time MBA and MPA students in Singapore. The quantitative study uses a questionnaire that employed the revised two-factor study process questionnaire (R-SPIQ-2F) to identify students approach to learning, and the adapted Assessment Preference Inventory (API) to examine students’ preferences to different assessment types/tasks.

The results of this study showed that educational goals relating to career advancement/enhancement and improved knowledge and skills were the key motivational factors that lead students pursuing postgraduate studies. When comes to approaches to learning, students generally adopting a deep learning approach, especially among the MPA students and the older students. This approach to learning was also evident in the assessment preference among the respondents, where they preferred assessments that required higher order level of thinking. When comes to the assessment types, respondents have strong preference for individual assignment and showed least preference for exam. However, there was no significant difference in the preference for any of the assessment items/formal among gender and age groups.

The findings in this study will be beneficial for the university to consider to redesign the curriculum for both programs to suit the needs of existing students as well as to increase its appeal to prospective students. The respondents’ views on their learning approach and assessment preferences will allow instructors and module leaders to relook into the teaching pedagogy and current assessment structure in order to improve students’ learning experience.

Session D 79
30 August 2017 10:15 - 11:45
Piniis A - Plasso Nall
Single Paper
Higher Education

Paper Presentation: Doctoral Education
Keywords: Doctoral education, Educational policy, Higher education, Mixed-method research, Qualitative methods, Researcher education, Self-regulation, Writing / Literacy
Interest group: SIG 24 - Researcher Education and Careers
Chairperson: Thomas Moser, Norway

Addressing the quality of doctoral supervisors
Keywords: Doctoral education, Educational policy, Qualitative methods, Researcher education
Presenting Author: Margaret Kiley, Australian National University, Australia

Research suggests that a supportive advising [supervision] relationship is central to successful and timely completion and particularly as an agent for socialization into the discipline the institution and a scholarly approach to research (Gardner, 2015; Golde, 2009). Furthermore, as Lovitts and Nelson (2000 p. 44) report: “The data suggest that the single most important factor in student decisions to continue or withdraw is the relationship with a faculty adviser”. However, anecdotally it is not uncommon to hear Heads of Department, Deans of Faculty and those in similar positions say that they know who the poorly performing doctoral supervisors are, but often they are not sure what they can do to remedy the situation. This study interviewed 36 senior staff in order to understand how they identified supervisors who were generally considered less than ideal in the way they supervised doctoral candidates and then how they addressed this issue. The results provide helpful insights for staff in leadership positions as well as those whose role it is to support doctoral education, and particularly supervision.

What is the value of a doctoral degree? Perceptions of doctoral value in the UK knowledge economy
Keywords: Doctoral education, Higher education, Mixed-method research, Researcher education
Presenting Author: Billy Bryan, University of Sheffield, United Kingdom
Co-Author: Kay Guccione, University of Sheffield, United Kingdom

Those who have a doctorate are said to hold significant knowledge and social capital. The recruitment of doctoral graduates yields collective knowledge, skills, networking, and prestige benefits to organisations, and to UK industries. As individuals though, do graduates experience net gain from the doctoral process, and how do they perceive the value that engaging with doctoral study conferred? This study used a mixed methods approach to collect survey data from current doctoral students (n=195) and interview data from recent doctorate holders (n=24). The main finding was that the doctorate was perceived not to be as valuable as both groups had expected, but gained other ‘added-value’ from the process. Doctoral students and graduates across disciplines and careers find most value in the personal
resilience and resourcefulness they develop through study, as well as deriving useful and translatable learning from inter-personal, cultural awareness, and relational processes. Student's value judgements were affected by factors such as supervision and their level of progress in the doctoral process. Graduate's perceptions were chiefly affected by their progress on the career ladder and their financial position. These findings have the potential to inform doctoral education programme leaders and HE policy makers in not only how to squeeze value from doctoral graduates, but to create a positive doctoral experience with lifelong benefits to the individual.

Doctoral Students' Writing Regulation Processes
Keywords: Doctoral education, Researcher education, Self-regulation, Writing / Literacy
Presenting Author: Anna Sala-Bubaré, Universitat Ramon Llull, Spain
Co-Author: Maria-Joan Haukari, Universitat Ramon Llull, Spain
Co-Author: Gert Rijlaarsdam, University of Amsterdam, Netherlands

Academic writing is a complex cognitive and sociocultural activity that requires writers to regulate their actions at different levels and phases. Doctoral education research shows students face many challenges during writing processes. However, little is known about how PhD students regulate their on-line writing process. To address this gap, the present study analysed two doctoral students' regulation processes while starting to write their first scientific article. Participants wrote an extended abstract of their research under naturalistic conditions. A screen-recorder and a keystroke logging software were used to collect data, along with a short writing log and responded to an open-ended questionnaire. After a week, writers received feedback on their texts and revised their abstracts under the same conditions. The analysis involved these levels: 'operations' (each keystroke or mouse movement), 'actions' (consecutive operations sharing a specific goal), and 'episodes' (actions aimed at the same objective). Based on the unit of analysis 'Regulation Episodes', 'episodes' were classified as 'regulation' and 'production', and 'regulation episodes' were further characterised in relation to their type, focus and location. Results showed writing a scientific article is a 'writing from-sources' activity right from the beginning of the process. Great variations not only between the two writers, but also between sessions regarding the type and distribution of the problems addressed, the regulation episodes and the attempted solutions. This study provides an innovative method to explore regulation processes of authentic tasks.

Session D 80
30 August 2017 10:15 - 11:45
Virta - 113
Single Paper
Assessment and Evaluation, Higher Education, Lifelong Learning, Teaching and Teacher Education
Paper Presentation: Professional Development and Workplace Learning
Keywords: Assessment methods and tools, At-risk students, Collaborative Learning, Communities of learners, Informal learning, Mixed-method research, Quantitative methods, Secondary education, Self-efficacy, Social interaction, Teacher Professional Development, Video analysis, Workplace learning
Interest group: SIG 14 - Learning and Professional Development
Chairperson: Marc Stadler, University of Muenster, Germany

Video-based comparative judgement as a method to measure teachers' professional vision
Keywords: Assessment methods and tools, Secondary education, Teacher Professional Development, Video analysis
Presenting Author: Iris Roose, Ghent University, Belgium
Co-Author: Pieter Van Avermaet, Ghent University, Belgium
Co-Author: Wim Sendelens, Vrije Universiteit Brussel (VUB), Belgium
Co-Author: Ruben Vanderlinden, Ghent University, Belgium

Professional vision has been identified as an important element of teacher expertise (Sherin & Van Es, 2009). Professional vision is defined as teachers’ ability to recognize and interpret effective teaching strategies (Stromer et al., 2013). Researchers have relied extensively on video to study professional vision. However, no yet has not been applied to study teachers’ professional vision in a standardized way. The "POTENTIAL – Power to teach AiI" Project is developing a video-based comparative judgement instrument to measure teachers’ professional vision of inclusive classrooms in a standardized way. The first part of the paper outlines the development of the video-based comparative judgement instrument. The conceptual model of teachers’ professional vision of inclusive classrooms and the model of comparative judgement were described. The second part presents two studies as a first step in the validation of the instrument. The first study is an expert study (n = 45) to require the validity of the content of the videos and investigate whether different types of experts come to a different ranking of the videos. The second study is a pilot with teachers from secondary education (n = 38) to provide evidence for the structure of the instrument and the response processes. On the basis of these two studies, further investigation of the use of video-based comparative judgement as a method to study teachers’ professional vision in a standardized way is recommended.

On the determinants of informal learning of teachers: A cross-sectional mixed-method study
Keywords: Informal learning, Mixed-method research, Teacher Professional Development, Workplace learning
Presenting Author: Antoine Locat, Université catholique de Louvain (UCL), Belgium
Co-Author: Simon Beauser, Maastricht University, Netherlands
Co-Author: Isabel Raemdonck, Université Catholique de Louvain, Belgium

Are our teachers able to keep up with changing insights and knowledge within their domain, are they ready for innovative didactical approaches and technological innovations? According to Dirk van Damme, The Head of the Centre for Educational Research and Innovation (CERI) of the OECD (2014) teachers in Europe do not show sufficient expertise to cope with these challenges. In other words, they have to learn to become better teachers. Given the dynamic environment of schools, investment in human capital is crucial and implies a strategic approach of supporting teachers’ continuous professional development. The professional development is both formal and informal in nature, and research on teachers’ informal learning is more limited (Hoekstra, Brekelmans et al., 2009). However, various studies suggest that informal learning is the most used type of learning in the workplace (e.g. Hicks, Bagg, Doyle & Young, 2007; Skule & Reichbron, 2002).

This study will investigate the teachers’ informal learning. Questionnaires will examine relations between teachers’ learnings and their antecedents (e.g. perceived job security, learning climate, teachers’ experience). Furthermore, interviews will examine the reason of these relations between the different variables under study. A special focus will be placed on the characteristics of informal learning through different examples.

Examining teacher self-efficacy in the context of Lesson Study practice
Keywords: Collaborative Learning, Communities of learners, Self-efficacy, Teacher Professional Development
Presenting Author: Tilmen Schipper, Windesheim, University of Applied Sciences, Netherlands
Co-Author: Olia Peela Malinen, Nilo Maki Institute, Finland
Co-Author: Sui Lin Gooi, VU University Amsterdam, Netherlands
Co-Author: Steibrecht De Vries, University of Groningen, Netherlands
Co-Author: Klaas van Veen, University of Groningen, Netherlands

This study uses a quasi-experimental design to examine whether teachers’ self-efficacy levels increase as a result of participating in Lesson Study (LS), which is a collaborative classroom- and inquiry-based professional development approach. Assuming that LS supports teachers to focus explicitly on students’ learning, Bandura’s theory was used to determine whether teachers feel more efficacious to execute teacher behavior related to student engagement, instructional strategies and student management. Given a relatively small research sample of 64 secondary school teachers and an unequal distribution of teachers across one subject area (Maths), non-parametric tests were used to detect differences between these groups. The intervention consisted of two Lesson Study cycles in one academic year and the overarching aim of all Lesson Study teams was to increase differentiated classroom behavior. A significant increase of teacher self-efficacy in terms of student engagement and instructional strategies was found in the Lesson Study group as opposed to no significant differences in the comparison group. This study on teacher self-efficacy adds to the growing body of mainly qualitative literature on the outcomes of Lesson Study.

Relationships between patterns of risk and success concerning the transition into labour market
Keywords: At-risk students, Quantitative methods, Social interaction, Workplace learning
Presenting Author: Anja Gebhardt, University of Teacher Education St.Gallen, Switzerland
Co-Author: Chantal Karrm, University of Zurich, Switzerland
Co-Author: Christian Bruhwiler, University of Teacher Education St.Gallen, Switzerland
Co-Author: Philippe Gomion, Institut für Erziehungswissenschaft, UZH, Switzerland
Co-Author: Stefanie Dornbach, University of Zurich, Switzerland

Referring to the biographical and sociocultural importance of successful transitions into the labour market, more research is needed to conduct vocational orientation processes, their underlying opportunities and support systems. This study aims at illuminating relationships between personal, familial, school and occupational risk factors and success indicators concerning the second transition. The analyses are based on a mixed sample design (longitudinal sample n=104, special interest sample n=302). Results show that occupational related factors and the academic achievement at the end of compulsory school are most relevant for the second transition. Latent class analyses were run to identify patterns of risk and resilience. The analysis show three different successful patterns, which based on theoretical and empirical considerations can be named as “average performer”, “low performer” and “high performer”. Furthermore with regard to various risk and protective support factors three patterns were identified. However, the finding of a youth group named “socially supported” made the inventory of risk and support factors superficial. Based on a combination of risk and support patterns, considerations of optimizing support offers will be discussed in the presentation.

Session D 81
30 August 2017 10:15 - 11:45
Pinni B - 84113
Single Paper
Higher Education
Paper Presentation: Higher Education - B
Keywords: Achievement, Action research, Attitudes and beliefs, Design based research, Developmental processes, Emotion and affect, Higher education, Learning approaches, Science education, Self-efficacy, Survey Research, Teacher Professional Development, Teaching approaches
Interest group: SIG 04 - Higher Education
Chairperson: Steve Nobel, Technische Universität Chemnitz, Institute for Media Research, Germany
Students’ identity formation processes and academic achievement at their university

Keywords: Achievement, Developmental processes, Emotion and affect, Higher education

Presenting Author: Hanke Korperhoek, University of Groningen, Netherlands

The objective of this paper was to demonstrate the construct validity and predictive validity of the measurement framework presented by Crocetti, Rubini, and Meeus (2008), which was originally developed to measure the identity formation processes (such as achieving commitments) of individuals in a geographically confined Austrian cohort. Participating students were actively engaged in the research process, e.g., development of a questionnaire assessing personal data, data collection and analysis, as well as publishing of results. Within the present study, we assessed students’ epistemological beliefs (i.e. views about source, certainty, development and justification of knowledge), domain-specific and general academic self-concept as well as domain-specific knowledge about allergies and related research.

Using causal diagrams to foster systems thinking in geography education

Keywords: Cognitive skills, Experimental studies, Inquiry learning, Science education

Presenting Author: Marieleen Che, KU Leuven, Belgium

An increasing interconnectedness of people and goods enhances the complexity of many geographical problems. For students to understand geography, systems thinking is a promising approach. It helps to understand increasing complexity by looking at the entire system and at the interconnectedness between the elements in the system. Encouraging students to use tools to handle complexity may help them to understand that complexity. In this study students were induced to elaborate causal diagrams in view of better understanding original texts and graphs on complex geographical issues.

Metacognitive Support in Simulation-Based Physics Instruction

Keywords: Inquiry learning, Instructional design, Metacognition, Science education

Presenting Author: Ines Debe, University of Salzburg, Austria

Computer-based simulations are essential to effective physics teaching and learning. They allow learners to actively manipulate graphical visualizations of complex phenomena. However, research on metacognitive learning in the context of physics instruction is scarce. In this study, we investigate whether direct or indirect metacognitive scaffolding (i.e., training and prompting, respectively), or a combination of both during simulation-based learning leads to better learning outcomes compared to simulation-based learning alone. Within a 2×2 factorial design, we explored the role of metacognitive training prior to the use of simulations and the role of metacognitive prompting on knowledge acquisition, metacognitive behavior, cognitive load, and mental effort. Results indicate no main effects for training and prompting, and no interaction effect. A closer look at the actual use of prompting, however, reveals a significant impact of the metacognitive strategies employed on students’ cognitive load as well as an interaction effect between prior knowledge and the actual use of prompting. We found higher scores on cognitive load in the condition where appropriate prompting was used and students had high prior knowledge.
Scientific thinking involves the ability to construct and to reason with and about models (Giere, 2006). Drawing-based modeling is an approach in which students can create computational models of systems they investigate, such as evolutionary systems, planetary systems and traffic. In this paper we investigate the kinds of model-based reasoning that were observed in students who were creating models in two domains: evolution and action potential as part of signal transport in nerve cells.

In the reasoning that students display about their models, it is sometimes visible that, even though they create the models themselves, they explain the modeling results, i.e. the way the resulting simulation behaves, in terms of factors outside the model. In the case of evolution this reasoning leads to the introduction of a kind of “magical” relations between components of the model.

We find a relation between successful creation of causal explanations with the way the students build and specify the models. It appears that students need a minimum level of control of the model in order to build reasoning completely based on the model they created themselves.

**Session D 83**

30 August 2017 10:15 - 11:45
Main Building A - A32
Single Paper
Lifelong Learning, Motivational, Social and Affective Processes

**Paper Presentation: Self-regulation and Motivation**

**Keywords:** Achievement, At-risk students, Developmental processes, Educational attainment, Mathematics, Metacognition, Motivation, Motivation and emotion, Quasi-experimental research, Self-efficacy, Self-regulation, Student learning

**Interest group: SIS 08 - Motivation and Emotion**

**Chairperson:** Norbert Eidtmann, University of Turku, Department of Teacher Education, Germany

**Perception of Mindfulness Practice and Its Contribution to Students Wellbeing**

**Keywords:** Developmental processes, Educational attainment, Self-efficacy, Motivation and emotion

**Presenting Author:** Ariel Teichman-Woernberg, Avcha Academic College, Israel

**Co-Author:** Iara Rachmilowitz, Avcha Academic College, Israel

Mindfulness meditation is intended to develop attention to an experience that is taking place in the present, with non-judgmental acceptance. The present study examined the experience of fifth and sixth graders who practice mindfulness and how this experience contributed to their wellbeing. Most of the interviewed students reported practicing mindfulness also in their free time in order to cope with anger, pressure and stress. They experience of the practice as calming, improving the concentration ability. In the education system, mindfulness practice can comprise an effective, available and applicable solution which contributes to the students’ positive feelings, by finding a quiet place in their minds.

**Enhancing adolescents' self-determined motivation and self-concept in math. An intervention study.**

**Keywords:** At-risk students, Mathematics, Motivation, Quasi-experimental research

**Presenting Author:** Claudia Cristiana Brandenberger, University of Bern, Institute of Educational Science, Switzerland

**Co-Author:** Tina Hascher, University of Bern, Switzerland

**Co-Author:** Gerda Hagenauer, University of Bern, Switzerland

A negative trend, especially for students in lower achievement levels, is for academic self-determined motivation to significantly decline across childhood through adolescence, and more so in math than in any other school subject. To counteract this negative development, an intervention study based on the Self-Determination Theory was developed and implemented in seventh-grade math classes with basic demands in Switzerland. The study applied a quasi-experimental design using two treatment groups (combined student/teacher group: teachers and students participate in intervention; students-only treatment group: only students participate in intervention) and a control group. The sample for this study included 348 7th grade students (student/teacher group: 134 students; students-only group: 122 students; control group: 92 students). The aim of this study was to examine the impact of both treatment forms on students’ motivation and self-concept. The intervention was evaluated longitudinally (pre- and post-test) through a student questionnaire. Paired sample t-tests and Cohen’s d showed that the most positive effects were found for students in the combined group with a significant increase in intrinsic motivation and self-concept. Multivariate analysis of covariance with repeated measures revealed a significant intervention interaction effect for intrinsic and identified motivation as well as self-concept, indicating significant differences between the groups in favour of students in the combined group. The results of the present study highlight that the decline of autonomous motivation across adolescence is strongly influenced by teachers who shape the learning environment and by the students who develop learning competencies and reflect on their attitudes towards learning.

**Parents’ autonomous motivation favours students’ motivation toward homework**

**Keywords:** Achievement, Self-efficacy, Self-regulation, Motivation, Motivation and emotion

**Presenting Author:** Angelica Moë, University of Padova, Italy

**Co-Author:** Irli Katz, Ben-Gurion University of the Negev, Israel

**Co-Author:** Marianna Atesi, Università di Palermo, Italy

Although homework is a frequent source of stress for both parents and students, parents’ autonomous motivation and display of positive affect can make the difference. In this research, we tested the hypothesis that parents’ autonomous motivation favours students’ motivation and display of positive affect during homework. Study 1 used a correlational approach and showed, with 205 dyads of parents and their children from the fourth to eighth grades, that parents’ autonomous motivation favours parents’ positive affect, which in turn is associated with students’ positive and negative affect, both directly and through the mediation of students’ self-efficacy. Study 2 assessed the effectiveness of an intervention, with parents focused on practising autonomous supportive modalities on students’ homework motivations and affect. The results showed that the training reduced parents’ controlled motivation and negative affect, and prevented a decrease in students’ autonomous motivation and engagement. The discussion focuses on theoretical and educational implications.

**Predictors of self-regulated learning in upper secondary and higher education**

**Keywords:** Metacognition, Motivation, Self-regulation, Student learning

**Presenting Author:** Christian Brandmo, University of Oslo, Norway

**Co-Author:** Olav Schewe, University of Oslo, Norway

The current study examines how different individual and social components of motivation predict various aspects of self-regulated learning and whether these potential predictions are valid across levels of education. The participants comprised 1,588 upper secondary school students and 981 higher education students from Norway, totaling 2,569 students. The data were collected through an informative web-solution that gave the participants immediate feedback on their component scores compared to a norm. The data were analyzed by means of factor analyses and structural equation modelling. Using a tree-factor model of self-regulated learning – planning and monitoring, volition and resistance for distraction, and adaptive regulation for learning – the results revealed that the different types of motivation variously predicted the components of self-regulated learning. Though there were similarities in the prediction pattern across educational levels, significant differences were also found. Implications for further research as well as practical implications are discussed.

**Session D 84**

30 August 2017 10:15 - 11:45
Pinno B - B1096
Single Paper
Teaching and Teacher Education

**Paper Presentation: Teacher Professional Development - B**

**Keywords:** Competencies, Educational Psychology, Educational Technology, Higher education, Motivation, Pre-service teacher education, Qualitative methods, Reasoning, Reflection, Student learning, Teacher Effectiveness, Teacher Professional Development

**Interest group: SIS 11 - Teaching and Teacher Education**

**Chairperson:** François Lombard, Université de Genève, Switzerland

**Beginning teachers' profiles of professional competence: Who are the most successful teachers?**

**Keywords:** Competencies, Educational Psychology, Motivation, Teacher Effectiveness

**Presenting Author:** Christina Liminger, Goethe University Frankfurt, Germany
The present study aims to, first, identify beginning teachers' patterns of professional competence at their transition into practice and to, second, investigate differences in professional success (referring to occupational behavior and well-being) between groups of teachers with these different patterns. The participants were 579 beginning teachers from various school subjects and school types who had just finished their formal teacher education in Germany. We conducted a latent profile analysis and included 16 subscales from different aspects of competence, which were educational knowledge, beliefs, motivation, and self-regulation. We found three patterns of competence among the beginning teachers which can be characterized as "overall competent teachers", "teachers with reduced knowledge", and "teachers with reduced motivation". The main finding of the group comparisons is that teachers with reduced motivation rated themselves as significantly less professional in their behavior and scored significantly lower on occupational well-being than the other two groups. This pattern of results is also found in student ratings of the teachers' behavior and well-being for a subsample of 52 teachers, although not all comparisons reach statistical significance. We conclude from our data that teachers do not graduate from formal teacher education with the same "starting competence". Moreover, apart from cognitive aspects of competence also non-cognitive aspects seem to be an important part of beginning teachers' starting competence with respect to their ability to operate professionally at school.

A review on ICT-training in Scandinavian teacher education

Keywords: Educational Technology, Higher education, Pre-service teacher education, Teacher Professional Development
Presenting Author: Fredrik Merk Reiknes, Norwegian University of Science and Technology, NTNU, Norway
Co-Author: Rune Krumsvik, University of Bergen, Norway

In today’s digital Scandinavian schools and in higher education, teachers and lecturers are expected to integrate information and communications technology (ICT) in their teaching to prepare pupils for the complex demands of the knowledge society. Consequently, teacher education programs in Scandinavian countries (Denmark, Finland, Iceland, Norway and Sweden) are also expected to prepare student teachers to teach their subject disciplines with ICT so that they can fulfill curricular demands and meet pupils’ learning expectations. However, the use of ICT in teacher education in countries such as Norway has been criticized for being teacher-centered, tool-focused, and slow to implement new and innovative pedagogies involving digital technologies. Although Scandinavian schools and higher education institutions are digitally well-equipped, there is little knowledge about how these technologies are used in the preparation of future school teachers. Therefore, the current study is a state-of-the-art review of the research literature on the use of ICT in Scandinavian teacher education from 2010 until 2016. The aim of the study is to shed light on how student teachers are prepared to teach with ICT in their subject disciplines, thus developing their professional digital competence. The research question is: How are student teachers in Scandinavian teacher education prepared to teach with ICT? The method is literature review which draws on methods from systematic review. A total of 45 studies were included in the final review. The findings discuss key strategies, current technological trends and future directions regarding the use of ICT in teacher education in the Scandinavian countries.

Stories of student teachers about their practice: a learning tool for students and teacher educators

Keywords: Higher education, Reflection, Student learning, Teacher Professional Development
Presenting Author: Iltej Pauw, Katholieke Pabo Zwolle, Netherlands
Co-Author: Woonjho Jongstra, Katholieke Pabo Zwolle, Netherlands

Stories of student teachers about their practice: a learning tool for students and teacher educators

Student teachers develop their professional identity individually. As an aspect of their development of their professional identity we teach student teachers to reflect on their own practical school-based experiences by writing stories and analysing these.

Could these stories also be a learning tool for teacher educators? In two studies we examined this question. In one study the plots of the story were analysed of 45 freshmen with five of the categories of Booker (2004). In another study both the hidden and the expressed values in verbal acts in stories of seven 3rd year students were analysed, categorising these values.

It appeared that the category of Booker ‘Overcoming the Monster’ was the main theme (archetype) junior students encounter and that students seldom show traces of reaching the second phase of professional identity: expanding personal power. It seems students possess only a few scripts for their acts and a rather narrow frame (image) of their profession.

In these studies we show that teacher educators can help their students by asking them questions about their stories and can reveal in cooperation with the students their values. They also can help them to get insight in the actual phase of their professional identity and show them other scripts to widen their frame of the profession of the teacher. In this way stories are as well useful as a learning tool for student teachers as for teacher educators.

The role of experience-based and research-based knowledge for teachers’ instructional decision-making

Keywords: Qualitative methods, Reasoning, Teacher Effectiveness, Teacher Professional Development
Presenting Author: Ulrike Franke, Ludwig Maximilians-Universität (LMU), Germany
Co-Author: Christof Woeker, Ludwig Maximilians-Universität (LMU), Germany

Abstract

It appears that teachers’ instructional decision-making is influenced more by the experience-based knowledge that is developed over a long series of episodes than by research-based knowledge of scientific theories and empirical findings. Therefore, the present study was designed to investigate what types of knowledge teachers provide as reasons for particular instructional decisions and whether their experience-based knowledge is in fact based on experienced episodes. In the present on-going study, in-service teachers of different types of school and different subjects are interviewed subsequent to a videotaped lesson. At least three scenes involving an instructional decision are employed as stimuli for the interview. Based on a structured interview guideline, teachers are asked for a reason for each instructional decision. A coding scheme comprising different types of knowledge that can be provided as a reason was developed. The results so far suggest that experience-based knowledge was the dominant type of knowledge mentioned as a reason for an instructional decision, whereas research-based knowledge was rarely cited. Specific characteristics of underlying episodic experiences that could translate to the authenticity of these experiences were hardly mentioned. These initial findings raise interesting questions about the nature of the teachers’ experience-based knowledge: Have the particular episodic experiences been encapsulated in automated routines or is it conceivable that in many cases real episodic experiences never actually occurred in the past? It may be difficult to differentiate empirically between these competing explanations, yet further analyses of the data from the present study will shed further light on these issues.

Session O 85
30 August 2017 10:15 - 11:45
Linna - Värriö Linna [K104] Single Paper
Assessment and Evaluation
Paper Presentation: Assessment and Evaluation
Keywords: Achievement, Assessment methods and tools, Cognitive development, Motivation, Primary education, Qualitative methods, Quantitative methods, Reasoning, Science education, Secondary data analysis, Teacher Effectiveness
Interest group: SIS 91 - Assessment and Evaluation
Chairperson: Olga Kasatkina, France
The modelling of teachers’ judgment in summative assessment practices

Keywords: Assessment methods and tools, Primary education, Qualitative methods, Teacher Effectiveness
Presenting Author: Lucie Miotto Lopez, University of Geneva, Switzerland
Co-Author: Lionel Dechamboux, Université de Genève, Switzerland

Our research examines the construction of meaning during summative assessment practices with respect to predefined assessment criteria and other emerging referents. The purpose is to model the dynamic knowledge of the teachers' judgment in practice, in particular in case of hesitations and when the teachers authorize them to make adjustments during grading process. First, we use a conceptual framework developed in the French-speaking community of researchers in assessment in education, that takes into account the relation between assessment criteria (called "reference", components of assessment frame of reference) and observables or signs in the student’s answer selected by the assessor (called "reference", Hadj, 1989). Processing of assessment reference is called "referentialization" (Figure & Rémaud, 2014), for instance when new meaning of pre-defined assessment criteria emerged during grading process. Secondly, we interpret the phenomena of referentialization we observed with respect to a professional judgment perspective (Labouste & Allal, 2008). Our results will show how pre-existing and emergent referents are differently located during the teachers’ activity of referentialization, between interpretation and decision-making processes. The kind of triangulation between these referents seems to characterize different profiles of teacher-assessor. We will discuss these profiles, in particular according to the validity of consequence of the assessment.
Development of achievement and test taking behavior - a class-centered analysis

Keywords: Achievement, Assessment methods and tools, Motivation, Secondary data analysis

Presenting Author: Riisto Holianinen, University of Helsinki, Finland
Co-Author: Carina Kupainen, University of Helsinki, Finland
Co-Author: Mari-Paulina Vainikainen, University of Helsinki, Finland
Co-Author: Risto Holianinen, University of Tampa, USA

In Finland, differences between schools have been one of the lowest in the OECD according to several PISA studies, but there is much less research on within-school effects in Finland, with only a few exceptions. These studies have shown that there are considerable level class differences on both school achievement and scientific reasoning.

Aim of this aim of this study was to detect if development of class-level academic achievement from 7th to 9th grade between classes differ and if yes, the second aim was study if there are between class-level differences in motivation and social capital.

Two theories provided ground for the chosen approach: Achievement goal orientation theory and the Theory of Social capital of which both classroom and family social capital.

The final study population filling out the questionnaires and achievement tests (math and reading) in 2011 (7th grade) and 2014 (9th grade) contained 5219 students (51.3% girls) from 462 classrooms and 117 schools.

Latent profile analysis and ANOVAs were executed with aggregated class level data.

The results showed that based on repeated achievement measures, it was possible to find three class achievement profiles: P1: increasing (69 %), P2: moderate (19 %) and P3: decreasing (13 %).

Classification profile differentiates both in motivation and social capital (both classroom and family social capital).

This study showed that the development of low-stake test achievement and behavior is associated with class level goal orientations and social capital.

Relationship between scientific and inductive reasoning in grades 5 and 7

Keywords: Cognitive development, Quantitative methods, Reasoning, Science education

Presenting Author: Erzsébet Kornó, University of Szeged, Hungary
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Co-Author: Benő Csapó, University of Szeged, Hungary

This study reports the first results of a project, which investigates the relationship between general thinking skills, scientific reasoning and motivation to learn sciences. The purpose of this paper is (1) to examine the development of general thinking skills and scientific reasoning between grades 5 and 7, and (2) to explore the relationship between inductive and scientific reasoning. The sample included 53-53 classes from 52 Hungarian schools (grade 5: N=549, males 49.9%, grade 7 (N=511, males 47.7%). An online test was developed to assess scientific reasoning (Gronbach’s alpha grade 5: .76; grade 7: .84). In order to complete the tasks students had to operate different thinking processes such as conservation; proportional, correlational, probabilistic reasoning and classification skills in science context. The domain general online inductive reasoning test comprised 35 items with four subscales: 15 figural series, 15 figural analogies, 14 verbal series and 11 number analogies (Gronbach’s alpha was .90 in both grades). Results indicate that students’ scientific reasoning skill changed significantly between the two school years. The correlation between scientific reasoning and domain general inductive reasoning was stronger in grade 7 (r=.40, p<.01) than in grade 7 (r=.62). Linear regression analyses showed that inductive reasoning explained 39.7% of variance in grade 7 and 63.6% of variance in grade 5. Our results highlight the importance of improving reasoning through the content of teaching in everyday school practice.

Online assessment of scientific reasoning and motivation to learn science: a pilot study in Namibia

Keywords: Motivation, Quantitative methods, Reasoning, Science education

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Co-Author: Benő Csapó, University of Szeged, Hungary

Abstract

The purposes of this study were to explore the possibilities of online assessment and to investigate the relationship between scientific reasoning and motivation to learn science in Namibia. The sample of the study was drawn from the fifth (N=275) and seventh grades (N=346). The online assessment tool for scientific reasoning consisted of 36 items with 16 tasks assessing conservation; proportional, correlational, probabilistic reasoning and classification skills in science context. The Science Motivation Questionnaire II (SMQ, Olyvm et al., 2011) was also applied. The eQA platform was used to collect the data. Learners were ferried from their schools to the University of Namibia’s ICT rooms. Due to the lack of reliable in grade 5 (Gronbach alpha=.84) we excluded them from further analyses. For grade 7 Gronbach alpha=.70. The tasks were moderately hard for the students: M=40.56%, SD=13.47%. One-parameter Rasch analyses showed that there were few items for differentiates student at low skill levels. The reliability of the SMQ was good, Cronbach alpha=.91. Average scores were relatively high, thus, students reported that they are motivated to learn science. Except self-efficacy significant (p<.05) but weak correlations were found between scientific reasoning and motivation. Results revealed that the scientific reasoning has to be revised to carry out reliable assessment in this age cohort in Namibia. Our findings indicate that online assessment may provide schools and teachers with user friendly assessment instruments but for this purpose Namibian education system need to pay more attention on the development of basic ICT infrastructures within schools.

Session D 86
30 August 2017 10:15 - 11:45
Vita - 109
Single Paper
Teaching and Teacher Education

Paper Presentation: Teaching and Teacher Education - J

Keywords: Bilingual education, Educational Psychology, Language (Foreign and second), Motivation, Pre-service teacher education, Reading comprehension, Science education, Self-regulation, Teacher Professional Development, Teaching / instruction, Video analysis
Interest group: SIG 11 - Teaching and Teacher Education
Chairperson: Kristina Köfger, Germany

Linking Instruction and Student Achievement to Reading in English as a Second Language

Keywords: Language (Foreign and second), Reading comprehension, Teaching / instruction, Video analysis
Presenting Author: Lisbeth M Breivik, Department of Teacher Education and School Research, Norway
Co-Author: Maria B. Németh, MTA-SZTE Research Group on the Development of Competencies, Hungary
Co-Author: Benő Csapó, University of Szeged, Hungary

This study follows teachers and students in seven classrooms at seven different schools across three school years, by identifying components of classroom practices that can be related to reading achievement. The study combines achievement data (national English reading tests), instructional data (video observations from English lessons), and student survey data (perceptions of their English instruction). The findings indicate low quality English instruction; evidence of implicit rather than explicit reading strategy use and instruction; and the majority of the students expressed satisfaction of the support they received in their English lessons, the observed support was primarily given in the first language aimed at the poor readers. This study contributes with systematical findings of what characterizes second language reading instruction.

Effects and Surprises of Teaching Biology in a Foreign Language

Keywords: Bilingual education, Language (Foreign and second), Motivation, Science education
Presenting Author: Pablo Pirinay-Dümmer, Medizinische Hochschule Brandenburg Theodor Fontane, Germany
Co-Author: Bonny Jäncke, Martin-Luther-Universität Halle-Wittenberg, Germany

Didactics often assume cognitive and motivational effects within properly conducted bilingual classroom settings for STEM education, where a science is taught in a foreign language, which the students also learn at school. This quasi-experiment investigates commonly assumed effects on grades, grade changes, motivation, interest and self-concept within a full-fall semester six point repeated measurement design with eight grades (n=51). While none of the often predicted effects on motivation, interest and self-concept could be shown, this study presents promising cognitive effects on grades and performance within bilingual classrooms that are particularly beneficial for weaker learners: introducing the additional level of complexity to the teaching class will not harm weaker students. They may instead benefit from such settings.

Motivational orientations, psychological needs and perceived autonomy support in teacher training

Keywords: Educational Psychology, Motivation, Pre-service teacher education, Teaching / instruction
Presenting Author: Daniela Martinek, University of Salzburg, Austria
Co-Author: Martin Carmignola, University of Salzburg - School of Education, Austria
Co-Author: Ulike Klapman, Pädagogische Hochschule Salzburg, Austria
Co-Author: Julia Maria Kelter, University of Salzburg, Austria

Being able to support their pupils’ autonomy in class is an essential skill for teachers. Research results indicate that next to specific training programs individual orientations of students in teachers training need to be considered to enable future educators to reduce control and offer autonomy support in class. Our project focused on empirical evidence concerning the prerequisites of teacher trainees during their program at the university. Therefore 351 students participated in a questionnaire-based empirical study using the following scales: General Causality Orientations Scale (Deci & Ryan, 1985), Basic Psychological Need Satisfaction Scale (Van den Broek et al. 2011) and Perceived Autonomy (based on Reeve et al. 2003). In addition we manipulated the announcement of an existing educational course by offering one in controlling and one in non-controlling language.

Data shows how students in teacher training differ in regard to the expressions of their causality orientations as they can be classified by distinct combinations of the three scales. Those profiles have an impact as high levels of autonomy orientation are linked to more valuable outcomes in the training program such as higher psychological need satisfaction and perceived autonomy. The experiment with two
manipulated course descriptions brought the expected effect of verbal formulations on perceived autonomy as all students regardless their causality orientations showed higher levels of perceived autonomy for the formulation in autonomy supportive language. The results can contribute to design supportive didactical settings for teacher training offering students autonomy support and structure in a non-controlling way.

**Prompting Preservice Teachers’ Professional Vision for Self-Regulated Learning**

**Keywords:** Pre-service teacher education, Self-regulation, Teacher Professional Development, Video analysis

**Presenting Author:** Tova Michtaky, Bar-Ilan University, Israel

The present study investigated the effects of three professional vision (PV)scaffolding level for analysing video-cases of complex self-regulated learning (SRL): (1) Self-guided, analysing video cases without any help, (2) Hint/approach, pre-service teachers got a time hint for the event they needed to analyse and (3) Guided approach, pre-service teachers got a pop-up notification of the relevant eventand SRL teaching. Findings demonstrated that the Hinted approach led to better performance on pre-service teachers’ use of SRL in their PV for SRL and actual SRL teaching as measured directly (implicit/explicit SRL-promoting strategy instruction), and indirectly (construction of SRL-promoting learning environments).

**Session D 87**

30 August 2018 10:15 - 11:45

**Pinni B - B3110**

Single Paper

Instructional Design, Lifelong Learning, Teaching and Teacher Education

**Paper Presentation: Phenomenography and Variation Theory**

**Keywords:** E learning / Online learning, Early childhood education, Instructional design, Lifelong learning, Mathematics, Peer interaction, Phenomenography, Pre-service teacher education, Qualitative methods, Student learning, Teaching / instruction, Teaching approaches, Video analysis

**Interest group:** SIS 9 - Phenomenography and Variation Theory

**Chairperson:** Tal Palievsky, University of Haifa, Israel

No Parents Left Behind! Enabling parental learning on a mobile phone app for working class families

**Keywords:** E learning / Online learning, Peer interaction, Phenomenography, Lifelong learning

**Presenting Author:** Luis Go, The University of Hong Kong, Hong Kong

**Co-Author:** Ming Fai Pang, The University of Hong Kong, China

It is found that text messaging were very effective in ‘nudging’ parents to participate in school activities and to get them more involved in their child’s learning (EEF, 2014). However, as of today, mobile technology is still exceedingly under-utilized for the education of parents as parents. The paper presents the innovation of combining the case study methodology, publicly available video materials on parenting and WhatsApp mobile app to create a low cost, easy-to-use mobile platform, thus making parent education more accessible to underprivileged working class families.

With the help of administrators of schools located in relatively economically depressed areas of the city, 15 to 20 parents in each of the 3 participating schools were invited into a school WhatsApp mobile app peer-learning group. Five parent situational videos were used as cases. Each case video was uploaded at the beginning of each lesson, and each case discussion allotted five days. The group parent education moderator monitored the level of participation and ensured that the discussion stays on the case.

Pre- and post- event interviews were conducted with the participants. Interview transcripts were analysed to evaluate parental learning. Preliminary results indicate significant levels of transformational learning occurring amongst the participants.

**Learning to see numbers as parts and wholes in preschool**

**Keywords:** Early childhood education, Instructional design, Mathematics, Phenomenography

**Presenting Author:** Angelika Kulberg, University of Gothenburg, Sweden

**Co-Author:** Anna-Lena Eldahl, Jönköping University, Sweden

**Co-Author:** Maria Reis, Göteborgs Universitet, Sweden

Children’s understanding of early arithmetic plays a significant role in their potential for future learning of mathematics. It has been argued that one important part of children's understanding of the first ten numbers is a serious understanding of the numbers part/part-whole relationships. The aim of the research project, from which this study emanates, was to explore how the first ten numbers are experienced and early arithmetic is developed by 5-6 year old children. In the beginning of the project 103 participating children were interviewed individually. The intervention programme concentrated on games that focused e.g. on seeing part/part-whole relationships on fingers, and was implemented in close cooperation with the pre-school teachers. After the ten-month intervention period, the children were interviewed again. We report on findings from the analysis of one task in the video recorded interviews, ‘the guessing game’, using a variation theory framework. The aim of this paper is to illustrate identified differences found in children's experience of the part/part-whole relationship in the task before and after the intervention.

** Learner contributions and sensitive teacher ears – Learning opportunities in mathematics instruction**

**Keywords:** Qualitative methods, Teaching / instruction, Teaching approaches, Video analysis

**Presenting Author:** Tuula Maunu, Gothenburg University, Sweden

**Learner contributions and sensitive teacher ears –**

**Learning opportunities in mathematics Instruction**

The aim of this study is to identify teachers’ responses to learner contributions in mathematics instruction and thereby to contribute to knowledge of what different responses mean to the emergence of learning opportunities. Variation theory is used to address learning opportunities in a content perspective (e.g. Martin, 2015). The empirical data encompasses 16 video recorded mathematics lessons. The lessons are either conducted in grade 9, 10 or 11 in Sweden. All lessons share the topic, the introduction of linear equations. Results show that learner contributions (LCs) are established in four different trajectories due to different teacher responses: Disregarded LCs, Selected LCs, Considered LCs, and Explored LCs. Also, the defining dimensions of the content are typically opened by teachers, with or without interaction. However, non-defining dimensions of the content are mainly opened to co-constitution between teacher and students, most often as a result of considered or explored learner contributions. Learner silence and insufficient teacher responses to learner contributions, as well as the importance of responsible learners and sensitive teacher ears, are discussed in relation to pedagogical implications for teaching.

**Reference:**


**Critical competencies in teacher students’ learning to teach**

**Keywords:** Phenomenography, Pre-service teacher education, Student learning, Teaching / instruction

**Presenting Author:** Kyriaki Dismas, Linnaeus University, Sweden

This investigation explores critical aspects of competence in teaching and learning to teach as experienced by teacher students in practice parts of teacher education. The focus is on what teacher students experience as critical in critical events occurring during their teaching practice, and if and how they focus on the relation between teaching and pupil learning, critical from a theoretical educational perspective.

Four groups of four teacher students each, preschool, leisure, literature and physics teacher students, participated in the research. During a period of teaching practice they wrote narratives about critical events in their teaching sessions. Reflecting and focusing interviews about the described critical events followed. The different forms of data collection give a possibility of triangulation and comparisons between methods. The general approach to the analysis of the material is contextual analysis.

Three types of events were mainly identified through the analysis of critical events described by the teacher students. måndagstiden, Facing the tension between the intended and the enacted object of learning and Creating relational didactics. Förening as flexibility to act contextually and in situ as well as courage to act anew and to take the risk of failure are considered to be main teaching competencies.

**Session D 88**

30 August 2018 10:15 - 11:45

**Pinni B - B3118**

Single Paper

Higher Education

**Paper Presentation:** Researcher Education and Careers - B

**Keywords:** Attitudes and beliefs, Collaborative Learning, Communities of practice, Content analysis, Culture, Doctoral education, Emotion and affect, Higher education, Mixed-method research, Social aspects of learning and teaching, Social sciences, Survey Research
The use of manipulatives in mathematics classrooms from the pedagogical and practical perspective

Keywords: Mathematics, Primary education, Student learning, Teaching / instruction

Presenting Author: Daranea LehtoTenn, University of Tampere, Finland

Co-Author: Jomma Joutsanlaiti, University of Tampere, Finland

It has been evidenced that when being utilised appropriately, manipulative materials-hands-on learning tools-can facilitate students' understanding of mathematical concepts. However, research has determined that teacher's usage of traditional teaching elements is not the only factor influencing the manipulatives use in mathematics classrooms. To discover how to leverage the beneficial use of mathematics manipulatives, we conducted qualitative research in third- to sixth-grade classes. Our empirical research results and analysis of existing manipulatives, together with work of other researchers, have brought to the light the hindrances to benefiting from manipulatives. Not only pedagogy, but also day-to-day practicality plays an important role in the success of manipulatives utilisation. These findings provide implications for manipulatives design and development during the next phase of our research as well as for future studies, classroom practice, school management, and teacher education.

Session D 90
30 August 2017 10:15 - 11:45
Pinzi A - A1081
Single Paper
Higher Education, Lifelong Learning
Paper Presentation: Learning and Professional Development - 8

Keywords: Cognitive skills, Content analysis, Educational policy, Higher education, Informal learning, Lifelong learning, Mixed-method research, Quantitative methods, Self-regulation, Survey Research, Teacher Professional Development, Technology, Workplace learning

Interest group: SIG 14 - Learning and Professional Development

Chairperson: Marlies Endrikj, University of Twente, Netherlands

Leadership for Innovative Teacher Teams in Higher Education

Keywords: Educational policy, Higher education, Teacher Professional Development, Lifelong learning

Presenting Author: Maike Koops Koorn, Zuyd University of Applied Sciences / Maastricht University, Netherlands

Co-Author: Pieter Van den Bosche, Maastricht University School of Business and Economics, University of Antwerp, Belgium

Co-Author: Marcel Van der Klink, Zuyd University of Applied Sciences, Netherlands

Co-Author: Wim Opjelaers, Maastricht University, Netherlands

It has been argued that connecting teachers in teams may support innovation in higher education. A team approach enables members to co-construct innovative solutions through engaging in team learning behaviors. In practice, however, teachers are not used to share and discuss their practices together. Team leadership behavior is repeatedly marked as a crucial factor for stimulating team learning, but specific empirical insights are lacking; especially in the context of higher education. The present study examined which leadership behavior encourages learning behavior in university teacher teams who encounter innovative tasks in their job assignment. Results of hierarchical regression analyses on 52 teams show that shared leadership was the most important factor for supporting team learning, above and beyond vertical team leadership. Specifically, our findings show that teacher team members who encouraged challenging the status quo promoted team learning behavior, in contrast to focusing on structuring the task. Subsequently, their team learning behavior supported their effectiveness in dealing with their innovative tasks.

Understanding crowdfunders' learning practices

Keywords: Informal learning, Mixed-method research, Self-regulation, Workplace learning

Presenting Author: Anouck Margaryan, Goethe University Frankfurt am Main, Germany

This paper reports findings of a study exploring how crowdfunders develop their knowledge and skills in the course of their work on digital platforms. The focus is on learning initiated and self-regulated by crowdfunders; engaging in challenging tasks; studying professional literature/online resources; sharing knowledge and collaborating with others. The mixed method study involves: (i) survey, (ii) interviews and observation of crowdfunders; (iii) interviews with crowdfund platform providers, employers and policymakers; (iv) analysis of worker discussion fora and publically available materials about training provision within the platforms. The study draws on data from two platforms representing two types of crowdfund – microwork (CrowdFlower) and online freelancing (Upwork). Initial findings uncovered evidence for observable individual and social learning activity within both types of crowdfund. Findings suggest that both microwork and online freelancing are learning intensive and both groups of workers are learning-oriented and self-regulated. Crowdfund is a growing form of employment in developed and developing countries. Improved understanding of learning practices within crowdfund would inform the design and governance of crowdfund and empower crowdfunders to direct their own learning enhancing the developmental potential of crowdfund.

An Investigation into Predictors and Mediators of Transfer of Training: A Time-Lagged Study Design

Keywords: Quantitative methods, Survey Research, Workplace learning, Lifelong learning

Presenting Author: Natalie Govaerts, KU Leuven - University of Leuven, Belgium

Co-Author: Eva Kyndt, KU Leuven - University of Leuven, Belgium

Co-Author: Filip Dochy, KU Leuven - University of Leuven, Belgium

The aim of this study was to explore the effects of specific types of supervisor support on transfer of training, taking into account established trainee characteristics, such as trainees' motivation to learn and transfer and their training self-efficacy. More specifically, supervisors' pre-training information, role modelling & facilitation, request sharing, favourable attitude, coaching & feedback, openness, involvement & accountability, work coverage, and training participation were examined. In addition, the mediating effect of training retention is explored, as learning outcomes are a necessary, but not sufficient condition for transfer of training. A time-lagged design was used to investigate the relationships in the proposed model and it was evaluated using partial least squares path modelling (PLS-PM). Data was gathered through online questionnaires from 111 participants of work-related training. Results indicate that motivation to transfer and training retention positively predicted transfer of training three months after training.

Motivation to learn and training self-efficacy did not have a significant direct relationship to transfer, nor did any of the specific types of supervisor support contribute directly to transfer training. However, it was found that trainees’ motivation to learn and supervisors’ involvement and accountability had an indirect effect on transfer of training through training retention.

Effects of online information provided by banks on financial decision making

Keywords: Cognitive skills, Content analysis, Technology, Lifelong learning

Presenting Author: Baerbel Fuerstenau, Dresden University of Technology, Germany

Co-Author: Mandy Hommel, University of Technology Dresden, Germany

Co-Author: Claudia Leopoldi, Université de Fribourg, Switzerland

Co-Author: Hector Ponce, Universidat de Santiago de Chile; 
Co-Author: Daniel Lopez, Universidad de Santiago de Chile, Chile

Financial competence has become increasingly important for citizens, especially in case they have to decide about complex financial products, such as mortgages. Mortgages have long-term consequences for individuals’ financial situations, and potentially for the economy. In order to avoid wrong decisions, potential first-time homebuyers often consult the internet. Therefore, in a study we analysed whether information provided online by banks can support learning and decision making, and thus the development of financial competence. We included webpages of two banks differing in quality and quantity of information. One hundred and one students took part in the study. They were randomly assigned to one of two experimental groups (bank 1 and bank 2), and a control group. All students answered behavioural questions, then surveyed the webpages of the respective bank, and took a retention and decision making test afterwards. Results did not show significant differences between the groups so that quality and quantity of information provided did not seem to be crucial for learning. We can cautiously conclude that natural settings such as banks’ webpages are only partly suitable for fostering financial competence about mortgages. Instead, systematic financial education using instructional research results (such as multimedia and text comprehensibility) seems to be needed.
Session D 93
30 August 2017 10:15 - 11:45
Pinni B - B415
Session Chair:
Assessment and Evaluation, Learning and Social Interaction
Paper Presentation: Metacognition - D
Keywords: Assessment methods and tools, At-risk students, Collaborative Learning, Early childhood education, Metacognition, Parental involvement in learning, Self-efficacy, Self-regulation, Video analysis, Viewing / Videos
Interest group: SIG 16 - Metacognition
Chairperson: Markus Talvio, University of Helsinki, Finland
Presenting Authors: children’s cognitive and emotional self-regulation in two naturalistic play settings
Keywords: Assessment methods and tools, Early childhood education, Self-regulation, Video analysis
Presenting Author: Pauline Slot, Utrecht University, Netherlands
Co-Author: Hanna Mulder, Utrecht University, Netherlands
Co-Author: Paul Leseman, Utrecht University, Netherlands

The preschool period is marked by rapid growth of children’s self-regulation and related executive functions. Self-regulation is considered an important aspect of school readiness and has been found to be related to academic and social-emotional outcomes in later childhood. Previous research has shown positive effects of play and play-based curricula on children’s self-regulation. In the current study, three-year-olds’ self-regulation was observed in two naturalistic play settings: one structured and more goal-oriented situation and a more open-ended play situation. The present study studied whether the display of self-regulation behavior related to the type of play and how the children’s observed self-regulation and test-based executive functions were related in the two play situations. Results showed that children showed higher levels of self-regulation during the more structured play setting compared to the open-ended setting. Furthermore, EFs were significantly related to cognitive aspects of self-regulation children displayed in the more structured and goal-oriented play setting, but not to behavioral self-control. EFs were, however, significantly related to behavioral self-control in the more open-ended play setting with kindergarten aged children. Possible implications of the findings for the care of young children are discussed.

Implicit theories and self-regulation in kindergarten: Development of a self-report instrument
Keywords: Assessment methods and tools, Early childhood education, Self-efficacy, Self-regulation
Presenting Author: Mirjam Compagner, University of Zurich, Switzerland
Co-Author: Yves Karlin, University of Zurich, Switzerland

Children’s implicit theories about the nature of their abilities, whether they are stable (fixed theory) or are susceptible to change (malleable theory), are related to both achievement and self-regulatory abilities (Burnette, O’Boyle, VanEpps, Pollack, & Finkel, 2013; Deese, 2000). Moreover, researchers showed that interventions who target students’ implicit theories influence how students interpret and respond to challenges. This study examined whether differences in implicit theories about abilities impact students’ self-regulation strategies and whether differences in implicit theories are related to students’ self-regulation strategies (Paunescu et al., 2015). Even though research suggests that five to six year old children may already formed beliefs about the nature of their abilities as either fixed or malleable (Gunderson et al., 2013) and should be able to differentiate between various dimensions of their ability self-concept, empirical support is limited. To date, no instrument has been available that can reliably and validly assess implicit theories in children under the age of seven. We aim to develop and evaluate an instrument to assess implicit theories of ability in kindergarten. The development of the instrument, the validation, and study of the self-concept for children as young as five to six years. Furthermore, the interaction of self-concepts, such as implicit theories of ability and ability self-concepts, is unclear. We aim to further the understanding of the development and structure of implicit theories in kindergarteners as well as generate new insight into the complex interplay between self-concepts and self-regulatory abilities in pre-schoolers.

Parental training to promote self-regulation in full- and preterm born toddlers
Keywords: At-risk students, Early childhood education, Parental involvement in learning, Self-regulation
Presenting Author: Kim Gätter, Rupecht Karls-Universität Heidelberg, Germany
Co-Author: Verena Clara Vetter, Heidelberg University Hospital, Centre for Child and Adolescent Medicine, Germany
Co-Author: Gitta Reuner, Heidelberg University Hospital, Centre for Child and Adolescent Medicine, Germany
Co-Author: Silke Hertel, Rupecht Karls-Universitat Heidelberg, Germany

Self-regulation (SR) and executive functions (EF) are important prerequisites for academic achievement (McClelland & Cameron, 2012). Very preterm born children have an increased risk for an adverse development with regard to SR/EF (Mulder, Pitchford, Hagger & Marlow, 2009). Given the strong link between parenting behaviors and children’s EF (Fay-Stammbach et al., 2014), any effort to promote parental co-regulation and create environments in which children have opportunities to practice SR, seems like a promising way to counteract an adverse development. Up to now, there is no preventive parent training with special focus on SR development for parents of preterm born toddlers.

The present study aims to refine, adapt and evaluate existing parent training programs to promote the development of SR to the special needs of parents with preterm toddlers. Based on a quasi-experimental pre-post-test design with three months follow-up, parents of full-term (FT) and preterm (PT) toddlers (current sampleN= 55, NPT = 23) are randomly assigned to three treatment groups: 1) scaffolding, 2) combined scaffolding and sensitivity, 3) stress-management. Children are between 24 and 36 months of age. A multi-method approach is applied. Data collection is ongoing and will be finalized by spring 2017.

First results point towards high acceptance and benefit of the training programs. Parents are motivated to transfer the learned strategies to their everyday lives and report a high competence gain in promoting their child’s SR, especially in the combined training group.

Further results based on questionnaire and observational data will be reported to strengthen the findings.

Building stories together: How can a playful pedagogy support self-regulation in primary schools?
Keywords: Collaborative Learning, Metacognition, Self-regulation, Video analysis
Presenting Author: Marisol Basilio, University of Cambridge, United Kingdom

Public presentation: When a challenging cognitive task that requires self-regulation, and many children struggle with becoming effective writers. In the Play, Learning and Narrative Skills (PLuNS) project, we focus on the development of early literacy skills in primary school children by providing collaborative building tasks preceding writing activities. Working in mixed ability groups, 5 to 10 year old children used LEGO sets to represent their stories and were encouraged to verbalise ideas that would inspire their writing. The building tasks had a great degree of freedom, so children could decide autonomously on their collaborative process: how to address the task, how to divide tasks in the group, how to merge their ideas into a single LEGO model. Teachers encouraged children to engage in metacognitive discussions about the process of working together, and about the process of writing. We measured the progress of 108 children in terms of their writing skills, metacognition, and collaborative skills (including socially shared regulation) before and after the intervention -but not in a control group-, and found significant improvements. This playful pedagogy is a promising approach to improving self and socially shared regulation that could be furthered in primary education.

Session D 94
30 August 2017 10:15 - 11:45
Pinni B - B415
Single Paper
Assessment and Evaluation, Teaching and Teacher Education
Paper Presentation: Teaching and Teacher Education - L
Keywords: Assessment methods and tools, Collaborative Learning, Competencies, Design based research, In-service teacher education, Mathematics, Motivation, Multimedia learning, Pre-service teacher education, Secondary education, Self-efficacy, Self-regulation, Teaching / Instruction
Interest group: SIG 11 - Teaching and Teacher Education
Chairperson: Catarina Araújo, Institute of Education - University of Minho, Portugal

Effects of Inquiry learning on learning outcomes in adolescents’ geography education
Keywords: Collaborative Learning, Motivation, Self-regulation, Teaching / Instruction
Presenting Author: Maria Luzia, University of Tampere, Finland

This study provides empirical evidence of effects of inquiry-based teaching and learning model called progressive inquiry on cognitive and affective learning results. The focus is on learning results among middle school and upper secondary students, and in all, 253 students were involved in the study. This way a comparison between different developmental stages can be made of the effects of the teaching and learning method in question. The results indicated that the progress of self-regulated learning was enhanced in both students during the intervention period. In middle school it was the students with only sufficient skills in self-regulated learning that benefited most from progressive inquiry, whereas in upper secondary school it was the students with the strongest self-regulation skills. Furthermore, in middle school the control and self-regulation groups showed a statistically significant mean effect on their results, but not in upper secondary school. Progressive inquiry showed a strong positive effect on learner’s motivation level in middle school context. In upper secondary school the effect of the teaching and learning model on motivation level was not as clear.

Designing a training format supporting student teachers’ parent-teacher communication competences
Keywords: Competencies, Design based research, Pre-service teacher education, Multimedia learning
Presenting Author: Karen De Coninck, Ghent University, Belgium
Co-Author: Ruben Vanderlinden, Ghent University, Belgium

This study explores the effects of an online training programme for student teachers to improve their parent-teacher communication competences. The training programme was based on a didactic model and a course design for teacher education. The model included the following steps: (1) understanding the nature of the communication process; (2) identifying the types of communication problems; and (3) developing strategies to improve communication. The programme was designed to improve the student teachers’ ability to make effective use of their skills and knowledge in their future professional practice. The results of the study showed that the programme was effective in improving the student teachers’ parent-teacher communication competences.
Teachers worldwide are expected to possess the necessary competences to collaborate and communicate successfully with parents. However, teacher education institutes fail to help student teachers to develop these competences. To address these shortcomings, a design-based research (DBR) project was set up to design an innovative training program to foster student teachers’ parent-teacher communication (PTC) competence development. This study reports about the first two processes of the DBR project: (1) analysis and exploration, and (2) design and construction. Regarding the first process, three theses were consulted, literature, interviews with teacher educators (n=14) and student teachers (n=8), and an online questionnaire with student teachers (n=269). Regarding the second process, both literature and stakeholders (n=18) were consulted in order to define crucial design principles and to construct a prototype of a new training program. Findings show that more practical training and experience during the initial phase and regarding the interpersonal and psychological dimension of the PTC competence. In this respect, the following design principles are put forward: authentic learning, specific pedagogical principles (learning by doing, learning through observation, receive immediate feedback and reflect on behavior), and blended learning. Discussion about these design principles with the stakeholders resulted in a prototype consisting of (1) an online theoretical introduction lesson on PTC, (2) two training sessions with online simulations, (3) one training session with face-to-face simulations, and (4) a reflection task. Next, it is important to start testing and refining this new training format in the following research phases.

**Teachers’ analysis of mathematics classrooms – How can different indicators complement each other?**

*Keywords*: Assessment methods and tools, In-service teacher education, Mathematics, Pre-service teacher education

*Pre-service education in Ludwigshafen and Germany*

Co-Author: Marita Friesen, Ludwigshafen University of Education, Germany

The teachers’ analysis of processes in the mathematics classroom is a key professional requirement which is connected with mathematics teachers’ criteria-related noticing and knowledge-based reasoning. For empirical research into teachers’ perceptions of classrooms, methodological questions related to the choice of indicators correspond with specific foci on particular theoretical constructs in the area of teacher expertise. This study consequently explores how different indicators for the teachers’ criteria-related analysis of classroom situations empirically point to this aspect of teacher expertise in a complementary way: On the base of comments on classroom situations from more than 40 German in-service teachers collected through an instrument which combined open format and multiple-choice questions, two different sets of indicators for the teachers’ analysis were focused on: On the one hand, a top-down coding of the open format answers afforded insight into how teachers connected their observations with corresponding professional knowledge. On the other hand, teachers’ situation-related views about the quality of instruction could be tapped by the multiple-choice format answers. The results suggest that these different indicators – even though they might appear as relatively distant at first sight – correlated significantly. The results may hence be considered as a contribution to linking not only different expertise aspects of the teachers’ analysis on the methodological level – knowledge-based reasoning and (potentially resulting) situation-related views in this case – but also as evidence which suggests a corresponding relationship of the theoretical constructs behind the different indicator sets.

**Teacher self-efficacy: a study on validity and reliability of an Italian version of the “Ohio scale”**

*Keywords*: Assessment education, Secondary school education, Self-efficacy

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*Co-Author*: Antonino, University of Modena and Department of Education and Human Sciences, Italy

*Co-Author*: Roberta Cardarelli, Universita' Modena e Reggio Emilia, Italy

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*Co-Author*: Andrea Pintus, University of Modena and Reggio Emilia - Department of Education and Human Sciences, Italy

This study investigate the construct validity and the reliability of an Italian version of the Teacher Self-Efficacy scale developed by Tschanen-Moran & Hoy (2001), also known as “Ohio scale”, a 24-item scale, administered to in-service second grade teacher. The TSES scale is found on three factors of Efficacy: Student Engagement, Instructional Strategies, and Classroom Management. In the Italian adaptation/or professional dimensions of teacher efficacy are identified and assessed: student engagement, classroom management, instructional strategies and “traditional” efficacy. The validity and reliability of the Italian version of the "Ohio scale" is confirmed. It is confirmed that the construct of self-efficacy is a multidimensional construct. Results suggest further investigation on teacher’s professional contexts.

**Session D 95**

30 August 2017 15:15 - 11:45
Main Building A - A2A
Session D 95

**Higher Education, Instructional Design, Learning and Instructional Technology**

**Paper Presentation: Comprehension of Text and Graphics - G**

*Keywords*: Arts, Comprehension of text and graphics, Educational Technology, Experimental studies, Instructional design, Learning Technologies, Multimedia learning, Qualitative methods, Student learning, Vocational education

*Interest group*: SG 02 - Comprehension of Text and Graphics

*Chairperson*: Valentin Riemen, UfMt University, Austria

* Cueing in Animations Leads to a Trade-Off between Knowledge of Terms and Transfer*

*Keywords*: Comprehension of text and graphics, Educational Technology, Instructional design, multimedia learning

*Presenting Author*: Christoph Mangolkamp, University of Wu¨rzburg, Germany

*Co-Author*: Kerstin E. J. Kasper, Pixelgenua Consulting GmbH, Germany

Cueing, also known as signaling, is a common instructional intervention when learning from animations. Based on the assumptions of cognitive theory of multimedia learning, cueing reduces extraneous cognitive load and, as a result, leads to better learning performance due to a better selection of the relevant content of an animation and a better integration of that content into a coherent mental representation. Contrary to this assumption, we argue that cueing the elements of an animation when the respective term is mentioned in a synchronously spoken text, leads to a better knowledge about the term, but decreases the learning performance of a person mentioned five or more times in a non-relevant context. To test this assumption, we conducted an experiment. Five percent of the participants learned an animation showing how a cylinder deactivation in a gasoline engine works, either with or without cueing the components of the animation. Results showed that cueing was effective for the components of the animation, but had no effect on knowledge of facts about the engine and even a negative effect on transfer to new problems. The results are discussed with respect to the design of cues depending on the learning goal.

**Testing Text-Filling Fosters Retained but not Initial Study of Multimedia Materials**

*Keywords*: Comprehension of text and graphics, Experimental studies, Instructional design, Student learning

*Presenting Author*: Alexander Etel, University of Freiburg, Institute of Psychology, Germany

*Co-Author*: Katharina Scheiter, Leibniz-Institut f¨ur Wissensmedien (IWiW), Germany

Are practice tests only helpful when having studied before taking them? This question was addressed in the present study contrasting two distinct hypotheses. First, text-taking fosters retention because it provides information about the effectiveness of the initial study to which learners can adapt their restudy behavior (i.e., indirect testing effect; ITE hypothesis). Second, text-taking fosters initial study because one simply knows about the text (i.e., test expectancy; TE hypothesis). Hence, learners can encode information that is specifically required for this type of test, optimizing performance. The two hypotheses were tested against each other in a multimedia learning scenario. Participants (N=80) did either not study or studied prior to taking a test, (re-)studied, and took the same test again. Tests required to recall and transfer knowledge. Supporting the ITE hypothesis, both recall and transfer performance increased with repeated study and test-taking, whereas only taking the test without having studied before did neither improve recall nor transfer performance. Results suggest that repeated study and test-taking is beneficial to multimedia learning because restudying can be used to counteract deficiencies from initial studying (i.e., indirect testing effect), and not because students just know the demands of the test (i.e., high test expectancy).

**Information visualizations for a general audience: the designers’ perspective**

*Keywords*: Visualizations of text and graphics, Qualitative methods, Vocational education

*Presenting Author*: Annemans Quispel, Tilburg University, Netherlands

*Co-Author*: Jos Schepersoord, Tilburg University, Faculty of Humanities, Netherlands

*Co-Author*: Atsos Maes, Faculty of Humanities Tilburg University, Netherlands

Information visualizations are increasingly used in education and mass media. Such visualizations are created by an increasing number of designers. Little is known about the criteria they use in their work, since designers are used to work on the basis of intuition and experience, rather than explicit knowledge. Gaining more insight into the design practice would be beneficial for design education and, eventually, the general public. We investigated criteria for popular information visualizations from the designers’ perspective. The main finding is that, contrary to the conventional wisdom, design is an important criterion, more important than attractiveness. However, in experimental studies, they have shown to prefer non-standard designs, which are considered unclear by non-designers. An explanation for this discrepancy may be that what they consider clear, may be less understandable for their visually less “literate” audience. In that case, design education faces a challenge in overcoming this communication gap between designers and their audience.

**When (no) more help is needed: Using eye movements to individually support multimedia learning**

*Keywords*: Comprehension of text and graphics, Educational Technology, Learning Technologies, Multimedia learning

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*Co-Author*: Anne Schueker, Leibniz-Institut f¨ur Wissensmedien (IWiW), Germany

*Co-Author*: Katharina Scheiter, Leibniz-Institut f¨ur Wissensmedien, Germany

Regardless of the effectiveness of multimedia instruction in general, some learners have difficulties to adequately process multimedia materials (i.e., text-picture combinations). One possibility to support these learners is to provide personalized, just-in-time instructional support using an adaptive multimedia system. The adaptive multimedia system used in the reported study monitors and analyses online the learners’ processing behavior based on the learners’ eye movements. Pursuant to these analyses learners with inadequate processing behaviors receive instructional support. In our experiment (N = 58) we investigated whether the adaptive multimedia system supports learners in processing multimedia materials more adequately and whether it is beneficial for the learning outcome. During learning, one group received adaptive instructional support based on their individual gaze behavior. The other group received no instructional support. After learning all participants completed a posttest. Results indicated an
interaction between prior knowledge and adaptivity: Only learners with higher prior knowledge profited from the adaptive multimedia system. Learners with lower prior knowledge, however, performed significantly worse with compared to without instructional support. Implications for the use of an adaptive multimedia system for individual support are discussed.

Session D 96
30 August 2017 10:15 - 11:45
Main Building - D - D14
Single Paper
Learning and Social Interaction, Learning and Special Education, Teaching and Teacher Education
Paper Presentation: Eye-Tracking
Keywords: At-risk students, Cognitive skills, Comparative studies, Comprehension of text and graphics, Cooperative / collaborative learning, Culture, Educational Psychology, Experimental studies, Instructional design, Mathematics, Mixed-method research, Quantitative methods, Teacher Effectiveness
Interest group: SIG 15 - Special Educational Needs, SIG 27 - Online Measures of Learning Processes
Chairperson: Marie Evers, KU LEUVEN, Belgium
Role of sender/peer feedback characteristics for performance and cognitive processing (eye tracking)
Keywords: Cognitive skills, Comprehension of text and graphics, Cooperative / collaborative learning, Quantitative methods
Presenting Author: Markus Berndt, Klinikum der Ludwig-Maximilians-Universität München, Germany
Co-Author: Jan-Willem Stipbos, University of Groningen, Netherlands
Co-Author: Frank Fischer, Ludwig-Maximilians-Universität (LMU), Germany
Feedback literature identifies mindful cognitive processing of (peer) feedback and (peer) feedback characteristics – as well as the presence of justifications – as important for its efficiency. However, mindful cognitive processing has yet to be operationalized and investigated. Moreover, different (peer) feedback characteristics may have an effect on the perception of the feedback by the receiver and also induce varying amounts of cognitive load. In a 2 x 3 factorial design, peer feedback on an essay (elaborated specific feedback without justifications) and sender's competence (low/average/high) were systematically varied. Eye tracking data of the peer feedback reading process (gaze durations and transitions) was correlated with performance measures (text revision and peer feedback recall) to infer mindful cognitive processing. Peer feedback perception was measured in terms of fairness, usefulness, acceptance, willingness to improve, and affect which in part aggregates to perceived adequacy of peer feedback. Cognitive load was measured for peer feedback reading and performance tasks. Results: Inclusion of justifications interacted with sender's competence on perceived affect and improved text-revision performance. Feedback load moderated the impact of justifications on text-revision performance. Eye tracking data proved to provide valid measures to infer mindful cognitive processing. In sum, there seem to be more intense mindful cognitive processing when more transitions between two text elements occurred. More intense mindful cognitive processing did not necessarily lead to better performance but seemed to serve a compensatory purpose to sustain performance, especially when justifications for peer feedback were not provided.

Attraction or distraction? Eye-tracking comparisons of TD versus ASD learner gaze at visual displays
Keywords: At-risk students, Comparative studies, Educational Psychology, Experimental studies
Presenting Author: Mary Hanley, Durham University, United Kingdom
Co-Author: Deborah Riby, Durham University, United Kingdom
The primary school classroom is crucial environment for children in terms of their learning. An important question is whether the physical classroom environment can impact upon children's ability to pay attention and to learn. In the classroom there can be many things to capture attention other than the focus of a lesson, such as visual displays on classroom walls. The aim of this study was to use eye-tracking to explore the impact of visual displays on attention and learning for typically developing children and also for children functioning on the autism spectrum. Children watched bespoke video stimuli of a teacher delivering 'story time' and mini-lessons. Half of the videos had no visual distraction (NVD) and half had high visual distraction (HVD). We recorded the children's eye movements while they watched the videos to explore the effect of displays on their attention, and we designed worksheets based on the lessons to measure the impact on their learning. Visual displays had a significant impact on attention for all children, but to a greater extent for children with autism. Visual displays also had an impact on learning, whereby children had poorer learning scores in the HVD compared to the NVD lessons. Individual differences in age, verbal, non-verbal and attention abilities were important predictors of learning, but time spent attending the visual displays was the most important predictor. This novel and timely investigation has implications for the use of visual classroom displays for all children, but particularly for children with autism.

Using mobile eye-tracking to analyse learning behaviour in class: Two case-study examples
Keywords: Comprehension of text and graphics, Instructional design, Mathematics, Mixed-method research
Presenting Author: Manku Hamula, University of Helsinki, Finland
Co-Author: Enrique Garcia Moreno-Esteve, University of Helsinki, Finland
Co-Author: Mikko Toivanen, Finnish Institute of Occupational Health, Finland
We used mobile eye-tracking and a qualitative analysis of the gaze data to analyse two case studies on problem solving behaviour in class. The students worked in pairs using GeoGebra software. We analysed the gaze video and the two ordinary videos qualitatively to identify details of the target student learning behaviour. Instead of individual glances, we looked at the sequences of gazes and interpreted them in the overall context of student problem solving. Our first case study the student wearing the gaze tracker had relatively long sequences of silent gazing. With gaze tracker, we gained additional information about his problem solving behaviour. In our second case study we observed students to repeatedly fail to observe relevant information on the screen. When we analysed our target student gaze during the critical events, we observed, that his gaze followed teacher's hand movement in the display. Our interpretation is that moving elements attract student visual attention to the extent that other, important information, can be missed. Despite the labour intensiveness, the gaze tracking methodology seems to be a promising tool for a fine grained analysis of student learning behaviour in class. It requires a lot of manual work and developing automatic coding of data is a worthwhile investment. One important finding of the pilot phase is that it is essential to have an interview with the student after the recorded lesson, preferably with the gaze tracking video as a stimulus.

Using real-world gaze proportions to investigate expert teacher priorities: An eye-tracking study
Keywords: Culture, Educational Psychology, Quantitative methods, Teacher Effectiveness
Presenting Author: Nora McIntyre, University of Sheffield, United Kingdom
Co-Author: Helska Maria Jarodzka, Open University, Netherlands
Co-Author: Robert Klassen, University of York, United Kingdom
Classroom teaching is complex. In the classroom, teachers must readily attend to disruptions and successfully convey new tasks and information. Outside the classroom, teachers must organise their priorities that are important for successful student learning. In fact, differing gaze patterns can reveal the varying priorities that teachers have. Teacher priorities are likely to vary with classroom expertise and can conceivably change with culture too. Therefore, the present study investigated expertise related and cultural teacher priorities by analysing their gaze proportions. To obtain this data, 40 secondary school teachers were eye-tracking glasses, with 20 teachers (10 expert; 10 novice) from the UK and 20 teachers (10 expert; 10 novice) from Hong Kong. We analysed gaze proportions during teachers' attentional (i.e., information-seeking) and communicative (i.e., information-giving) gaze. Regardless of culture, expert teachers' gaze proportions revealed prioritisation of students, whereas novice teachers gave priority to teacher materials. For culture-specific expertise, UK novices prioritised teacher materials more than UK experts and Hong Kong novices' prioritises non-instructional, non-student ('other') regions of the classroom more than Hong Kong experts, despite both attentional has been received from the support teacher gaze data, which corresponds with conclusions from existing teacher effectiveness research.

Session D 97
30 August 2017 10:15 - 11:45
Penn B - B3109
Single Paper
Learning and Social Interaction, Teaching and Teacher Education
Paper Presentation: Social Interaction in Learning and Instruction - D
Keywords: Achievement, Collaborative Learning, Educational attainment, Educational Psychology, Learning and developmental difficulties, Mixed-method research, Primary education, Quantitative methods, Self-efficacy, Social interaction, Teaching / Instruction, Video analysis
Interest group: SIG 19 - Social Interaction in Learning and Instruction
Chairperson: Jennifer Husman, University of Oregon, United States
The association between educational dialogue and academic performance
Keywords: Collaborative Learning, Mixed-method research, Primary education, Social interaction
Presenting Author: Heiki Muinonen, University of Jyväskylä, Finland
Co-Author: Elja Pakarinen, University of Jyväskylä, Finland
Co-Author: Helena Rasku-Puttonen, University of Jyväskylä, Finland
The association between educational dialogue and academic performance

Heli Muuronen, Elja Pakarinen, Helena Rasku-Puttonen, Anna-Maija Pokkeus, Marja-Kristiina Lerkkanen
University of Jyväskylä

Abstract
Educational dialogue is regarded as crucial for students’ learning (e.g., Alexander, 2000; Menor, 2008) but only a few studies have provided clear evidence of specific learning gains associated with it. There is a need for empirical evidence on the benefits of educational dialogue to student outcomes. The aim of the study was to examine to what extent is educational dialogue associated with students’ performance in academic subjects. We recorded 156 Grade 6 lessons from 46 classrooms and identified the level of the quality of dialogue and feedback from the video recordings using the CLASS-S. The association between the quality of educational dialogue and students’ grades in academic subjects were analysed using multilevel modelling. Educational dialogue was positively associated with students’ grades in language arts and physics/chemistry when students’ gender, parents’ educational background and teacher’s work experience were controlled for. In order to describe what the educational dialogues are like, language arts and physics/chemistry lessons were qualitatively analysed. Transcribed lessons were read through several times to ensure the dialogic interaction and to identify the episodes of educational dialogue. Several educational dialogues were identified relying on Alexander’s (2006) five principles of dialogic teaching. The findings suggest that students’ learning might benefit from educational dialogue. The results of this study are in high importance since there are only very limited previous evidence about the association between educational dialogue and students’ academic performance.

School achievement: Does social behavior matter?

Keywords: Achievement, Educational attainment, Learning and developmental difficulties, Social interaction
Presenting Author: Julia Becherer, Institute for Psychology of Learning and Instruction (IPhL), Kiel University, Germany
Co-Author: Olat Koehler, Leibniz Institute for Science and Mathematics Education, Germany
Co-Author: Friederike Zimmermann, Kiel University, Germany
Prior research gives evidence to suggest that dissocial behavior and prosocial behavior are related to school achievement. Little is known, however, about the incremental contribution of social behavior to school achievement over and above known predictors and for different measures of achievement such as school grades or standardized tests. Therefore, the purpose of this study was to examine whether adolescent student’s dissocial and prosocial behavior influences school achievement as assessed by school grades and standardized achievement tests in mathematics and German while controlling for prior achievement, intelligence, and motivational variables. Altogether four subsamples of 7th and 9th graders with a total N of 4410 were investigated. Structural equation modeling consistently revealed in all subsamples that dissocial behavior and prosocial behavior incrementally contributed to school grades in mathematics and German over and above the known predictors. Effects of social behavior on test scores in German occurred only in one subsample of 9th graders, whereas test scores in mathematics were consistently related to dissocial behavior in all four subsamples. Overall, the results strongly support the relevance of investigations into the relationships between dissocial and prosocial behavior and school achievement.

Interpersonal adaptation in teacher-student interaction

Keywords: Educational Psychology, Quantitative methods, Social interaction, Video analysis
Presenting Author: Helleen Pennings, Utrecht University, Netherlands
Co-Author: Meike Brekelmans, Utrecht University, Netherlands
Co-Author: Jan van Tartwijk, Utrecht University, Netherlands
We investigated how teachers’ and students’ interpersonal behaviour patterns unfold and adapt to each other over time, during the lesson start. Using a continuous coding approach, observers rated moment-to-moment levels of Agency and Communion in teacher and student behaviour during the first 10 minutes of a lesson in 35 classrooms. Based on the resulting time-series data we derived several indicators of interpersonal adaptation (e.g., entainment of linear trends, synchronicity of rhythmical qualities). We examined to what degree the principle of interpersonal complementarity of interaction between people (sameness for Communion, opposition for Agency) applies to teacher-student interaction and how the specific professional role and status of the teacher would affect this.

Our expectations of interpersonal adaptation were basically confirmed in the present study. In most of the 35 classrooms, teacher and student behaviour during the lesson start was consistent with the overall principle of interpersonal complementarity. The results were also in line with expectations about violations of the general principle, given the professional role of the teacher (e.g., reformation from hostility).

Our exploration of the relation between momentary interpersonal dynamics and long-term teacher interpersonal style supported our conjecture that attention to micro-processes in classrooms (e.g., pattern of variability, anticipation of behavior) adds to outcome-oriented, macro-level investigations of teacher-student interaction.

The Link Between Teacher Self-Efficacy and Student Achievement Depends on Teachers’ Perspective

Keywords: Achievement, Educational Psychology, Self-efficacy, Teaching / instruction
Presenting Author: Marjolein Zee, University of Amsterdam, Netherlands
Co-Author: Helma M. Y. Koonen, University of Amsterdam, Netherlands
Co-Author: Peter de Jong, University of Amsterdam, Netherlands
The present study sought to explore the extent to which students’ reading and math achievement are predicted by teachers’ self-efficacy toward individual students (i.e., student-specific TSE) and toward the classroom (i.e., with general and aggregated student-specific TSE). General and student-specific TSE scales and standardized achievement tests were administered among a sample of 360 fourth to sixth grade students and 49 teachers from 19 regular elementary schools across the Netherlands. Multilevel structural equation modeling was used to test for direct relationships. Results indicated that neither students’ reading achievement, nor their mathematics performance was predicted by their teachers’ general TSE, after accounting for students’ background characteristics. These findings held regardless of whether the general or aggregated TSE measure was used. In contrast, moderate positive associations were noted between student-specific TSE and both measures of academic achievement. The results of this study seem to support the assumption that the association of teachers’ self-efficacy with students’ reading and math achievement depends on teachers’ perspective.

Session D 98
30 August 2017 15:15: - 11:45
Pieni B - B1097
Single Paper
Higher Education, Instructional Design, Lifelong Learning
Paper Presentation: Writing - C
Keywords: At-risk students, Cognitive development, Cognitive skills, Higher education, Instructional design, Language (Lt/Standard Language), Lifelong learning, Literacy, Primary education, Self-regulation, Teaching approaches, Writing / Literacy
Interest group: SIG 12 - Writing
Chairperson: Johan Korhonen, Åbo Akademi University, Finland
Writing development in a linguistic and rhetoric perspective
Keywords: Cognitive development, Language (Lt/Standard Language), Writing / Literacy, Lifelong learning
Presenting Author: Victoria Johansson, Lund University, Sweden
Co-Author: Asa Wenglin, University of Gothenburg, Sweden
Co-Author: Pia Gustafsson, Lund University, Sweden
This presentation addresses the issue of how to describe and evaluate writing development. We use a corpus of written texts from 10-year-olds up to adults to discuss how writing development can be described on the one hand linguistically, and on the other hand rhetorically. We are inspired by Myttri’s (2008) discussion about teachers need to know more about different developmental trends in writing performances, in order to be able to intervene more strategically with their students.

Research questions are: 1. How can syntactic features in the text be linked to rhetorical aspects of the texts? and 2. How does the development of syntactic and rhetorical abilities relate to age, and writing experience? Data consist of 190 written texts from 95 participants who each produced one narrative and one expository text on computer in an experimental setting. Syntactic features have been analysed both quantitatively and qualitatively.
Results show that text length increases with age there, but that adults have shorter texts than adolescents. Investigating sentence types, declarative sentences are more common in narrative texts, and interrogative sentences are more common in expository texts. Developmentally, adults use more interrogatives in expository, and more fragments in narratives. Analysing sentence openings reveals that the young age groups use more time adverbials in their narratives, and more circumstantial adverbials in their expository text, while the older age groups use a more varied repertoire of syntactic elements to highlight different aspects. This study stresses that teaching must relate rhetoric and syntactic aspects in their teaching of writing.

Effects of dyslexia on undergraduate students’ writing processes and product

Keywords: At-risk students, Cognitive skills, Higher education, Writing / literacy
Prenting Author: David Galbraith, University of Southampton, United Kingdom
Co-Author: Vierle Biaaijen, Center for Language and Cognition Groningen, Netherlands

This quasi-experimental study was designed to assess the effects of dyslexia on the writing of 60 undergraduate students, half of whom had been assessed as dyslexic. All participants completed intelligence tests and a WISC-III subtest of decoding and working memory tests. These tests showed that students with dyslexia had significantly lower phonological/spelling ability but equivalent levels of verbal and non-verbal intelligence. Participants were then given 45 minutes to plan and write an article for the university newspaper discussing the legalisation of euthanasia. To identify the cognitive processes occurring during writing, half the participants were asked to complete the triple task (Kellogg, 1987) while producing the texts. Keystrokes were also recorded using Inprotoj (Loeljen & Van Waes, 2013). The results showed that dyslexic students produced significantly shorter, poorer quality texts (even after spelling had been corrected), and that they paused for significantly longer between and within words. Analysis of the relationships between cognitive processes and text quality showed that whereas non-dyslexic writers produced better quality text the less they continued generating content during text production, dyslexic writers wrote better the more they continued generating content during text production. Mediation analyses indicated that the effect of dyslexia on quality was partially but not fully mediated by spelling ability and its effect on word-level pauses. We will argue that, over and above their spelling difficulties, adult writers with dyslexia have difficulties implementing their content plans during writing, and suggest that support should include strategies for the management of higher level writing processes.

Teachers as writers: the pedagogical impact of teachers’ writing identities and personal practices

Keywords: Language (L1/Standard Language), Literacy, Teaching approaches, Writing / literacy
Prenting Author: Karen Leary-Oliver, University of Exeter, United Kingdom

The premise that teachers of writing should themselves write has been highly influential since the 1970s and forms a central tenet of professional development programmes such as the US National Writing Project. Pedagogated on a belief that teachers as writers will bring the same kind of understanding of the writing process to the classroom as professional writers, the argument is that when teachers position themselves as writers in the classroom, instruction and learning are enriched. Yet relatively little appears to be known about the pedagogical consequences of teachers’ writing ontos impact on student outcomes.

This paper reports on a systematic review of the literature concerning classroom impact of teachers as writers. A keyword search of educational databases was conducted and over 400 potentially relevant papers located. These were screened over four iterations by two reviewers using agreed inclusion/exclusion criteria and graded for quality. 43 were found to address teachers’ writing identities, personal writing and classroom practice. 22 papers satisfied all criteria and were subjected to in-depth analysis and synthesis. The findings reveal that the evidence base in relation to teachers as writers is not strong, particularly with regard to impact on student outcomes. Available data suggest that teachers often have narrow conceptions of what counts as writing and being a writer and that multiple tensions exist, relating to low self-confidence, negative writing histories, and the challenge of enacting teacher-writer positions in school. Some repurposings for student motivation and engagement are evident but impact on students’ writing is unclear.

Effective writing interventions via revision instruction: The role of explicit process strategies

Keywords: Instructional design, Primary education, Self-regulation, Writing / literacy
Prenting Author: Paula Lopez, University of León, Spain
Co-Author: Raquel Fidalgo, University of León, Spain
Co-Author: Gert Rijlaarsdam, University of Amsterdam, Netherlands
Co-Author: Mark Torrance, Staffordshire University, United Kingdom
Co-Author: Alba Gonzalez Moreira, University of León, Spain

This study aimed to determine whether 8th grade students need to know and apply explicit procedures for revising their text, or whether similar (or greater) benefit might be gained from developing their understanding of writing processes. Our sample comprised 134 8th grade Spanish students divided into 6 classes from two schools, with two classes in each school. In all conditions, students started by learning strategies for planning their text, at the same time that it was also stressed as the start point for revision in both OO (Online Observation) and OR (Off-line Observation) conditions. (OR) students observed the instructor reading and commenting on their own imperfect texts as input for revision. In the Observing Writer condition (OW), students were taught explicit revision procedures strategies, principally by observing these being modelled by the instructor. In the control condition the instruction focused on set communicative goals for planning. The study followed a pretest-posttest transfer test design. Test quality was assessed by rating scales supported by anchor texts. We found evidence of immediate and sustained benefits for text quality of both interventions, relative to controls. However, we found no evidence of a learning revision strategy over observing a reader. Students wrote with digitising pens, providing real time measures of writing time course. In our paper we will also present findings from these data.

Session D 99
30 August 2017 10:15 - 11:45
Pbd: 16
Single Paper
Teaching and Teacher Education

Paper Presentation: Teaching and Teacher Education - N
Keywords: Achievement, Argumentation, Attitudes and beliefs, Case studies, Higher education, Knowledge creation, Learning approaches, Quantitative methods, Science education, Secondary education, Student learning, Teacher Professional Development, Teaching approaches
Student learning, Teacher Professional Development, Teaching approaches
Interest group: SIG 11 - Teaching and Teacher Education
Chairperson: Teresa Limo, University of Porto, Portugal

Knowledge work assignments in upper secondary school: results of 13 cases
Keywords: Case studies, Quantitative methods, Secondary education, Teaching approaches
Prenting Author: University of Helsinki, Finland
Co-Author: Minna Lakkala, University of Helsinki, Finland
Co-Author: Alii Toom, University of Helsinki, Finland

In today’s world, schools should provide upper secondary students with relevant generic knowledge work competences for further education and work life. These competences refer to students’ capability to act, study and work intentionally and effectively both individually and collaboratively in changing contexts and changing work environments. It is important that these competences develop only through extensive, repeated and long-term practice and utilisation of multiple knowledge assignments, which should be applied in varying instructional contexts throughout the studies. The aim of this study was to investigate the existing knowledge work practices related to knowledge work in Finnish upper secondary schools. The versatile qualitative data including classroom observations, course plans and instructions, student and teacher questionnaires and teacher interviews utilised in the current study were collected for the study. The analysis allowed defining four different levels of knowledge assignments in terms of their object-orientation, collaboration, reuse of knowledge objects, process-like emphasis, problem-based approach, authenticity, epistemic challenge, utilisation of various types of knowledge and digital technology. Most of the knowledge assignments were classified on levels two and three representing both traditional and innovative pedagogical elements. The results show that teachers seem to face challenges in building coherent knowledge assignments to support student learning of knowledge work competences. The results suggest that knowledge assignments utilised in upper secondary school could be even more pedagogically aligned. They could provide even more epistemic and collaborative challenges as well as foster authentic and longitudinal working processes.

Exploring changes in student teachers’ meaning-oriented learning during teacher education
Keywords: Attitudes and beliefs, Higher education, Learning approaches, Student learning
Prenting Author: Stella van der Meulen, Eindhoven University of Technology, Netherlands
Co-Author: Jeannette Geidens, University for Professional Teacher Education ‘De Kempen’, Netherlands
Co-Author: Douwe Beljaard, Eindhoven University of Technology, Netherlands
Co-Author: Sonny Schellings, Eindhoven University of Technology, Netherlands

This study investigates to what extent 22 students in Dutch academic primary teacher education are meaning-oriented in their learning, which changes occur during their study, and the influence of their learning environment on being meaning-oriented. In the literature, a meaning-oriented learner is generally described as a learner who is capable to regulate his/her own learning, to understand a topic thoroughly, to form an own opinion about that topic, and to draw own conclusions. A meaning-oriented learner has knowledge construction as his/her main concept of learning.

The extent of being meaning-oriented was measured both at the start and at the end of students’ study (study duration: three to four years) by using a questionnaire. Nine students were interviewed shortly after graduation about what enhanced their meaning-oriented learning during teacher education. Through combining the questionnaire data and the interview data, relations between the changes in the extent of being meaning-oriented and students’ perceptions of what enhanced meaning-oriented learning were investigated.
For the total group of students, an increase in their use of deep processing strategies was measured. At the individual level, the questionnaire results revealed change in the extent of being a meaning-oriented learner varying from a slight decrease to a high increase. The combining of the questionnaire data and the interview data showed a relation between individual change in the extent of being a meaning-oriented learner and a student's perception of opportunities to fit the learning to personal interests and to regulate one's own learning.

Do good students become good teachers?

Keywords: Achievement, Higher education, Student learning, Teacher Professional Development
Presenting Author: Kristin Wolf, Goethe-University Frankfurt, Germany

Although school GPA is one of the most important criteria for the selection of teachers in many European countries, there is very little research on its prognostic value for future professional success. We address this research gap by investigating the prognostic value of success in school for teachers' professional success and the mediating role of success in different phases of teacher training. In two longitudinal studies of teacher candidates (N=250, N=670) professional wellbeing and instructional quality were assessed as criteria for professional success. Overall, the results suggest that teachers' success in school predicts success during teacher training, but it is not a good predictor for later professional success. In contrast, success in teacher training predicts later professional success significantly.

Strategies for Engaging Students in Rich Epistemic Discourse

Keywords: Argumentation, Science education, Teaching approaches, Knowledge creation
Presenting Author: Hilary Swanson, Northeastern University, United States
Co-Author: Allan Collins, Northwestern University, United States

It is widely acknowledged that rich epistemic discourse is critical to getting students to think scientifically. Yet it is difficult for teachers to engage students in such discourse. This study investigates the strategies used by one teacher to foster rich epistemic discourse in his science classroom. It examines her moves during a whole-class discussion in which 8th grade students became earnestly invested in authentic sense-making and knowledge-building, as they worked together to build a causal explanation for why a glass of cold milk warmed up "fast and then slow." Through a grounded analysis of this discussion, six categories of teacher strategies were discovered. These categories contained strategies for 1. giving students perspective, 2. fostering equitable participation 3. framing students as agents of knowledge construction, 4. eliciting student ideas, 5. showcasing ideas for careful consideration, and 6. helping students make sense of each other's ideas. These strategies provide teachers with demonstrably effective ways of engaging students in NGSUS-aligned practices such as explanation and argumentation.

Session D 100

30 August 2017 10:15 - 11:45
Main Building D - D11
Single Paper
Motivational, Social and Affective Processes

Paper Presentation: Motivation and Goal Orientation

Keywords: Educational Psychology, Emotion and affect, Goal orientation, Higher education, Motivation, Motivation and emotion, Quantitative methods, Secondary education, Teaching / instruction
Interest group: S35 69 : Motivation and Emotion
Chairperson: Antti Lahero, University of Helsinki, Finland

Broadening classroom goal structures nomological network using doubly latent multilevel modeling

Keywords: Goal orientation, Motivation, Quantitative methods, Secondary education
Presenting Author: Lisa Bardach, University of Vienna/ Faculty of Psychology, Austria
Co-Author: Marco Lütgenjoerger, University of Vienna, Austria
Co-Author: Ghilam Hassan Khasilaj, Department of Language Education, University of Bojndor, Iran
Co-Author: Seyyedeh Mina Hamed, English Department, Ferdowsi University of Mashhad, Iran

The present study aimed to expand the classroom goal structures nomological network by investigating relations with a broad array of motivational constructs; achievement goals, self-efficacy, interest, self-concept and personal best goals. To analyze the relations between mastery and goal classroom structures and the motivational facets, we first applied recently developed doubly latent multilevel modeling that allows for a proper control for measurement and sampling error in classroom-goal structures research. The sample consisted of 1200 secondary school students from 62 classes. Students filled out a paper-and-pencil questionnaire including scales from the Goal Structure Questionnaire as well as measures for all motivational constructs during regular class. Results indicated positive relations between mastery goal structure and all motivational outcome variables. The theoretical and educational relevance of our findings are discussed.

The development of achievement goal orientations during the first school years

Keywords: Educational Psychology, Goal orientation, Motivation, Quantitative methods
Presenting Author: Katarina Nuutila, University of Helsinki, Finland
Co-Author: Heta Tuominen-Soini, University of Helsinki, Finland
Co-Author: Marika Niemivirta, University of Oslo, Norway

Achievement goal orientations (preferences for certain achievement-related goals and outcomes) play an important role in both terms of motivation and achievement. While these are known to be rather stable over the middle and high school years, the research on younger students' achievement goal orientations and their development is still sparse. In this study, we investigated (1) how children's achievement goal orientations change from first to third grade, and (2) how these possible changes are related to each other. In addition, gender effects were examined. The data were collected from 18 classes in seven elementary schools in Southern Finland (N=204) during the three first school years, and consisted of teachers' evaluations of each child's achievement goals orientations (i.e., mastery, performance-approach, performance-avoidance and work-avoidance). The results revealed moderate to high stabilities of the individual goal classes (allowing preliminary statements about the extent to which goals can be influenced by other variables) and indicated that reciprocal effects with the outcome variables exist: Teaching quality predicted the adoption of task, learning avoidance, and work-avoidance goals but no effects were found for the reverse direction. Instead, relational goals positively and work-avoidance goals negatively predicted teaching quality. In regard to professional stress, appearance approach goals and normative avoidance goals emerged as positive predictors; whilst appearance avoidance goals and normative approach goals were negative predictors. Additionally, professional stress in T1 negatively predicted the adoption of task and avoidance goals in T2, indicating a complex picture of motivational dynamics.

Teaching Quality and Stress: Antecedents or Outcomes of University Instructors’ Achievement Goals?

Keywords: Goal orientation, Higher education, Motivation, Teaching / instruction
Presenting Author: Martin Daumiller, University of Augsburg, Germany, Germany
Co-Author: Markus Dreisel, University of Augsburg, Germany

Achievement goals of university instructors can be expected to be associated with instructors' teaching quality, and their perceived stress and strain at work. Cross sectional analyses have already confirmed relations of instructors' achievement goals with professional stress and teaching quality (Daumiller, Grassinger, Dickhüser, & Dreisel, 2016). However, goal theory research has mainly focused on unidirectional effects of goals on education, whilst reciprocal relationships have mostly been neglected but are highly plausible. The aim of this study was to examine the couples effects of the ordering of the effects of achievement goals with teaching quality and professional stress. At the interval of half a year, 347 university instructors (171 females; highest degree: 121 master, 226 PhD, thereof 67 full professors) were tested. Results with regard to their achievement goals, teaching quality, and professional stress. The results revealed moderate to high stabilities of the individual goal classes (allowing preliminary statements about the extent to which goals can be influenced by other variables) and indicated that reciprocal effects with the outcome variables exist: Teaching quality predicted the adoption of task, learning avoidance, and work-avoidance goals but no effects were found for the reverse direction. Instead, relational goals positively and work-avoidance goals negatively predicted teaching quality. In regard to professional stress, appearance approach goals and normative avoidance goals emerged as positive predictors; whilst appearance avoidance goals and normative approach goals were negative predictors. Additionally, professional stress in T1 negatively predicted the adoption of task and avoidance goals in T2, indicating a complex picture of motivational dynamics.

Boredom, wellness, and coping: An examination of relations among American teachers

Keywords: Educational Psychology, Emotion and affect, Motivation, Motivation and emotion
Presenting Author: Hadley Solomon, University of New Hampshire, United States
Co-Author: Beth Parnell, University of New Hampshire, United States
Co-Author: Joy Dangora Erickson, University of New Hampshire, United States
Co-Author: Mylés Lynch, University of New Hampshire, United States
Co-Author: Vaskilli Partinou, University of New Hampshire, United States
Co-Author: Minoti Hagia Delton, University of New Hampshire, United States

Boredom in classroom settings has been associated with a host of maladaptive outcomes including dropping out of school and reduced overall wellness. Little work has been done to examine boredom in teachers and how it relates to teacher outcomes. The purpose of the current study was to examine teachers' self-reported boredom in classroom settings and its relation to important motivational and affective constructs including appraisals of control and value and teacher burnout. A series of analyses were conducted to examine the relations of American teachers' (N=148) perceived boredom to outcomes including teacher self-efficacy, burnout, appraisals, and coping. Results indicate teachers reporting higher levels of boredom also report lower self-efficacy for teaching, lower appraisals of control and value, increased burnout, and increased reliance on substance use as a coping mechanism. Results, implications, and significance of these findings will be discussed.

Session D 101

30 August 2017 10:15 - 11:45
Main Building D - D108
Paper Presentation: Teaching and Teacher Education - P
Keywords: In-service teacher education, Mathematics, Science education, Teacher Professional Development, Teaching / instruction, Video analysis
Interest group: SIG 11 - Teaching and Teacher Education
Chairperson: Eleni Kyza, Cyprus University of Technology, Cyprus

Videotaped lessons as means to enhance reflection and knowledge of secondary mathematics teachers
Keywords: Mathematics, Teacher Professional Development, Teaching / instruction, Video analysis
Presenting Author: Ronnie Karsenty, Weizmann Institute of Science, Rehovot, ISRAEL, Israel

The VIDEO-LM Project aims to enhance mathematics teachers’ reflective skills, as well as their mathematical knowledge for teaching, through watching and discussing videotaped lessons of unknown teachers. Discussions are guided by the use of an analytic framework, consisting of six viewing lenses, which directs teachers to explore the videotaped lessons from various core aspects of the mathematics teaching practice. The lenses are (1) mathematical and meta-mathematical ideas around the lesson’s topic; (2) explicit and implicit goals that may be ascribed to the teacher; (3) the tasks selected by the teacher and their enactment in class; (4) the nature of the teacher-student interactions; (5) teacher dilemmas and decision-making processes; and (6) beliefs about mathematics, its learning and its teaching as inferred from the teacher's actions. VIDEO-LM professional development courses have been offered to secondary mathematics teachers in Israel since 2012. In order to investigate the impact of these courses, data was gathered from 17 implementation sites during 2012-15, with a total of 212 participants. Several types of qualitative content analyses were conducted. Findings show that using the six-lens framework in video-based peer conversations supports the development of a reflective language, with which teachers relate not only to the teaching events watched, but also to their own practices. In addition, the analyses of several cases point to a considerable growth in teachers’ mathematical knowledge for teaching, as measured by using the MKT categories defined by Ball and her colleagues.

Working with learner errors in classrooms: the Data Informed Practice Improvement Project
Keywords: Mathematics, Teacher Professional Development, Teaching / instruction, Video analysis
Presenting Author: Karin Brodie, Wits University, South Africa
Co-Author: Nicholas Molets, Wits University, South Africa
Co-Author: Abel Uheriware, Wits University, South Africa

This presentation examines changes in practice among high school mathematics teachers who participated in the Data Informed Practice Improvement Project (DIPIP) over a period of three years. The project worked with teachers in professional learning communities, with a focus on understanding the reasoning behind learners’ errors and working with learners’ partially valid reasoning, in order to develop teachers’ knowledge for teaching and improve their instructional practice. The focus on learner errors was intended to address teachers’ pedagogical content knowledge, which then supported teachers to engage with their own content knowledge. All teachers noticed errors, however very few think about errors as evidence of learners’ valid reasoning or opportunities for learning. Teachers who participated in DIPIP worked with learners’ errors in tests, in interviews with learners, in planning lessons and in teaching in order to think more deeply about their content and pedagogical content knowledge and their practice. This presentation will focus on an analysis of teachers’ lessons, before, during and after the project, using the MGI tool and selected case studies. The analysis shows that most teachers made small but significant changes in their practice on most dimensions.

The PRACTISE professional development program: using classroom video to foster scientific discourse
Keywords: Science education, Teacher Professional Development, Teaching / instruction, Video analysis
Presenting Author: Hilda Borko, Stanford University, United States
Co-Author: Jonathan Osborne, Stanford University, United States
Co-Author: Florencia Gomez Zaccarelli, Stanford University, United States
Co-Author: Evan Fishman, Stanford University, United States
Co-Author: Emily Reigh, Stanford University, United States
Co-Author: Anita Tseng, Stanford University, United States

This presentation examines the efficacy of the Practicum Academy for Improving Science Education (PRACTISE) – a practice-based approach to science professional development (PD) for elementary (grades 3-5) classroom teachers. The PD focuses on instructional practices to support scientific discourse, specifically argumentation from evidence, among students. The decision to focus on scientific discourse is grounded in theory and empirical findings regarding the importance of classroom discussions of key scientific concepts and practices for fostering students’ conceptual understanding and scientific reasoning. The PRACTISE model includes a summer institute followed by a teaching practicum in a local summer school program, and follow-up sessions during the year. Videos of participating teachers’ science lessons situates the PD in the core activities of teaching, providing an opportunity for the teachers to study their classroom discourse practices collaboratively. The project used a two-cohort design to test the effectiveness of the PRACTISE model and added value of the practicum. Cohort 1 participated in the full PD program; Cohort 2 participated in the summer Institute and follow-up sessions only. Ratings of videos of classroom science lessons indicate that the PRACTISE PD was effective for helping teachers to incorporate science discourse into their classroom instruction. Findings regarding the added value of the practicum are mixed. This research contributes to our understanding of how to best prepare teachers to engage their students in scientific discourse using evidence-based argument, which is of considerable interest to the fields of science education, professional development and teacher education.

Pushing teachers to rethink and change their practice on goal clarity in video-based discussions
Keywords: In-service teacher education, Teacher Professional Development, Teaching / instruction, Video analysis
Presenting Author: Alexander Groeschner, Friedrich Schiller University of Jena, Germany
Co-Author: Martina Jarebok, Technische Universität München (TUM), Germany
Co-Author: Tina Seidel, Technische Universität München (TUM), Germany

Teacher professional development (PD) research points out core features that support teachers’ learning. Our study contributes to this research strand by adopting Desimone’s (2009) conceptual model for studying the effects of PD and examining how facilitated video-based discussions in an one-year practice-oriented PD program, the Dialogic Video-Cycle (DVC), push teachers to rethink their teaching routines regarding goal clarity and to incorporate knowledge and skills learned in PD into their teaching. We chose to focus on goal clarity because the clear communication of lesson goals has been shown to have positive effects on students’ perception of learning conditions, learning management and motivation development. We coded and analyzed videotapes of two DV cycles in 2-minute segments as well as videotapes of pre and post teaching of the six DVC’s participating teachers for the full lesson. Our findings indicate that the PD facilitator played an essential role in the video-based discussions about goal clarity and that the video-based discussions provided practice-based opportunities for the teachers to rethink their teaching routines. Furthermore, our findings show that teachers significantly changed their teaching practice from pre to post test by incorporating knowledge and skills learned in PD into their classrooms. With this study we added value to the question of how PD can be related to the teaching practice. In addition future implications for designing video-based facilitation to push teacher learning forward are discussed.

Session D 102
30 August 2017 10:15 - 11:45
Vita - 120
Single Paper
Teaching and Teacher Education

Paper Presentation: Teaching and Teacher Education - Q
Keywords: Argumentation, Case studies, Educational Psychology, Pre-service teacher education, Qualitative methods, Quantitative methods, Science education, Self-efficacy, Social interaction, Student learning, Teacher Professional Development, Teaching approaches
Interest group: SIG 11 - Teaching and Teacher Education
Chairperson: Helena Viholainen, University of Jyväskylä, Finland

Impact of Professional Development on Teacher Facilitation of Science Discourse: a case study
Keywords: Argumentation, Case studies, Science education, Teacher Professional Development
Presenting Author: Emily Reigh, Stanford University, United States
Co-Author: Florencia Gomez Zaccarelli, Stanford University, United States
Despite the extensive knowledge base on effective teacher professional development (TPD), the field lacks an adequate understanding of how teachers implement knowledge from TPD experiences. This paper presents a case study of four teachers who participated in a TPD program focused on supporting classroom discourse and argumentation in elementary science. In order to understand changes in teacher practice after the TPD, three years of classroom videos were analyzed for talk formats, activities, and moves that facilitate productive science discussions. At teachers adopted key practices from the TPD on the three parameters of analysis. However, their styles of implementation were markedly different. Overall patterns across the four cases, as well as two contrasting cases and the affordances of each will be presented. As teachers shifted to student-centered discussions, they struggled to negotiate their new role; the initial reaction for some was to step out of the discussion. Analysis of teacher moves shows their eventual adoption of a wide range of strategies that allowed them to actively facilitate the discussion without impeding student contributions. Both teachers in the contrasting cases implemented practices introduced by TPD, although one of them also combined invitations with support and brought discussions to resolution. This paper offers strategies for engaging students in scientific argumentation, a major focus of the Next Generation Science Standards, and provides evidence of how teachers take up new practices, which will inform TPD developers and providers.

MacGyver and Mother Teresa in one: Teachers’ job satisfaction, conceptions of learning and role
Keywords: Qualitative methods, Quantitative methods, Teacher Professional Development, Teaching approaches
Presenting Author: Karin Poom-Välimäki, Tallinn University, Estonia
Co-Author: Erika Lõõtström, University of Helsinki, Finland
Co-Author: Kristi Kislerko, Tallinn University, Estonia
Co-Author: Tuul Oder, Tallinn University, Estonia

Teachers’ beliefs about their role is an important component of teacher identity. Teacher identity is based on core beliefs about teaching and is an ongoing process of interpretation and re-interpretation of experience (Beljajev et al., 2000). 658 Estonian lower secondary school subject and class teachers provided metaphors that characterized teacher’s role. Additionally, the teachers were asked to respond to open-ended survey questions regarding their conception of teaching. The majority of teachers’ metaphors were identified to be hybrids, which shows that teachers have complex understanding about their role. Differences were found between the teacher groups participating in the study. The analysis of affective connotations of the metaphors showed that there are approximately one third of the teachers who were not satisfied either with their role or work conditions. This could be an indicator of reduced well-being. The affective connotations reflected teachers’ job satisfaction. Statistically significant differences emerged between the positive and negative affective groups in terms of satisfaction with job conditions and job enjoyment. There was no significant difference among teachers based on metaphor analysis and their general beliefs (constructivist, traditional) about teaching.

The effect of school-based experience on preserve teachers’ self-efficacy beliefs
Keywords: Educational Psychology, Pre-service teacher education, Quantitative methods, Self-efficacy
Presenting Author: David Berg, University of Otago, New Zealand

This research examined preserve teachers’ efficacy beliefs, immediately prior to and after the final practicum of an Estonian three-year initial teacher education programme. The primary purpose of the study was to explore the effect of practicum on the students’ teacher self-efficacy beliefs. A secondary objective was to compare the utility of two established measures of teacher self-efficacy.

Teacher self-efficacy beliefs are teachers’ beliefs about their capacity to perform their professional roles successfully. These beliefs are of interest to teacher educators, as they have been shown to relate to significant outcomes for students, schools, and teachers (Tschannen-Moran, Hoy, & Hoy, 1998). A body of research has examined the impact of teacher self-efficacy beliefs; however, less attention has been given to the antecedents of such beliefs (Labone, 2004; Pfeiffer-Eden, 2016; Tschannen-Moran & Woolfolk Hoy, 2007). Considering possible antecedents, it seems probable that during a practicum experience, preservice teachers have considerable engagement with Bandura’s (1997) four sources of self-efficacy beliefs: mastery experience, vicarious experience, verbal persuasion, and physiological and affective states, and that these may contribute to preserve teachers’ self-efficacy beliefs.

In this study, preserve teachers from New Zealand (n = 39) completed the Teachers’ Sense of Efficacy (long form) (Tschannen-Moran & Woolfolk Hoy, 2001) and the English version of the Norwegian Teacher’s Self-Efficacy Scale (Skaalvåg & Skålevik, 2009), before and after their final practicum placements.

Results indicated that the participants’ self-efficacy beliefs increased from pre to post. These results are discussed along with a comparison of the two measures.

Learning climate and conflicts in teacher education practice
Keywords: Pre-service teacher education, Quantitative methods, Social interaction, Student learning
Presenting Author: Johan Kristian Andreasen, Department of Education, Norway
Co-Author: Rune Helgaard, Department of Public Health, Sport and Nutrition, Norway

Cooperating teachers play a central role in the training of new teachers, and greatly affect how student teachers develop a repertoire of teaching strategies and their understanding of professional practice. This is

Session D 103
30 August 2017 10:15 - 11:45
Main Building C - C6
Single Paper
Higher Education

Paper Presentation: Higher Education, Motivation and Self-Efficacy
Keywords: Achievement, Biology, Competencies, Higher education, Metaconception, Mixed-method research, Motivation, Problem-based learning, Reflection, Researcher education, Self-efficacy
Interest group: SIG 04 - Higher Education
Chairperson: Kaethe Schneider, Friedrich Schiller University Jena, Germany

Cognitive and non-cognitive predictors of early academic achievement in higher education
Keywords: Achievement, Higher education, Metaconception, Motivation
Presenting Author: Jonas Willems, University of Antwerp, Belgium
Co-Author: Liseje Coertjens, Université catholique de Louvain (UCL), Belgium
Co-Author: Vincent Donche, University of Antwerp, Belgium

As European countries in which there is no entrance test to university, study success rates in Flemish/Dutch speaking part of Belgium first year of higher education (FYHE) are low. This has considerable psychological and financial costs for the individual student, the family and the society. Decades of research have been carried out to better understand why some students are more successful than others in FYHE. Despite this overwhelming amount of literature on determinants of academic achievement, the combination of cognitive and non-cognitive factors is less often studied. Therefore, the aim of this research is to explore the extent to which the combination of cognitive (prior knowledge) and non-cognitive (processing strategies, regulation strategies, academic motivation, self concept self-efficacy) variables predict academic achievement of students in FYHE after controlling for pre-entry characteristics age, gender, prior education) and adopting an integrative research perspective. More concretely, structural equation modelling was used to investigate the extent to which the aforementioned variables together predict grade point average and academic success (percentage of study points obtained) after the first semester of FYHE. Thus, students’ academic achievement in FYHE is conceptualized by the seldom used measure of early academic achievement. Data of 335 first year students within two faculties of science of a Belgian university college were gathered at the beginning of academic year 2015-2016. Results show that cognitive variables and pre-entry characteristics are important predictors of early academic achievement. However, evidence for the hypothesis that non-cognitive variables are determinants of early academic achievement, is limited.

Effect of undergraduate research on motivation and self-efficacy beliefs about research
Keywords: Higher education, Motivation, Researcher education
Presenting Author: Floris van Blankenstein, ICLEN Leiden University Graduate School of Teaching, Netherlands
Co-Author: Nadira Saab, Leiden University, Netherlands
Co-Author: Roland M. Van der Rijt, ICLEN Leiden University Graduate School of Teaching, Netherlands
Co-Author: Paul Van den Broek, Leiden University, Netherlands

Some research suggests that participating in undergraduate research increases teachers’ self-efficacy feelings about research several skills. However, this evidence is scarce and moreover, there seems to be little evidence about the impact of undergraduate research on motivation for research. The aim of this study was to investigate how students’ self-efficacy beliefs about collaboration and writing research papers, and their intrinsic motivation for doing research and writing research papers would develop over time while they participated in undergraduate research projects. During a one-year bachelor course, students practiced doing research in groups of around 25 students. They completed questionnaires three times during the year. In addition, 12 students were interviewed about their motivation and self-efficacy beliefs. Self-efficacy for collaboration and writing and intrinsic motivation for writing increased significantly over the year. Intrinsic motivation for research did not change significantly. The interview data suggest that experience is an important factor that explains increases in self-efficacy. Factors that may explain the lack of an increase in intrinsic motivation are a sense that the research project is irrelevant and too many rules that need to be followed when conducting research. Motivation may increase when students have more autonomous control over their research project.

Graduates’ evaluations of the usefulness of their university education in early career situation
Keywords: Competencies, Higher education, Mixed-method research, Reflection
Presenting Author: Taaja Tunonien, University of Helsinki, Finland
Co-Author: Anna Pappal, University of Helsinki, Finland
Co-Author: Sari Lindblom, University of Helsinki, Finland

The development of graduates’ generic skills at the university and their satisfaction of university education after entering the working life have been explored in many studies (Crebert et al. 2007; Tynjälä et al. 2009).
2006). These studies have mostly applied quantitative and group-level analysis. Research on individual qualitative differences has been scarce. In the present longitudinal mixed-method study, we aim to explore how graduates with different skills to evaluate their competences at the time of their graduation differ in their evaluations of the usefulness of their university education and job satisfaction in early career situation. The categorisation of graduates to either rich or limited descriptions of academic competences was based on our previous study (Authors, in press). The present study extends the previous study by exploring those graduates after three years of graduation. Follow-up questionnaire data were analysed using independent samples t-test and content analysis. The results showed that graduates with rich descriptions of their academic competences evaluated university education more useful in their current jobs than graduates with limited descriptions. There were no statistically significant differences between the graduates with rich and limited descriptions of their competences in neither satisfaction of the degree nor job satisfaction. The results however showed qualitative differences in graduates’ experiences of the usefulness of university education and in what kind of challenges they have had in working life. This study indicates that graduates’ skills to recognise their competences at the time of their graduation may affect the challenges they have in their future employability.

**Biography**

**Students’ learning outcomes, self-efficacy beliefs and study success in PBL course**

**Keywords:** Biological, Higher education, Self-efficacy, Problem-based learning. 

**Presenting Author:** Vivi Vitanen, University of Helsinki, Finland

**Co-Author:** Hekki Hirvonen, University of Helsinki, Finland

**Co-Author:** Sari Lindblom, University of Helsinki, Finland

Self-efficacy beliefs and self-monitoring have been beneficial for academic achievement. The present study analyses the relations between learning outcomes, self-efficacy beliefs, self-reported grades and course grades of the first- and second-year biology students (n=61) in problem based learning environment. The self-report data measuring students learning outcomes and self-efficacy beliefs were collected in the end of field course in ecology research. The data were analysed with quantitative and qualitative procedures. Two different student groups were identified in the analysis, which showed differences in experiences of learning outcomes, but the groups did not differ in terms of the self-efficacy beliefs or course grades. The results further showed that students’ self-reported grades differed from the course grades. Students whose course grades were higher than their self-reported grades scored the lowest on self-efficacy beliefs. The results indicate that students with lower levels self-efficacy more likely underestimated their grades. However, unclear assessment criteria can also explain the differences between students’ self-reported grades and course grades.

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**Section D 104**

30 August 2017 10:15 - 11:45
Lirna - K103
Single Paper

Motivational, Social and Affective Processes

**Paper Presentation:** Motivation and Educational Psychology - B

**Keywords:** Educational Psychology, Emotion and affect, Goal orientation, Metacognition, Motivation and emotion, Multimedia learning, Social interaction

**Interest group:** SIG 06 - Motivation and Emotion

**Chair:** Hekki Hirvonen, University of Jyväskylä, Finland

**Physiological Indicators of Affective Processes during Multimedia Learning with a Virtual Human**

**Keywords:** Emotion and affect, Metacognition, Motivation and emotion, Multimedia learning

**Presenting Author:** Nicholas Madron, North Carolina State University, United States

**Co-Author:** Roger Azavedo, North Carolina State University, United States

**Co-Author:** Michelle Taub, North Carolina State University, United States

**Co-Author:** Garrett Miller, North Carolina State University, United States

**Co-Author:** Megan Price, North Carolina State University, United States

**Co-Author:** Amanda Bradbury, North Carolina State University, United States

**Co-Author:** Joseph Grafsgaard, North Carolina State University, United States

Regulating cognitive, affective, metacognitive, and motivational (CMM) self-regulated learning (SRL) processes during multimedia learning can be extremely challenging for students. There is a recent trend in using physiological measures to measure aspects of CMM during learning with advanced learning technologies such as multimedia environments to identify instances of effective and ineffective regulation and determine the nature of the physiological arousal (e.g., dealing with complexity of multimedia content; monitoring relevance of multimedia content, attempts at emotion regulation). We examined skin conductance responses (SCR) derived from EDA from 13 college students during multimedia science learning with an intelligent virtual human (IVH). Results indicate a higher rate of SCRs occurred during instances requiring more and accurate regulation of students’ CMM SRL processes. Specifically, higher arousal was found for when students had to provide a justification for their response compared to other learning activities (e.g., reading content, answering multiple choice questions). The results of this study advances models of SRL, multimedia learning, and have implications for the design of future multimedia environments.

**Structure of emotions revisited: A co-occurrence network analysis of positive and negative emotions**

**Keywords:** Educational Psychology, Goal orientation, Social interaction, Motivation and emotion

**Presenting Author:** Julia Moeller, Yale University, United States

**Co-Author:** Zorana Ivicevic, Yale University, United States

**Co-Author:** Marc Braddock, Yale University, United States

**Co-Author:** Arielle White, Yale University, United States

This study revisits the structure of emotions by employing a co-occurrence network analysis. While previous studies have examined the structure of emotions primarily through inter-individual correlations, we investigate how often and which specific positive and negative emotions occur together across people. The sample comprised 21,678 high school students who reported how they feel at school using open-ended questions and 28 rated emotion items. As in previous studies, positive and negative emotion ratings were negatively correlated across individuals, and this negative correlation became stronger when emotions were more experienced. Notwithstanding, network analysis of both the open-ended responses and of emotion rating scales found frequent co-occurrences between both positive and negative emotions within individuals. In the network of recalled emotions, the most frequent pairs of co-occurring positive and negative emotions were happy-fright, happy-stressed, and happy-bored. In the network of happiness emotion terms, the most frequent pairs of positive and negative emotions were accepted-hate, interested-stressed, and happy-stressed. The network analyses presented in this article open new directions to the long-lasting debate about the structure of emotions by revealing co-occurrences that inter-individual correlations would not show.

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**What do teachers think about their students’ inclusion? Consistency of self- and teacher reports**

**Keywords:** Educational Psychology, Goal orientation, Social interaction, Motivation and emotion

**Presenting Author:** Martin Venet, University of Applied Sciences of Special Needs Education Zurich, Switzerland

**Co-Author:** Susanne Schwaab, Universität Graz, Austria

Social inclusion, school well-being and academic self-concept can be used as indicators to evaluate the success of inclusive education. Much research has been carried out regarding these three topics, and an at-risk situation has been identified for students with special educational needs (SEN) in inclusive education. The aim of this study is to investigate students’ and teachers’ perspectives of these variables and to evaluate the teacher version of the German Perceptions of Inclusion Questionnaire (PIQ; Vennet, Zurbriggen, Eiskath, Schwaab & Hessels, 2015). Therefore, the PIQ was administered to 28 eighth grade students and 11 teachers in a public school in Bavaria, self- and teacher reports of 329 students (M age = 14.5, SD = 0.5) of whom 10% had SEN were analyzed. Confirmatory factor analysis confirms the factorial structure of the PIQ teacher version and high reliability was shown. Further, results of the multiple-indicator correlated trait-correlated model with one method factor less than methods (CT-CIM-1 model) indicated that the consistency of self- and teacher reports differs with regard to the three dimensions. Finally, results of structural equation modeling indicate that the student specific variables (SEN, sex, age) have different effects on the self- and teacher-reports. Implications for both further research and practice will be discussed.

**Keywords:** inclusion, self-report, teacher rating, consistency, CT-CIM-1 model

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**Young adults’ career goal effort and stress trajectories in academic and non-academic tracks**

**Keywords:** Educational Psychology, Goal orientation, Social interaction, Motivation and emotion

**Presenting Author:** Maja Ranta, University of Jyväskylä, Finland

**Co-Author:** Elina Marttinen, University of Jyväskylä, Finland

**Co-Author:** Julia Dietrich, Friedrich Schiller University of Jena, Germany

**Co-Author:** Katarina Salmela-Aro, Helsinki Collegium for Advanced Studies, Finland

The aim of this long-term longitudinal study was to investigate the developmental trajectories of career goal effort and career goal stress among individuals either in the educational academic track or non-academic track. Little is known about the developmental changes of career goal appraisal and the extent to which it is sensitive to the educational macro-context. Finnish adolescents (N = 689, 47.5 % female) appraised their career goal related effort and stress five times between age 16 and 23. While in secondary education, 56.0 % of the participants were in high school (academic track) and 43.0 % were in vocational school or not studying at all (non-academic track). After secondary education, the participants transitioned to either tertiary education, work or somewhere else. Latent growth modelling was conducted to examine the changes in the career goal related effort and stress. The results showed that among individuals in the academic track, goal effort and goal stress increased from age 16 to 23. Among individuals in the non-academic track, effort was found to fluctuate: first rising, then being stable during secondary education, then declining during the second transition, and finally starting to increase again.
Session D 105
30 August 2017 10:15 - 11:45
Main Building A - A31
Single Paper
Cognitive Science, Learning and Instructional Technology
Paper Presentation: Educational Technology
Keywords: Computer-assisted learning, Design based research, Distributed cognition, Educational Technology, Learning analytics, Primary education, Science education, Student learning, Survey Research, Technology enhanced learning
Interest group: SIG 07 - Learning and Instruction with Computers
Chairperson: Katerina Vítková, Faculty of Education, Masaryk University, Brno, Czech Republic
How students use smart phones and tablets in learning science and mathematics?
Keywords: Educational Technology, Primary education, Student learning, Survey Research
Presenting Author: Markus Pedaste, University of Tartu, Estonia
Co-Author: Dvors Must, University of Tartu, Estonia
Co-Author: Ali Leijen, University of Tartu, Estonia
Co-Author: Mario Matõs, University of Tartu, Estonia
Co-Author: Lea Aleksander Sirman, University of Tartu, Estonia
Co-Author: Kigi Kori, University of Tartu, Estonia
Co-Author: Lina Adv, University of Tartu, Estonia
Smart phones and tablets are activated in everyday life but it’s not clear for what and how often these are used in learning context. In our study we investigated on what purposes and how often mobile devices were used in learning science and mathematics. We conducted a survey where 3521 students from 6th and 9th grade evaluated their frequency of using mobile devices in lessons and homework in three competences areas: information, communication and content creation. Hierarchical cluster analysis enabled to distinguish five groups of students: digital natives, information students, communicating information students, content creation students, and nonusers. The first four characterize students (50.1%) who use mobile devices for learning science and mathematics at least once in a week. The group of nonusers (49.9%) used mobile devices for learning once or twice in a month or less. Among those five general groups can be differentiated 11 sub-groups and the profiles of those groups help to design new interventions to support effective use of smart phones and tablets in learning. In the design process should be also taken into account information about students’ gender and age group. Our results showed that the distribution of boys and girls as well as 6th and 9th grade students vary in different groups – boys belong more often to the group/content creation students and digital natives, the 9th grade students are more often in the group of communicating information students and, the 6th grade students in the group of nonusers.
Creating technology-based learning scenarios to support observation skills in VET schools
Keywords: Design based research, Educational Technology, Teaching / instruction, Vocational education
Presenting Author: Valentina Canuso, Swiss Federal Institute for Vocational Education and Training (SPFVET), Switzerland
Co-Author: Alberto Cattaneo, Swiss Federal Institute for Vocational Education and Training SPFVET, Switzerland
Co-Author: Jean Luc Gunther, University of Fribourg, Switzerland
Observation is a relevant skill for professionals in different fields. However, at present, very little pedagogical attention has been given to the instructional ways to promote the acquisition of this skill, especially in initial VET systems. In this study, we discuss the various conceptions of observation for the profession of clothing designers and suggest two instructional scenarios to foster the acquisition of this skill in Swiss women’s fashion design courses. Each of the two scenarios was implemented in a paper-based version first and then in a technology-enhanced one, so to investigate also to what extent technology can contribute to the promotion of observation. Twenty-eight learning activities were run in two clothing designer’s schools of Canton Ticino over one semester; they involved six teachers and sixty-eight learners. Data collection was completed by means of structured interviews with teachers and learners. All activities were video-recorded too. The data were analyzed using a structuring content analysis approach. Findings show that observation is a transversal skill in the curricula of the clothing designers, while visual cues generated by the learners and superimposed images could be two effective ways to promote observation. The study also recommended that observation is also perceived as an added value to increase the quality of teaching and the interactions between teachers and learners.
Interactivity is not sufficient for imagination-based integration of external representations
Keywords: Design based research, Distributed cognition, Educational Technology, Science education
Presenting Author: Aditi Kotiyal, Indian Institute Of Technology Bombay, India
Co-Author: Nisarg Majumdar, Indian Institute of Technology Bombay, India
Co-Author: Harshit Agrawal, Homi Bhabha Centre for Science Education, Tata Institute of Fundamental Research, Mumbai, India
Co-Author: Jia Yang, University of Wollongong, Australia
Co-Author: Jun Ma, University of Wollongong, Australia
Co-Author: Abdealla Pardo, University of Sydney, Australia
We report the design, development and testing of a fully functional user interface, designed (a) as an intervention tool to support imagination-based integration of multiple external representations (MERs), and (b) as a probe to understand the cognitive processes involved in MER integration. The interface has fully manipulable and interconnected MERs (simulation, graph and equation) representing a simple oscillator (pendulum) system. The interface design is inspired by distributed and embodied cognition approaches.
We assessed MER integration using this interface, with 7th grade students, who interacted with the interface for an hour. They then answered, as well as verbally reasoned about questions that tested MER integration. Students’ actions on the interface (gaze and mouse clicks) were recorded during their interaction with the interface. These were correlated to their reasoning, to understand actions (patterns of interaction) that could have potentially led to the interaction.
The results provide a very nuanced view of the relationship between manipulability/interaction and integration. Good performers (on the MER integration tasks) had a high level of interaction, but with significant variations between participants, suggesting that interaction is needed for integration, but there is no single interaction pattern supporting integration. However, students exhibiting similar interaction patterns as the good performers performed bad in the integration tasks. This integrativity is not sufficient for MER integration, but cannot guarantee it. Support from facilitators is needed for MER integration, as in any other complex task where novices’ attention needs to be guided.
Blended analytics: A first step in capturing and visualizing physical and digital learning processes
Keywords: Computer-assisted learning, Educational Technology, Learning analytics, Teaching / instruction
Presenting Author: Sarah Howard, University of Wollongong, Australia
Co-Author: Kate Thompson, Griffith University, Australia
Co-Author: Jie Yang, University of Wollongong, Australia
Co-Author: Jun Ma, University of Wollongong, Australia
Co-Author: Abdealla Pardo, University of Sydney, Australia
Current methods of classroom research have struggled to meaningfully capture the longitudinal and complex nature of learning processes. To complicate this, teachers are increasingly expected to ‘blend’ their traditional face-to-face practice with learning in digital places. However, in doing this learning becomes increasingly invisible, as it has been difficult to capture how students learn through a digital device. Therefore, it has been difficult to understand how learning happens across physical and digital blended learning spaces. Multimodal methods are needed to capture a wider range of classroom data to understand how students interact, use digital technologies and other resources in these spaces in their learning processes. Tools to meaningfully communicate findings to teachers, to support students’ learning processes and learning design, are also needed. In this paper, we present a combined classroom data collection method, which includes observations in both physical and digital spaces. This paper will specifically address the first component: observation of the physical classroom, through a pilot study and early video analysis of a classroom video system in an Australian Year 1 classroom. The video analyzed shows five students’ working on a writing task. Results from video tracking show a range of student movement patterns, which can inform learning analytics design and unpack students’ learning processes. Implications of the findings, design for modeling observation data and developing learning analytics are discussed.
Session D 106
30 August 2017 10:15 - 11:45
Main Building A - A28
Single Paper
Assessment and Evaluation, Developmental Aspects of Instruction, Learning and Instructional Technology, Teaching and Teacher Education
Paper Presentation: Learning and Professional Development - E
Keywords: Assessment methods and tools, Competencies, Computer-assisted learning, Developmental processes, Early childhood education, Higher education, In-service teacher education, Learning approaches, Mathematics, Professions and applied sciences, School effectiveness, Student learning, Teacher Professional Development, Vocational education, Workplace learning
Interest group: SIG 14 - Learning and Professional Development
Chairperson: Tiina Anspäl, University of Tartu, Estonia
Instructional Sensitivity: Impacts and perspectives for vocational assessments (and education)
Keywords: Assessment methods and tools, Developmental processes, Vocational education, Workplace learning
Presenting Author: Viola Klotz, University of Mannheim, Germany
Co-Author: Esther Winther, German Institute for Adult Education Leibniz Centre for Lifelong Learning (DIE), Germany
Co-Author: Julia Stange, German Institute for Adult Education Leibniz Centre for Lifelong Learning (DIE), Germany
Apprentices’ performance after vocational educational training (VET) is commonly attributed to the effectiveness of the training. This implies the assumption that learners’ development of competence is significantly affected by vocational instruction. However, the few analyses of instructional sensitivity within the general school-based educational system have in most cases shown little or no effect of instruction (time in school) on performance in assessments. The question as to whether, and to what extent, VET in adult education is effective (in the sense that it fosters competence development), as well as the related question – whether we are able to track the resulting learning progress with adequate measures (assessments) – has hardly been investigated. In the present study, we propose the modeling of instructional sensitivity via diattential item functioning (DIF), and apply this method to a sample of n = 554 apprentices. It was found that during vocational instruction, apprentices significantly improved their
performance in competence-based assessments and that we were able to track these changes in the quality of their competence over the span of a three year initial VET. Moreover, with the proposed method, it is possible to identify items that are particularly sensitive to instruction and that therefore appear to be amenable to the future development of competence assessments.

**Professional vision and scaffolding in promoting SFON**

**Keywords:** Early childhood education, Mathematics, Teacher Professional Development

**Presenting Author:** Maikki Jaatinen, University of Turku, Finland

**Co-Author:** Anna Mattinen, University of Turku, Finland

**Co-Author:** Minna M Hannula-Sormunen, University of Turku, Finland

This research aims to investigate how daycares professionals’ attitudes, mathematical pedagogical awareness, professional vision and scaffolding develop during intensive 23-week long PD program aimed at developing early educator’s skills. It trigger and scaffold 2.5-3.5 year-old children’s spontaneous focusing on numerosity (SFON) and cardinality recognition skills. 23 daycares professionals from 6 daycares centers took part in the PD program. Data in pre-, intermediate and –post-tests was collected with mathematical pedagogical awareness and attitudes questionnaire, video-based semi-structured interviews for analyzing professional vision and with 10-minute long video recorded SFON small group play situations for analyzing professional scaffolding.

Results of this study indicated that daycares professionals considered supporting early math skills as part of daycare activities and increased their support of children’s SFON tendencies during the intervention. Professionals’ mathematical pedagogical awareness also developed during the data. The findings show how professionals handle such differences in their professional vision learning trajectories and these differences also affected their scaffolding skills. Supporting early educators’ professional vision and scaffolding related to SFON and early numeracy skills is a promising new avenue for improving early education.

**Becoming a nurse: student and teacher perceptions of professionalization**

**Keywords:** Competencies, Higher education, Learning approaches, Professions and applied sciences

**Presenting Author:** Martine Bélisle, Université de Sherbrooke, Canada

**Co-Author:** Johanne Goudreau, Université de Montréal, Canada

**Co-Author:** Louise Boyer, University of Montréal, Canada

**Co-Author:** Natacha Bastides, Université de Sherbrooke, Canada

Criticisms and recommendations about the lack of student preparation for the workplace have led to renewals or complete renewals of university programs around the world. In Quebec, these reforms are especially present in university programs that intend to prepare students for a given profession. The competency-based approach (CBA) is frequently adopted to increase the quality of training and to develop a high level of skills among future graduates. As it is the case in the baccalaureate program in nursing at the University of Montreal which includes educational methods that actively engage students in authentic learning situations. Focusing on the situation of nursing education, this research enables us to consolidate our conceptual framework on student professionalization (Bélisle, 2011), which entails the development of competencies, the appropriation of the professional culture, and the construction of a professional identity. Our research goals were: (1) to describe student and teacher perceptions of student professionalization in nursing, particularly in view of their competency development, cultural appropriation and identity construction; (2) to identify educational practices that were perceived as contributing to student professionalization. Using a qualitative/interpretative approach, we conducted group discussions (Knugæ & Casey, 2000) with students and teachers in nursing. In this communication, student and teacher perceptions of student development as nurse clinicians will be compared and results will be discussed through the lens of our conceptual framework on student professionalization. This qualitative research will shed light on pedagogical conditions contributing to student professional development throughout their learning trajectory in a competency-based program.

**A system-wide implementation to promote STEM learning using robotics**

**Keywords:** Computer-assisted learning, School effectiveness, Student learning, Teacher Professional Development

**Presenting Author:** Erhan Sinay, Toronto District School Board, Canada

The implementation of robotics in elementary schools is not widespread in Canadian schools. Many barriers such as lack of knowledge and confidence among teachers hinder the integration of robotics at schools. This study examined the effect of a system-wide, robotics professional learning interventions implemented by the large school board, on teachers’ self-efficacy, knowledge, and teaching practices for teaching STEM with robotics. Participants were 91 elementary teachers from grades k-8 and over 1600 students in 66 schools. A mixed methods design was used and data were collected through surveys and interviews. Results indicate that a system-wide effort did result in: 1) improved TPACK and confidence to teach with robotics among teachers, 2) the use of higher levels of the SAMIR model, and 3) increased student engagement.

**Session E 107**

**30 August 2017 12:00 - 13:30**

**Main Building C - C1**

**ICT Demonstration**

**Learning and Instructional Technology**

**Writing in Digital Environments: A 21st Century Approach to Actionable Analytics**

**Keywords:** Collaborative Learning, Competencies, Learning analytics, Writing / Literacy

**Interest group:** SIG 12 - Writing

**Chairperson:** Sirpa Eskelä-Haapanen, University of Jyväskylä, Finland

**Writing in Digital Environments: A 21st Century Approach to Actionable Analytics**

**Presenting Author:** Joseph Morey, USF, United States

**Designated by faculty at the University of South Florida in collaboration with colleagues throughout the United States and Europe,** **my Reviewers (MyR) provides teachers and administrators with the tools and resources they need to improve students’ collaboration and writing competencies. An e-learning environment that facilitates feedback on student writing, peer review, and team projects, MyR provides document markup tools and actionable writing analytics that empower instructors to offer better feedback in less time. MyR’s real-time analytics provide the data that learning institutions need to facilitate student learning, track progress, and track student development.**

**My Reviewers is used by approximately 12,000 students each year at USF and 2000 students in the Critical Writing Program at the University of Pennsylvania. Thanks to NSF funding, The Role of Instructor and Peer Feedback in Improving the Cognitive, Interpersonal, and Intrapersonal Competencies of Student Writers in STEM Courses, faculty in STEM courses at MIT, Darmouth, NCSU, USF, and UPENN are deploying My Reviewers to research the efficacy of peer review.** **Abroad, My Reviewers is used by students in the English for Academic Purposes at Malmö University (Sweden) and by doctoral students working on their dissertations at the University of Tartu (Estonia).**

The My Reviewers **corpus serves** as a vigorous site of interdisciplinary research, including over 450,000 reviews of tests and thousands of instructor comments, student comments, survey responses, and rate-the-rater scores.

**Session E 108**

**30 August 2017 12:00 - 13:30**

**Main Building A - A35**

**ICT Demonstration**

**Learning and Social Interaction**

**Introducing a social network analysis toolkit for socially responsive classrooms**

**Keywords:** At-risk students, Educational Technology, Peer interaction, Social interaction

**Interest group:** SIG 19 - Social Interaction in Learning and Instruction

**Chairperson:** Paula De Barba, University of Melbourne, Brazil

**Introducing a social network analysis toolkit for socially responsive classrooms**

**Presenting Author:** Christofero Marnaa, University of California, San Diego, United States

**Co-Author:** Alan Daly, University of California, San Diego, United States

**Co-Author:** Giovanna Schaeffer, University of Zurich, Switzerland

**The aim of this demonstration is to introduce a social network analysis toolkit that can be used by researchers and educators alike to examine and understand student-student social interaction in learning and instruction processes. The toolkit offers a wide range of functions and measures drawn from a social network perspective. We will display, explain and familiarize participants with the toolkit’s functions, ranging from collecting data, storing data, making visualizations, extracting data, and even running and comparing social network measures.**

**In the same way that, a social network analysis toolkit was designed as a way of building a bridge between research and practice.** **Differing by a theory of social capital, we will highlight the potential value of examining social interdependencies and interconnectedness among students in a classroom network rather than simply looking at one-to-one interactions. In doing so, we will provide an example from our empirical research of using the toolkit in two Year 4 classrooms. This will consist of a step-by-step introduction to designing and implementing social network analysis as well as discussing a number of social network measures we implemented that participants may also consider using in their own settings.**

**Session E 109**

**30 August 2017 12:00 - 13:30**

**Main Building A - A06**

**ICT Demonstration**

**Learning and Instructional Technology**

**The SMI Digital Classroom. A multi-station data collection framework for educational research.**

**Keywords:** Computer-assisted learning, Educational Psychology, Student learning, Technology

**Interest group:** SIG 27 - Online Measures of Learning Processes

**Chairperson:** Fabian T. C. Schmidt, Leibniz Institute for Science and Mathematics Education (IPN), Germany
The SIM Digital Classroom. A multi-station data collection framework for educational research.
Presenting Author: Markus Plank, SensoMotoric Instruments GmbH, Germany

SensiMotoric Instruments GmbH (Berlin, Germany) has launched SIM Digital Classroom, an integrated framework for educational research on behavioral correlates of attention, learning and memory based on eye tracking and connected physiological sensors. The SIM Digital Classroom promises a wealth of behavioral data about temporal and spatial characteristics of student behavior when interacting with screen-based educational material. You can, for example, assess what works in a classroom environment and what doesn't, where and when students' attention is won and lost. The solution has been designed specifically for researchers interested in students' individual learning strategies during knowledge acquisition and retrieval, teacher expertise and classroom management skills as well as content improvement and development of truly adaptive learning environments.

One researcher, located at a single PC, can deploy behavioral experiments to up to 40 student laptops or computers, monitor student progress, interact with single students if required via messages and alerts, and monitor incoming research-grade data quality. No matter if all students are accomplishing the same experimental protocol, or if every student is provided with distinct learning content, the SIM Digital Classroom allows for automatic data synchronization and aggregation, allowing you to get to results immediately after data collection. The framework doesn't require deep technical or methodological expertise, allowing also educational researchers new to the field of eye tracking and physiological sensor acquisition to focus on scientific hypotheses and gain insights that shape student-centered training schemes, curriculum and learning strategies.

Session E 110
30 August 2017 12:00 - 13:30
Pinn B - B4117
ICT Demonstration
Learning and Instructional Technology
A Second Life environment to train Mathematical Acting in the Context of Nursing.
Keywords: Higher education, Instructional design, Mathematics, Workplace learning
Interest group: SIG 07 - Learning and Instruction with Computers
Chairperson: Sebastian Kuntze, Ludwigsguburg University of Education, Germany
A Second Life environment to train Mathematical Acting in the Context of Nursing.
Presenting Author: Diana P. Zwan, Windesheim University of Applied Sciences, Netherlands
Co-Author: Sus Lin Goei, Windesheim University of Applied Sciences, Netherlands
Co-Author: Omid Norouzi, Tarbiat Modares University, Iran
Co-Author: Johannes Van Luit, Utrecht University, Netherlands

A Virtual Learning Environment (VLE) can be regarded as a potentially useful teaching tool to integrate domain-specific knowledge with the personal transferable and generic academic skills in instructional practices (Tymjallah, 2013). Students have to transform abstract theories and formal knowledge to construct principles and conceptual models (Weeks et al., 2013). They have to learn to distill and use relevant information from complex situations, especially complex calculation problems. This ICT demonstration is about a VLE that is designed for teacher nursing students to support them in recognizing various problem states to which the math theorem applies and enhance nursing students’ competences through a solid base of mathematical facts and procedures. The design includes features such as interactive stories and is equipped with (complex) care situations and clear objectives for solving problems that ensure that players have that immersion experience in the virtual world (Shute et al., 2009). It should therefore motivate nursing students for learning mathematics by integration of ‘real life’ (complex) care situations and bridge nursing students’ transfer problems by using a virtual workplace environment with (complex) care situations.

Session E 111
30 August 2017 12:00 - 13:30
Pinn B - B4116
ICT Demonstration
Learning and Instructional Technology
Supportive hints in a digital environment to foster adolescents' expository text comprehension
Keywords: Computer-assisted learning, Educational Technology, Learning Technologies, Reading comprehension
Interest group: SIG 07 - Learning and Instruction with Computers
Chairperson: Simon Beausera, Maastricht University, Belgium

Supportive hints in a digital environment to foster adolescents' expository text comprehension
Presenting Author: Marlies ter Beek, Rijksuniversiteit Groningen, Dept of Education and GION, Netherlands
Co-Author: Leonie Brummer, GION - University of Groningen, Netherlands
Co-Author: Anouk Donker-Bergstra, Rijksuniversiteit Groningen, Dept of Education and GION, Netherlands
Co-Author: Marie-Christine Opdenakker, University of Groningen, Netherlands

Over the last decades the research focus in the domain of learning and instruction has shifted towards digital applications and environments. With the use of new technologies and web 2.0 most ICT programs seem promising, but often empirical research to prove their effectiveness is lacking. After conducting a scientific literature review on the topic of digitally supported middle school text comprehension programs, it was decided to design a program based on existing knowledge and specific practical needs. In doing so, the result was a web-based digital environment: Gazelle. This acronym (in Dutch) stands for motivated and active self-regulated reading. Gazelle aims at fostering comprehensive reading, since many educators emphasized their students’ struggle with expository texts (e.g., in geography and history, where students need to read vast amounts of text). Comprehensive reading is supported by cognitive, metacognitive and motivational scaffolds called hints. The program logs students' performance, their use of hints, and their judgement of learning (JDL). At the same time, the program provides relevant output for teachers, such as an overview of student progress and results. The hints used in Gazelle are categorized based on specific skills, such as causation or recognizing the main idea. This way, teachers can not only see which students are struggling with text, but also which skills need to be developed.

Session E 112
30 August 2017 12:00 - 13:30
Pinn B - B3111
ICT Demonstration
Teaching and Teacher Education
Responding to Student Writing Using Screenshot Technology
Keywords: Student learning, Teaching / instruction, Technology, Writing / Literacy
Interest group: SIG 12 - Writing
Chairperson: Venera Gashaj, Switzerland

Responding to Student Writing Using Screenshot Technology
Presenting Author: Christopher Arsen, North Carolina State University, United States

Screenshot technology allows an instructor to scroll through a student’s essay or other work onscreen, highlighting or marking up areas of the text while talking to the student. The result is a brief (usually 5-minute) video that the student can then watch and listen to, and replay if necessary. Research has shown that, compared to conventional written feedback, screenshots provide far more information in less time, are perceived by students far more positively, more clearly provide positive affect, and are more effective instructionally (Author, 2016; Author, in press). This interactive ICT session will first explain and demonstrate the use of screenshot technology for responding to student work. Participants will then try out the technology using one of several brief pieces of student writing appropriate to the age group of their students. Several other uses for screenshotting will then be demonstrated, such as the use of screenshot for peer review, formative teacher response, and formative evaluation. A list of screenshot programs (some free) will be provided, along with a summary of the research showing the positive outcomes of responding to student work using the technology.

Session E 113
30 August 2017 12:00 - 13:30
Main Building A - A34
ICT Demonstration
Learning and Instructional Technology
Let's talk student engagement: Connecting teachers and students using learning analytics
Keywords: At-risk students, Higher education, Learning analytics, Student learning
Interest group: SIG 04 - Higher Education
Chairperson: Sus Lin Goei, Windesheim University of Applied Sciences, Netherlands

Let’s talk student engagement: Connecting teachers and students using learning analytics
Presenting Author: Marion Bliemer, The University of Auckland, New Zealand, New Zealand
Co-Author: Jenny McDonald, The University of Auckland, New Zealand
Student (dis)engagement is a frequently debated topic in higher education worldwide. Many post-compulsory education providers invest heavily, in terms of financial and human resources, into the enhancement of student retention and success. As higher education institutions are increasingly being measured for the effectiveness of returns on students’ investment, it is not surprising that attempts to measure engagement are made through national student surveys to probe success and excellence at both the student and institutional level. Learning analytics data provides a lens into engagement. However, remotely collected system log data do not provide a picture of the ‘whole’ student and other data such as feedback, formative assessment, attendance and student demographics may inform action in any given pedagogical context. In this ICT demonstration, participants will have the opportunity to explore hands-on a cross-institutionally developed learning analytics tool that connects teachers with all students, not just those at risk. The featured tool is underpinned by personalizing the student experience at scale via persuasive text messages which are based on teacher-defined criteria of what constitutes engagement. The aim is to enable teachers to leverage learning analytics in their own educational contexts without having to be data or IT experts. Access to the tool and examples of learner data will be provided via a cloud-based environment. During the presentation, participants will be invited to engage in discussions about how we can define, measure and encourage student engagement, considering our shared experiences as teachers, learning designers, data analysts and IT experts.

Session E 114
30 August 2017 12:00 - 13:30
Pinn B - B3110
ICT Demonstration
Learning and Instructional Technology


Keywords: Computer-assisted learning, Instructional design, Multimedia learning, Student learning
Interest group: SIG 07 - Learning and Instruction with Computers
Chairperson: Benjamin Caspar Fauth, Hector Research Institute of Education Sciences and Psychology, Germany
Presenting Author: Jennifer Mueller, Eberhard Karls Universität Tübingen LEAD Graduate School & Research Network, Germany
Co-Author: Uwe Destermeier, Leibniz-Institut für Wissensmedien (iWiM), Germany
Co-Author: Susana Ruiz Fernandez, Leibniz-Institut für Wissensmedien (iWiM), Germany
Co-Author: Peter Gerjets, Leibniz-Institut für Wissensmedien (iWiM), Germany

Tangibles are physical objects with embedded digital information, e.g. visualization or sound, which can be used to support the understanding of abstract concepts like fractions or musical notations. To exploit the advantages of tangibles as tools for teaching and learning not only new technologies but also new teaching methods are needed. In this demonstration we will use video examples to describe the development and implementation of such a combination of a tool and teaching methods. In an eight weeks long extracurricular course we use tangibles on a multi-touch table (MTT) to simultaneously teach abstract mathematical as well as musical concepts. The course is based on using LEGO-like bricks of different lengths as representations for musical notes by adding digital information of sound duration to them. In combination with a music application on the MTT musical patterns (melodies, harmonies, and rhythms) can be built and played. Structural similarities between musical and mathematical patterns are used in the course to derive composing techniques from familiar mathematical operations like geometrical translations. From our research on this course we expect to gain new insights on benefits of tangibles for learning of abstract mathematical and musical concepts.

Session E 115
30 August 2017 12:00 - 13:30
Main Building C - C2
ICT Demonstration
Learning and Instructional Technology

CoRevis. Automated concept map feedback for writing cohesive texts

Keywords: Computer-assisted learning, E-learning / Online learning, Educational Technology, Writing / Literacy
Interest group: SIG 07 - Learning and Instruction with Computers
Chairperson: Jaspurina Brouwer, University of Groningen, Netherlands
CoRevis. Automated concept map feedback for writing cohesive texts
Presenting Author: Christian Burkart, University of Freiburg, Germany
Co-Author: Andreas Lachner, Eberhard Karls Universität Tübingen, Germany
Co-Author: Matthias Nickless, University of Freiburg, Germany

Novice writers are often challenged by the demand of writing cohesive and comprehensible texts. In this ICT Demonstration, we propose the web-based feedback tool, CoRevis, to support students in writing cohesive explanations. CoRevis visualizes cohesion deficits in students’ explanations in a concept map. In several experimental studies, CoRevis proved to be effective, as students with the concept map feedback conducted revisions which resulted in more cohesive and also more comprehensible texts than the texts of students who revised without concept map feedback. These findings could also be replicated in more naturalistic classroom settings. Together, the findings provide evidence that CoRevis can be a useful scaffold to support students writing cohesive texts, an ability that is paramount in today’s information age.

Session E 116
30 August 2017 12:00 - 13:30
Main Building C - C7
ICT Demonstration
Assessment and Evaluation

Video-based assessment of teachers’ professional vision of inclusive classrooms

Keywords: Assessment methods and tools, In-service teacher education, Pre-service teacher education, Quantitative methods
Interest group: SIG 01 - Assessment and Evaluation
Chairperson: Tina Nielsen, University of Copenhagen, Denmark
Video-based assessment of teachers’ professional vision of inclusive classrooms
Presenting Author: Karoline Keppens, Ghent University, Belgium
Co-Author: Iris Roose, Ghent University, Belgium
Co-Author: Esther Gehysse, Vrije Universiteit Brussel (VUB), Belgium
Co-Author: Ruben Vanderinde, Ghent University, Belgium
Co-Author: Piet Van Aermaal, Ghent University, Belgium

Globally, schools and teachers are facing a growing diversity in student populations, which is reflected in worldwide educational policies to implement more inclusive learning environments. According to the literature, (student) teachers need to be supported in their new role as facilitators of inclusion, as they play a major role in the success of these inclusive policies. As a consequence, an important step is to increase their ability to recognize and interpret effective teaching strategies in dealing with student diversity. This is conceptualized by Sluiter. Körink and Steidell (2013) as professional vision. Researchers have relied extensively on video as a means for studying professional vision. One way to study professional vision through video is the method of comparative judgement. However, the method of comparative judgement has not yet been applied to study (student) teachers’ professional vision through video. Therefore, the project POTENTIAL – Power to teach ALL! developed a video-based comparative judgement instrument to measure (student) teachers’ professional vision of inclusive classrooms. Two validation studies - an expert study and pilot study - took place to inquire the validity of the instrument. Results of both studies confirm the validity of the videography instrument to measure (student) teachers’ professional vision of inclusive classrooms in a standardized way. This instrument will be presented during the ICT demonstration.

Session E 117
30 August 2017 12:00 - 13:30
Pinn B - B3117
ICT Demonstration
Assessment and Evaluation

A Digital Platform for the Assessment of Competences (D-PAC)

Keywords: Assessment methods and tools, Competencies, Educational Technology, Psychometrics
Interest group: SIG 01 - Assessment and Evaluation
Chairperson: Tommi Kokkonen, University of Helsinki, Finland
To ensure the development of competences in education, performance assessments are key. In these assessments, students are asked to create a (written) product or to give a presentation. Evaluating performance assessments is problematic, however, as assessors differ in how they interpret and use rating criteria. As a result, analytic scoring procedures, which are traditionally used for the rating of performance assessments, face problems in reliability and validity. Therefore, D-PAC introduces a digital tool that uses pairwise comparisons as an alternative scoring method. According to the law of comparative judgement (Thurstone, 1927), people are far more reliable in comparing the quality of two performances, than in making absolute judgements about the quality of a single performance. Moreover, by including multiple assessors, who all have their own perspectives of what a quality performance comprises, the validity of this method is warranted. Based on the pairwise comparisons of all assessors, the tool provides a rank-order of students’ performances. So far, 26 user groups used D-PAC for the evaluation of performance assessments in a wide variety of domains. Results from these try-outs indicate that D-PAC is a credible tool. In general, D-PAC ratings were more reliable and valid than analytic ratings. Further, D-PAC can be used to promote learning, by providing feedback to both students and assessors. In this ICT session, the different functionalities of D-PAC will be demonstrated and the possibilities and drawbacks of using D-PAC for research and educational purposes will be discussed.

**Session E 118**
30 August 2017 12:00 - 13:30
Poni A - A209B
ICT Demonstration
Learning and Instructional Technology
New era of collaboration – Demonstrating conversational knowledge creation technology

**Keywords:** Design based research, Educational Technology, Knowledge creation, Learning Technologies

**Interest group:** SIG 07 - Learning and Instruction with Computers

**Chairperson:** Els Boshuizen, Open University, Netherlands

**New era of collaboration – Demonstrating conversational knowledge creation technology**

**Presenting Author:** Nina Hakonen, University of Helsinki, Finland

**Co-Author:** Erika Maasikam, University of Helsinki, Finland

**Co-Author:** Olli Sarvi, University of Helsinki, Finland

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The demonstration shows how a new software prototype (designed in Engaging Working Culture Project) supports new era of collaboration; digitally mediated conversational knowledge creation.

Prototype helps participants to create shared artefacts in order to develop new understanding both individually and collectively. This EWC prototype was designed based on student-activating inquiry-, project- and problem-based approaches to learning and de. Especially, focusing on 1) activate and diagnose, 2) support the learning process and 3) evaluate the changes in thinking and acting. Engaging Learning Model (Lee, 2012). Phases are supported by constant feed forward by peers and the teachers. The EWC prototype can be used in various practices and educational institutions to improve knowledge creation practices.

Our working hypothesis is that this EWC prototype may accelerate learning processes by making conceptions overt to discussion and reflection. First pedagogical pilot group of this design-based study were eight mathematics and science student teachers. The actual software testing was carried out during a brief study period. In the beginning, participants filled in a questionnaire. The sessions were filmed and observed and learning journals were also written. Feedback and evaluation conversations took place during the pilot period. It appeared that our EWC software solution provided a new kind of social plane for discussion and socially shared understanding. The participants were instantly able to make use of the possibilities of the EWC prototype. The participants of EARLI ICT demonstration can test the prototype and experience its effects in practice.

**Session E 119**
30 August 2017 12:00 - 13:30
Poni A - A3103
ICT Demonstration
Learning and Instructional Technology
Classroom data management and interactive teaching with OneNote and EverNote: ICT Demonstration

**Keywords:** Computer-supported collaborative learning, E-learning / Online learning, Learning Technologies, Technology

**Interest group:** SIG 07 - Learning and Instruction with Computers

**Chairperson:** Kaja Auutti, University of Helsinki, Finland

**Classroom data management and interactive Teaching with OneNote and EverNote: ICT Demonstration**

**Presenting Author:** Markus Dorrman, Otto-Friedrich-Universität Bamberg, Germany

ICT (information and communication technology) has become a vital component of our professional and private life. A global survey of today's digital literate world shows how much is at hand to collaborate with others in the classroom. Teachers and human resource developers in the vocational sector work on new opportunities to benefit from the advantages of tablet classes. BYOD (Bring your own device concepts) and BYOCD (choose your own device concepts) both sides bring dual education system (DOK Indiv 2016, S.2). Furthermore, this development reflects the influence of ICT on the students’ acquisition of job-related competences for their future profession. So far the use of ICT in classes and the ICT competences of students seem to be expandable (ICLS 2015). One reason for the poor amount of integration of ICT in classroom is that many IT training programs in schools OneNote or EverNote are appropriate software to support ICT. Both software programs are mainly cloud based teaching solutions. The participants of this ICT demonstration will experience the diverse opportunities of working with OneNote and EverNote in classroom. Both tools are largely unknown software programs of Microsoft and Apple and provide a variation of opportunities for teachers and educators. It will also be possible to integrate BYOCD concepts into the demonstration. In an interactive exchange the participants will evaluate and criticize the presented software.

[1] The data of the study was based on younger students but it seems to be transferable in many ways.

**Session E 120**
30 August 2017 12:00 - 13:30
Main Building A - A33
ICT Demonstration
Learning and Instructional Technology
Engaging Global Business Education – How to implement innovative digital pedagogical practices?

**Keywords:** Computer-supported collaborative learning, E-learning / Online learning, Educational Technology, Technology

**Interest group:** SIG 07 - Learning and Instruction with Computers

**Chairperson:** Anne Milk, University of Jena, Germany

**Engaging Global Business Education – How to implement innovative digital pedagogical practices?**

**Presenting Author:** Lauri Vaaara, University of Helsinki, Finland

In this demonstration you will learn how to implement innovative pedagogical practices that meet the latest requirements of education (Finnish National Board of Education, 2015European Parliament, 2015). This will be actualized via a pedagogical system that has been designed into a digital platform to create an engaging learning environment. This environment provides the possibility to implement 21st skills, student-activating learning practices and business-related education into high-school courses. Furthermore, the solution provides a network to link working life and educational institutes as well as various events to foster the educational objectives, for example SuSah Youth Exhibition in Finland.

Engaging Global Business Education (EGBE) is an ambitious attempt to design technology-mediated pedagogical practices based on the Engaging Learning model (Lonka, 2012) to bridge the gap between formal education and the needs of future work life. The practices together with corresponding material will be integrated into high school education through a user-friendly and advanced digital learning environment (provided by Cleantek Ltd).

At the moment, 12 high schools all around Finland are involved in the piloting phase of the project. Based on the outcomes of the testing phase, four global business courses for high-school students are going to be ready to use in 2017. In future, the aim is also to implement customized versions of the courses to primary education, higher education and even companies. During this demonstration you will also hear about the first waves of feedback, which has been very promising so far.

**Session E 121**
30 August 2017 12:00 - 13:30
Linna - K108
Symposium
Motivational, Social and Affective Processes

**What does it take to be motivated – the impact of social relationships and social skills**

A Digital Platform for the Assessment of Competences (D-PAC)

**Presenting Author:** Renke Bouwer, University of Antwerp, Belgium

**Co-Author:** Marije Lederhuis, University of Antwerp, Belgium

**Co-Author:** Maarten Goossens, University Antwerp, Belgium

**Co-Author:** Sven De Maeyer, University of Antwerp, Belgium
Keywords: Achievement, Cultural psychology, Educational psychology, Motivation, Parental involvement in learning, Peer interaction, Social aspects of learning and teaching, Social interaction, Teaching / instruction
Interest group: SIG 10 - Social Interaction in Learning and Instruction
Discussion: The Success of Jyväskylä Institute

The motivating role of peers & teachers among Russian and Filipino students - A Motivation Typology
Presenting Author: Frances Höfterich, University of Greifswald, Germany
Co-Author: Anna Lossa, Ernst-Moritz-Arndt-University, Germany
Co-Author: Diana Raufelder, Ernst-Moritz-Arndt-University, Germany

This cross-national study investigates the perception of peers and teachers as sources of motivation in a total sample of 1410 seventh and ninth grade Russian (n=396) and Filipino (n=1014) secondary school students. According to the Motivation Typology (Raufelder, Jagenow, Dörny, & Höfterich, 2013), there are four motivation types (MT) based on students’ socio-motivational relationships with peers and teachers in school: (1) teacher-dependent MT, (2) peer-dependent MT, (3) teacher-and-peer-dependent MT, (4) teacher-and-peer-independent MT. Cross-cultural studies (e.g., Höfterich, Raufelder, & Eid, 2014) show that the distribution of students within this typology varies greatly. Hence, peers and teachers are viewed differently in their motivational role in different cultural contexts. The current study expands the knowledge on the typology by investigating students from non-western countries such as Russia and the Philippines. Applying a Multigroup Confirmatory Latent Class Analysis (MLCA), we found that 37% of Russian students were assigned to the teacher-and-peer-dependent MT, whereas 85% of Filipinos were assigned to the teacher-and-peer-independent MT. These results manifest the different impact of social environmental variables (e.g., social relationships in school) on students’ motivation, which is of particular importance in current time, marked by the globalization and migration processes. Practical implications for school psychologists and educators derived from the results will be discussed.

Grit in the Classroom: How to Improve Motivation and Learning Outcomes
Presenting Author: Christian Krokel, London School of Economics and Political Science, United Kingdom

A growing body of empirical evidence in psychology and economics points to the important role of socio-emotional skills in shaping motivation learning outcomes. In particular, grit – passion and perseverance in the pursuit of long-term goals – has been shown to predict educational success over and beyond IQ. In the current study, the concept of grit as an essential motivational aspect is introduced, how it is measured, how it can be effectively cultivated in classroom settings, and its impacts on learning outcomes. To this end, a small-scale intervention in Turkey and a large-scale nation-wide intervention in Macedonia are presented, aiming at fostering grit in students and/or teachers to mainstream grit as social skill contributing to students’ motivation. Finally, a short overview is presented of the extent to which grit can be put into practice to enhance motivational processes in the classroom.

Enhancing students’ motivation – the impact of teacher support and teacher-parent partnership
Presenting Author: Charlot Rubach, Universität Potsdam, Germany
Co-Author: Nadine Kadzi, Universität Potsdam, Germany

Based on Epstein’s model of overlapping spheres of influence (1987) this study examined whether teachers’ behavior is more strongly related to 9th and 10th grade students’ motivation, self-concept and school-based beliefs, if teachers are working in collaboration with parents. Data stemmed from a longitudinal study that assessed student (N=1118) and teacher data (N=52) in 13 secondary schools in Germany. Using Two-level structural equation models showed that, teachers support had positive effects on students’ motivation and self-concept at both school and students’ values at high school. Moreover, enhanced student’s social skills at the class level. Additionally, formal forms of partnership and information exchange moderated the relation between teacher-student relationship and students’ valuing of family-school partnership

Inter-individual differences in social motivation related to Self-determination & school-engagement
Presenting Author: Alexander Lätcho, Institute of Educational Science, Germany
Co-Author: Diana Raufelder, Ernst-Moritz-Arndt-University, Germany

Little is known about the association between inter-individual differences in motivation and self-determination, school engagement and social problem behaviors. This study examines whether self-determination predicts school engagement in children who are assigned to four different motivation types (MT) based on their socio-motivational relationships with peers and teachers: (1) peer-dependent MT, (2) teacher-dependent MT, (3) peer-and-teacher-dependent MT and (4) peer-and-teacher-independent MT. To test the association of self-determination and school engagement among the four MT a large sample of students (N = 1688) from Brandenburg, Germany was used. The four types were first compared on latent variables using Structural equation modelling (SEM) in Mplus, and afterwards a latent multigroup SEM (MGSEM) was conducted to test whether self-determination, relatedness, and autonomy predicts emotional and behavioral school engagement for each MT respectively. The results highlight the importance of inter-individual differences for the association of students’ psychological needs (competence, relatedness, and autonomy) and their school engagement.

Session E 122
30 August 2017 12:00 - 13:30
Penz B - B1302
Symposium
Keywords: Social and Affective Processes
Facets of heterogeneity and their impact on emotions in the classroom
Keywords: Achievement, Developmental processes, Educational Psychology, Emotion and affect, Motivation, emotion and affect, Quantitative methods
Interest group: SIG 08 - Motivation and Emotion
Discussions: Tina Hascher, University of Bern, Switzerland

Heterogeneity in Competence and Situational Interest of Students relates to Emotional Classroom Emotions
Presenting Author: Eva Becker, Institut für Erziehungswissenschaft, Switzerland
Co-Author: Melanie Kautz, Leibniz Institute for Science and Mathematics Education at Kiel University, Germany
Co-Author: Madeleine Bieg, University of Konstanz, Germany
Co-Author: Fritz C. Staab, University of Zürich, Switzerland

Dealing with heterogeneity in the classroom and fostering student’s individual needs, is a crucial demand that has been placed on teachers to optimize students’ learning conditions. Besides stable individual differences, heterogeneity between students (e.g., socio-economic background, special needs) there are also differences that arise at a situational level. For instance, lessons in which some students don’t feel challenged while others find the tasks too difficult and some students are interested in the topic while others are not. The aim of the study is to examine antecedents (teaching quality) and effects (emotions) of lesson-specific heterogeneity in students’ competence and situational interest. The study was conducted with samples from Germany (43 classes, 358 mathematics lessons, experienced teachers) and Switzerland (29 classes, 87 German lessons, pre-service teachers). Teachers and students filled out short questionnaires in the pre-five minutes of a minimum of three lessons. Results from hierarchical regression analyses showed that lessons with larger heterogeneity in students’ perceived competence and situational interest were associated with lower teaching quality (cognitive activation, lesson structure, social support) and a negative emotional climate (students: more anger and boredom; teachers: more anger and anxiety). Consequently, both teachers’ and students’ emotions can be considered as central factors in the development of emotional classroom environment and the students’ role: negative emotions propel the students’ learning. Besides instructional techniques to deal with heterogeneity (e.g., adaptive instructions), emotional competences to deal with these classroom situations could be a focus in teacher trainings.

Being over- or underchallenged: Effects on students’ career aspirations via self-concept and boredom
Presenting Author: Maike Kranich, University of Konstanz, Germany
Co-Author: Thomas Geotz, Department of Empirical Educational Research, Germany
Co-Author: Anna-Lena Roos, University of Konstanz, Germany

In a school context, heterogeneous classes regarding cognitive capabilities and previous knowledge are one challenge teachers are confronted with. Consequently, the same instructional setting could result in students being overchallenged due to task demands above their abilities and students being underchallenged due to task demands below their abilities. Being over- or underchallenged 1st) plays a crucial role for the development of students’ career aspirations, which in turn influence their career aspirations and 2nd) is important for the level of boredom which the students experience. Furthermore, high levels of boredom could also decrease career aspirations. The present study investigates the influence of students’ being over- or underchallenged on their career aspirations mediated by academic self-concept and academic boredom. We tested these mediation hypotheses with a sample of N = 662 Swiss high school students (Mage = 17.69) from 35 classes by using a questionnaire-based trait assessment of subject specific (i.e., German, French, mathematics) perceived challenge, self-concept, boredom and career aspirations. Results showed that being overchallenged reduces students’ career aspirations while taking self-concept into account, whereas being underchallenged enhances these aspirations via self-concept. Furthermore, we could also show a negative effect of both, being over- and underchallenged, on students’ career aspirations mediated by boredom. As such, the results of our study indicate effects of heterogeneity (being over- or underchallenged) on students’ career aspirations and suggest that boredom – as the most frequently experienced emotion at school – should be neglected when looking at future career choice.

The relationship between state math anxiety and math performance among sixth graders
Presenting Author: Rikka Sorvo, University of Jyväskylä, Finland
Co-Author: Tuula Arö, University of Jyväskylä, Finland
Co-Author: Mikko Aro, University of Jyväskylä, Finland
Co-Author: Helena Viholainen, University of Jyväskylä, Finland
Co-Author: Timo Ahonen, University of Jyväskylä, Finland
Co-Author: Tuire Kuponen, University of Jyväskylä, NMI, Finland
Co-Author: Noona Kuru, University of Jyväskylä, Finland

Most of the math anxiety studies among children have focused on trait anxiety and left state anxiety unexplored. The previous studies have also overlooked the effect of the degree of difficulty of the performance task on the relationship between state and trait math anxiety among sixth graders (N = 128) and the interplay between state math anxiety and math achievement, depending on task difficulty. The students were divided into three ability groups based on their arithmetic skills. They completed easy and difficult math task, adapted to their ability group and the performance was standardized based on the group. The trait math anxiety was assessed with six items and the state math anxiety with four items per task (easy/difficult). Trait anxiety in autumn was related to state anxiety in both easy and difficult task in the spring. Moreover, participants who were only anxious about the difficult task, performed worse in the difficult task in relation to their skill level than they did in the easy task, whereas participants who were not anxious or were anxious about both tasks, performed similarly in the tasks relatively the average in their ability group. These results emphasize the importance measuring also state math anxiety in addition to trait anxiety. The results also give us information about the immediate effect of state math anxiety on math performance.
Structural model and developmental dynamics of general and subject-specific academic anxieties
Presenting Author: Katarzyna Gogol, University of Konstanz, Germany
Co-Author: Martin Brunner, University of Luxembourg, Germany
Co-Author: Franz Preckel, University of Trier, Germany
Co-Author: Romain Martin, University of Luxembourg, Luxembourg

General and subject-specific conceptualizations of academic anxiety appear to exist in the literature and have not been related to each other previously. Moreover, the potential hierarchical nature of academic anxiety has not been debated. However, referring only to one perspective and neglecting the other necessarily draws an incomplete picture of this important emotion in educational research. Thus, in the present study, we introduce a new structural model of academic anxiety that investigated and supported a subject specific and hierarchical organization of academic anxiety with general component at the apex of the hierarchy. Further, we applied the new model to examine developmental dynamics of general and subject-specific (i.e., German, French, and mathematics) components of students' academic anxiety. Specifically, we analyzed how the general anxiety change in the different subject-specific anxieties (top-down processes) and on the other hand, how subject specific anxieties influence change in the general level of academic anxiety (bottom-up processes). Moreover, we studied how subject specific anxieties affect change in anxiety in other subjects (across-subject processes). We did not find any support for substantial top-down nor bottom-up developmental processes. However, our results indicate substantial negative developmental effects across anxiety in different school subjects. Taken together, the present study makes a substantial contribution to a fuller and more nuanced understanding of the structure and development of academic anxiety.

Session E 123
30 August 2017 12:00 - 13:30
Main Building E - E221
ICT Demonstration
Learning and Instructional Technology
Interactive Feedback about Instructional Quality: Easy Distribution and Usage Tracking
Keywords: Design based research, Educational Technology, In-service teacher education, Teacher Professional Development

Chairperson: David Gabraith, University of Southampton, United Kingdom

Interactive Feedback about Instructional Quality: Easy Distribution and Usage Tracking
Presenting Author: Samuel Merk, University of Tuebingen, Germany

All over the world and every day researchers, school inspectors, principals and teachers themselves generate qualitative and quantitative data describing instructional quality. Although feeding back this information is valuable for school and teaching development, systematic implementation of instructional quality feedback is scarce in some countries and researchers are sceptical about the understanding and the usage of feedback through teachers.

In our ICT-demonstration we want to show, that the 'shiny' web application framework for R is a ideally suited tool to overcome both problems, hence it uses the widespread statistical language R to generate rich and powerful interactive web applications with no knowledge of HTML, CSS or JavaScript. So teachers can explore their feedback interactively by generating different plots of numerical data or displays of free text answers, whereas researchers can investigate the usage of this feedback applications via log data.

Results of a design based research study with the shiny framework will be outlined.

Session E 124
30 August 2017 12:00 - 13:30
Lirra - K109
Symposium
Teaching and Teacher Education
Investigating in-service and pre-service teachers' promotion of SRL through classroom observation
Keywords: Assessment methods and tools, Attitudes and beliefs, Educational Psychology, Metacognition, Pre-service teacher education, Self-regulation
Interest group: SIG 16 - Metacognition
Discussant: Erik De Corte, University of Leuven, Belgium

Insights into teachers' promotion of SRL in primary and secondary mathematics classrooms
Presenting Author: Charlotte Dignath, Institute of Psychology, Germany
Co-Author: Gerhard Buehner, University of Frankfurt, Germany

Two video-based observation studies were conducted using a highly structured observation instrument to assess primary and secondary school teachers' promotion of self-regulated learning (SRL) by rating teachers' implicit and explicit instruction of strategies and their arrangement of a learning environment that enhances students' self-regulation. Additionally, secondary school teachers participated in a semi-structured interview to confront objective classroom observations with teachers' subjective views.

Classroom observations revealed that teachers spend only very little time on explicit strategy instruction. Moreover, they rather instruct cognitive strategies, but very few metacognitive strategies. These results are more pronounced in primary than in secondary school classrooms. By contrast, primary school teachers provide students more often with learning environments that require student-regulation than secondary school teachers do. Teacher interviews revealed that teachers are rather reluctant towards the promotion of SRL.

The results show that there is still a strong need for teacher training on enhancing SRL directly and indirectly. In particular teachers lack explicit strategy instruction and addressing of metacognitive strategies during their teaching.

Exploring diversity in teachers' implementation of self-regulated learning in primary schools
Presenting Author: Mona De Smul, University of Ghent, Belgium
Co-Author: Hilde Van Kere, Ghent University, Belgium
Co-Author: Sofie Harrew, Ghent University, Belgium
Co-Author: Seet Devos, Ghent University, Belgium

Although the importance of promoting self-regulated learning (SRL) in primary education is often stressed, mixed method research investigating the role of the teacher in this respect is scarce. Therefore, the present study investigates primary school teachers' promotion of SRL combining and comparing both quantitative (i.e., self-report questionnaires) and qualitative data (i.e., semi-structured interviews and classroom observations). Moreover the study aims at studying differences between schools reporting a comprehensive versus a limited implementation of SRL in daily practice. Based on survey data of 331 teachers from 44 schools in Flanders, six schools were selected for further qualitative research. Preliminary results are discussed and based on the results, implications for teacher professional development by means of an innovative school improvement program are presented.

Effects of Scaffolding Level on Preservice Teachers' Professional Vision & Capacity to Teach SRL
Presenting Author: Tova Michalski, Bar-Ilan University, Israel

A major concern of teacher educators is how teachers acquire expertise to positively develop students’ self-regulated learning (SRL). Accordingly teachers are asked to understand the role of SRL in their pedagogical content knowledge, to plan materials and strategies for infusing SRL into lessons and finally to reflect on their actions and decisions in order to evaluate goals, processes, and efforts (Putnam & Borko, 2000). However, research findings suggest that SRL is difficult to attain by preservice teachers (e.g., Perry, et al., 2007; Kramarski & Michalski, 2010), who lack experience in producing knowledge in new situations and who lack skills as analytical competency practitioners (Schön, 1995). Methods of digital video case-based learning are considered to have great potential for promoting reflective and problem-solving abilities as well as other higher level cognitive competencies related to analytical competency (e.g., Lundeberg, 1999).

To meet the growing challenges for SRL-promoting teacher preparation, the current study aimed to explore preservice teachers’ capacity to analyze video-cases of complex SRL-teaching events by developing their professional vision (PV) and aimed to compare the training effects of different scaffolding paths (the autonomous path; the hint path, and the guided path) on the depend variables PV for SRL and direct and indirect SRL-teaching to their students. Findings demonstrated that the hint approach led to better performance on teachers’ use of SRL in the PV for SRL and actual SRL teaching as measured directly (implicit/explicit SRL-promoting strategy instruction), and indirectly (construction of SRL-promoting environments).
The use of video clip analyses that focus on teachers' behaviors has become a quite common practice in professional development courses. Usually, a lesson is recoded, segments or clips of the films are shown to teachers, and those clips are analyzed by the participants. The present study took another approach. Rooted in the SRL research, the study addresses the following questions: To what extent teachers' who are exposed to different types of video clip analyses would develop different levels of pedagogical content knowledge, and would also implement different SRL strategies in their teaching? About 50 mathematics teachers participated in the present study. They all watched the same video-clips that recoded 'good' mathematics teaching. Teachers were randomly assigned into four research groups, as follows: Group A (control group) analyzed the clips as the teachers suggested; Group B analyzed the clips by focusing on the motivational aspects; Group C analyzed the cognitive-metacognitive aspects of the teaching; and Group D focused on all three components of SRL: cognition, metacognition, and motivation. Results showed significant differences between the four groups on all dependent variables. In particular, Group D developed a higher level of pedagogical content knowledge and also implemented significant higher levels of explicit SRL skills than group C, which in turn were significantly higher than those of Group B: the control group scored significantly lower than all other three groups. The theoretical and practical implications will be discussed in the conference.

Session E 125
30 August 2017 12:00 - 13:30
Main Building E - E350
Invited Symposium
Learning and Special Education

Classroom composition research on social-emotional outcomes

Keywords: Achievement, Emotion and affect, Primary education, Secondary education, Self-efficacy, Social aspects of learning and teaching, Social development, Social interaction, Special education

Interest group: SIG 15 - Special Educational Needs

Discussant: Dieder Baeyens, KU LEUVEN, Belgium

An overview of classroom composition research on social-emotional outcomes

Presenting Author: Christoph Müller, University of Fribourg, Germany
Co-Author: Carmen Zurbriggen, University of Fribourg, Switzerland

Classroom composition research on social-emotional outcomes (CGRS) aims to systematically explore how characteristics of classmates are related to the social-emotional outcomes of children and adolescents. In this conceptual introduction to CCRS it is first provided an insight into the scientific roots of CCRS, namely peer influence research and school effectiveness research. It then developed a conceptualization of research areas typically of interest in CCRS, which comprises four different fields of inquiry. A brief review on exemplary studies in these areas of research is given. Finally, current challenges of CCRS are presented. The contribution ends with a brief outlook on potential future research directions.

Does classroom composition affect school satisfaction of students with special educational needs?

Presenting Author: Katja Scharenberg, University of Education Freiburg, Germany
Co-Author: Wolfram Rollett, University of Education Freiburg, Germany
Co-Author: Wittold Boś, TU Dortmund University, Germany

Analysing effects of the classroom learning environment is of special importance in inclusive education as mainstream classes are more heterogeneous regarding students' academic achievement and sociocultural origin, but benefits are assumed for all children (Ansonow & César, 2006). Studies examining effects of individual, peer and classroom variables for SEN students are rare (de Boer et al., 2013). Previous research found neutral or positive effects of inclusive education on achievement (Cole et al., 2004; Koca et al., 2014; Ruijls & Poetsma, 2009). There is, however, a lack of evidence regarding effects of inclusive education on non-achievement related, sociomotional outcomes (e.g. school satisfaction). Thus, our study examined whether 1) classroom composition affects school satisfaction, 2) such effects differ between sub-groups of at-risk students, and 3) whether classroom composition mediates the hypothesised effect of SEN at individual level. Analyses based on a sample of 1,025 students in inclusive primary schools (Grade 4). SEN students (15.1%) were disadvantaged regarding sociomotional outcomes, but school satisfaction did not interact with sociocultural background. However, SEN students did not seem to benefit from attending classes with more privileged peers. The results indicate that process indicators might be more relevant for sociomotional outcomes in inclusive classrooms than contextual characteristics.

Antisocial behavior among adolescents: The influence of classmates prosocial behavior

Presenting Author: Vanena Hofmann, University of Fribourg, Switzerland
Co-Author: Christoph Müller, University of Fribourg, Germany

Prior research has revealed that the behavior within a classroom serves as a descriptive norm for individuals to behave in a certain way. While research often focused on negative peer influence, peers' prosocial behavior might in turn be associated with positive individual development. It was therefore presumed that classroom-level prosocial behavior would predict a decrease in antisocial behavior of individual students. Data were obtained from a longitudinal study of lower secondary school students in Switzerland (N = 864), from which data collection points at the end of Grade 7 and at the end of Grade 9 were used. Students completed self-reports on prosocial behavior, antisocial behavior, and antisocial attitudes, which were analyzed using multilevel models to control for clustering within classrooms. Results indicated that a higher level of prosocial behavior within a classroom significantly predicted a decrease in individual students' future antisocial behavior.

Comparison of the group actor-partner interdependence model and a latent-manifest contextual model

Presenting Author: Carmen Zurbriggen, University of Fribourg, Switzerland
Co-Author: Martin Venetz, University of Applied Sciences of Special Needs Education Zurich, Switzerland

Invited Symposium
Learning and Special Education

According to the big fish-little pond effect (BFLE), students compare their own academic abilities with those of their classmates, and the information obtained then forms a reference that shapes students' academic self-concept. To counteract negative social comparison effects (e.g., a student with low achievement compares himself with higher-achieving classmates and develops a low academic self-concept), it is often proposed that teachers should adopt an individualized frame of reference when giving feedback to students. We thus investigated whether the BFLE on students' academic self-concept is moderated by teachers' frame of reference. For this purpose, two different methods for the analysis of group composition effects were used and compared.

The methods supported the BFLE. Class-average achievement was negatively associated with individual academic self-concept, even after controlling for individual achievement. Furthermore, teachers' individualized frame of reference had a small positive effect on students' academic self-concept, and diminished to some extent the BFLE.

The results suggest that teachers' individualized feedback may be associated with an improvement of students' self-concept, and may contribute to less negative social comparison effects among classmates. Benefits and drawbacks of both methods of analysis used will be discussed.

Session E 126
30 August 2017 12:00 - 13:30
Main Building A - A05
Invited Symposium
Assessment and Evaluation, Educational Policy and Systems

Challenges in school improvement research in a multilevel context

Keywords: Assessment methods and tools, Communities of learners, Comparative studies, Cooperative / collaborative learning, Meta-analysis, Mixed-method research, Qualitative methods, Quantitative methods, Quasi-experimental research

Interest group: SIG 23 - Educational Evaluation, Accountability and School Improvement

Organiser: Katharina Maag-Merk, University of Zurich, Switzerland
Organiser: Tobias Feldhoff, Johannes Gutenberg University Mainz, Germany
Organiser: Arnoud Oude Gooi Beverborg, Johannes Gutenberg-Universität Mainz, Germany
Organiser: Falk Radsch, Germany
Discussant: Melanie Ehren, United Kingdom

Both methods supported the BFLE. Class-average achievement was negatively associated with individual academic self-concept, even after controlling for individual achievement. Furthermore, teachers' individualized frame of reference had a small positive effect on students' academic self-concept, and diminished to some extent the BFLE.

The results suggest that teachers' individualized feedback may be associated with an improvement of students' self-concept, and may contribute to less negative social comparison effects among classmates. Benefits and drawbacks of both methods of analysis used will be discussed.
To reach a better understanding of the relation between school improvement capacity, teaching and student outcomes and to broaden our knowledge base, we need studies that appropriately model the complexity of school improvement, which use complex designs and methods of analyses. The choice of designs and methods has an influence on the insights that are possible. Therefore, this paper is elaborating methodological challenges and requirements in school improvement research based on a systematic review of quantitative longitudinal studies in current school improvement research (Feldhoff, Radics & Bischof 2016). We developed a framework of the complex nature of school improvement processes described by six characteristics that guided our analysis. Taken together, across all 13 studies we found that none addresses research on the dynamic interaction of the factors in building school capacity to change and on the reciprocal interactions between schools’ capacity to change, teaching quality and student outcomes as well as their change. All in all the paper shows the necessity and the potential of longitudinal studies for further school improvement research.

Exploring processes and outcomes through a mixed methods design

Presenting Author: Geert Devos, Ghent University, Belgium
Co-Author: Benedikt Vanlaere, Ghent University, Belgium

Developing professional learning communities (PLCs) appears to be a promising avenue for building capacity for sustainable improvement. This mixed methods study first classifies Flemish primary schools into clusters, based on the strength of three interpersonal PLC characteristics. This reveals that four clusters can be distinguished. The case study method is then used to contrast the collaboration and resulting learning outcomes about a school-specific innovation in four schools belonging to two extreme clusters. Experienced teachers in these schools completed four logs that reveal differences in type and content of the collaboration throughout the school year between the high and low PLC schools. Results nurture optimism about the learning potential in high PLC schools as their learning outcomes are diverse. The content of the outcomes shows both differences and similarities compared to the low PLC schools.

Diversity in learning trajectories. Towards a tangible conceptualization of dynamic processes

Presenting Author: Marianne Vermunt, Johannes Gutenberg-University Mainz, Germany
Co-Author: John Geelings, Utrecht University, Netherlands
Co-Author: Peter Sleegers, BMC Antwerp, Belgium
Co-Author: Tobias Feldhoff, Johannes Gutenberg University Mainz, Germany
Co-Author: Klaas van Veen, University of Groningen, Netherlands
Co-Author: Maarten Winants, Radboud University Nijmegen, Netherlands

Knowledge of which information teachers use in their sensemaking processes and how these culminate in competences is limited, but necessary to understand how teachers learn professionally in the workplace and how their development interplays with the change capacity of schools. This study aims at enriching the dynamic conceptualisation of these ongoing and situated processes, which in a previous study using a dynamic systems analysis were characterized by effort, intentionality, and sensitivity. For that purpose, log data have been coded along competence categories and subsequently learning sequences and trajectories have been imputed. Measures thereof were compared between two teams. The results point to the diversity in paths to develop knowledge and skills, but also to the restraints that types of tasks (of teams) bring with them. The hypothesis that can be distilled from this study, is that the contribution of teachers to the change capacity of their schools is accordingly diverse and modest. The application of this type of study for future school improvement research will be discussed.

The importance of measurement equivalence for predictor models across countries

Presenting Author: Catalina Lomos, LiSER - Luxembourg Institute for Social Economic Research, Luxembourg

This presentation will consider the latent concept of teacher Professional Community (PC) using the large-scale assessment data of International Civic and Citizenship Study (ICCS 2009) and perceived teacher participation in professional communities within schools of more than 58,000 teachers from 36 countries around the world. Using this latent concept measured through five observed items, we will reflect on the importance of comparable measurements across countries, we will empirically test for measurement invariance, and show how much the countries' PC scores and score differences are impacted by the different methods of measurement equivalence testing. In addition, the presentation will also show what is the relationship of PC with other school processes, such as distributed leadership, across the 36 countries, and most importantly how and how much are these relationships impacted by the level of measurement equivalence established across countries and the method through which equivalence is established. The topic of measurement equivalence needs to receive more attention within comparative school effectiveness and school improvement research, especially when we aim to establish valid models of predictors and relationships across more groups or countries.

Session E 127
30 August 2017 12:00 - 13:30
Main Building A - A31
Invited Symposium: Cognitive Science

Effects of non-invasive brain stimulation on learning

Keywords: Achievement, Cognitive development, Cognitive skills, Language (L1/Standard Language), Learning and developmental difficulties, Learning disabilities, Learning Technologies, Mathematics, Neuroscience
Interest group: SIG 22 - Neuroscience and Education
Organiser: Roland H. Grabner, University of Graz, Austria
Organiser: Nieneke van Atteweld, VU University Amsterdam, Netherlands
Discussant: Tieme Janssen, VU University Amsterdam, Netherlands

The effect of brain stimulation on learning when taking into account the neural correlate

Presenting Author: Rui Cohen Kadosh, University of Oxford, United Kingdom

Fluid cognitive skills, such as working memory, reasoning, and mathematics, are critical in most academic settings. Current attempts to improve cognitive skills in children and adults have yielded mixed results and limited evidence of transfer beyond the immediate cognitive training materials. These failures have led some to suggest that cognitive skills are fixed. Another suggestion is that these failures are due to suboptimal approaches to exploit neuroplasticity. An innovative method to modulate neuroplasticity is using brain stimulation, with the assumption that concurrent brain stimulation and cognitive intervention interact synergistically, enhancing the benefits derived from the intervention. The present experiments examined how progress in learning where related to the effect of brain stimulation at the neural level. The experiments were conducted in two sample sizes, one in children and one in adults on arithmetic learning. The effect of brain stimulation was varied as an independent variable, but varied as a function of the neuronal system we tried to affect. The results lead to the idea that a consideration of the neurocognitive factors characterising the individuals in the experimental design can lead to a much clearer understanding of effects than considering only the group they belong to. This approach yields advancement at the basic and translational level. It would enable the improvement and individualisation of interventions, and produce a better understanding of the underlying neurocognitive mechanisms.

Can Electrical Brain Stimulation (IES) Improve School-related Learning? A Meta-analysis

Presenting Author: Michael Schneider, University of Trier, Germany
Co-Author: Bianca Simonsmeyer, University of Trier, Germany

The search for more effective learning techniques has been a quest of humanity since time immemorial. Recently, researchers have started evaluating whether stimulating the brain noninvasively with a weak and painless electrical current (Brain Stimulation) can enhance short-term memory, cognitive, or assessment performance, what has attracted massive public interest. Here, we present the first meta-analytic test of the hypothesis that IES before or during a learning phase is more effective than placebo or no treatment, as an assessment, because IES enhances learning through long-term potentiation. The meta-analysis included 546 effect sizes from studies on language or mathematical competence. As predicted, the effect of IES was much stronger for the stimulation during a learning phase (d = 0.712) as compared to the stimulation during an assessment phase (d = 0.207). The effect was stimulation- dosage specific and, in line evidence for the modulation of long-term synaptic plasticity by IES in the context of practically (e.g. school) relevant learning tasks and highlights the need for more systematic evaluations of IES in educational settings.

IES of the auditory cortex to enhance basic acoustic learning processing abilities in dyslexia

Presenting Author: Tina Zehle, Otto-v.-Guericke University Magdeburg, Germany

Transcranial electrical stimulation (IES) has become a valuable research tool for the investigation of neurophysiological processes underlying human action, cognition and perception. In recent years IES has been also successfully applied to alter human auditory cortex reactivity, its related individual spectro-temporal processing abilities and acoustic speech perception (Heiraths et al., 2016a). These findings strongly implicate IES application as a therapeutic tool on auditory and speech-related disorders such as dyslexia. In this presentation I will give an overview over the spectrum from basic research on auditory IES in healthy populations through to pilot data on improved acoustic processing abilities in adults and adolescents with dyslexia.

IES for cognitive enhancement of healthy minors: A complex governance challenge

Presenting Author: Jantien Schuijer, VU University Amsterdam, Netherlands

The use of cognitive enhancers for educational purposes has drawn increasing academic and public attention over the last years. Currently, pharmaceuticals are the most widely discussed enhancement method in the literature, but new evidence suggests that methods based on Transcranial Electric Stimulation (IES) have some potential as cognitive enhancer as well. Just like pharmaceutical enhancers, the availability and education-related use of IES-devices raises a broad range of ethical, legal and societal issues that need to be addressed by policy-makers. Few studies, however, have specifically studied these issues in relation to child wellbeing. In this systematic review, we explore the issues for child wellbeing that could arise from the availability and education-related use of IES-devices by healthy minors.
We demonstrate that the issues form a complex web of expectations and concerns, which are united by high levels of factual uncertainty and moral diversity. Little is known yet about the working mechanisms of IES and its (long-term) effect on healthy developing brains, and different perspectives towards virtues such as autonomy and authenticity lead to discussions on whether certain enhancement effects would be desirable, and whether potential risks would be acceptable. We argue for a responsible innovation approach, which encourages an adaptive attitude towards emerging knowledge and dynamic societal values, to deal with the identified issues regarding IES-based enhancement appropriately.

Session E 128
30 August 2017 12:00 - 13:30
Main Building E - E301
Invited Symposium

Factors Fostering Metacognitive Monitoring and Control

Keywords: Educational Psychology, Experimental studies, Informal learning, Metacognition, Reading comprehension, Science education, Self-regulation

Interest group: SIG 16 - Metacognition

Organiser: M. van der Ven, Utrecht University, The Netherlands

Discussant: Hee-Woon Kim, Simon Fraser University, Canada

Analyzing监控 and disfluency: The role of fluency-contrasts

Presenting Author: Elisabeth Pfeifer, Technical University of Munich, TUM School of Education, Germany

Co-Author: Christoph Mengelkamp, University of Wurzburg, Germany

Co-Author: Maria Bannert, Technical University of Munich, Germany

Monitoring is essential in educational contexts: If students monitor learning in an analytic way, they can initiate adequate control and thus improve performance. The aim of this study is to investigate if disfluency affects analytic monitoring and if fluency-contrasts moderate the effects of disfluency on monitoring and performance. Based on prior research, we expected fluency-effects (differences between fluent and disfluent material) when a fluent text is presented before a disfluent text (contrast fluent-disfluent). Inversely, when a fluent text is presented before a fluent text (contrast disfluent-fluent), no fluency-effects on monitoring and performance are expected. To test these hypotheses, students learned from a disfluent and afterwards a fluent text or conversely (type of contrast as a between manipulation). In Experiment 1, fluency was manipulated by letter deletion, and in Experiment 2, fluency was manipulated by font type (fluency as a within manipulation). In order to capture monitoring, students made different types of judgments during learning. Results from both experiments show that students made equal judgments for the fluent and the disfluent text when they experienced contrast disfluent-fluent. Inversely, students who experienced contrast fluent-disfluent made lower judgments for the disfluent than for the fluent text in both experiments. Similarly, lower performance for the disfluent than for the fluent text was found only for contrast fluent-disfluent but not for contrast disfluent-fluent. Thus, students’ monitoring as well as their performance is moderated by the type of contrast in fluency. To foster monitoring in educational settings further moderators of metacognitive processes should be investigated.

Feedback Improves Kindergartners’ Self-Monitoring and Self-Rewarding

Presenting Author: Mariette van Loon, University of Bern, Switzerland

Co-Author: Claudia Roebers, University of Bern, Switzerland

Young children have problems accurately monitoring their performance; they are typically overconfident and not aware of their errors. This is disadvantageous for their learning. The present study aimed to investigate whether two types of feedback, performance feedback and metacognitive feedback, may be suitable to improve kindergartners’ monitoring accuracy and self-rewards. Kindergartners (n = 105, mean age 5.8 years) completed six analogical reasoning tasks, made monitoring judgments (indicating for each item whether they thought their response was correct or incorrect), and then gave themselves reward points for each completed task (indicating how many gold coins they deserved for their performance). Children were randomly assigned to performance feedback (PF), metacognitive feedback (MF), and no-feedback (NF) groups. Results show that kindergartners were overconfident, and did not recognize most of their errors. Importantly, feedback improved self-monitoring and self-reward judgments in comparison to the NF control group. The children who received PF or MF were better able to recognize their errors, and PF was most effective to improve kindergartners’ self-rewarding. Findings indicate that feedback, and especially PF, can improve monitoring accuracy, error detection, and realism of self-rewarding in the pre-school context.

Does access to the Internet foster or bias metacognitive judgments?

Presenting Author: Stephanie Plesni, University of Newcastle, Germany

It is an open question if access to the Internet fosters or biases meta (cognitive functioning. For example, Fischer, Goudd, and Keil (2015) showed that Internet access in one task caused higher knowledge estimates regarding a second unrelated task. This experiment replicates and extends this research. In a 2 x 2 between-subject experiment participants (n = 184) were assigned Internet or no Internet conditions in each of two phases. In phase 1, they metacognitively judged their ability to answer four explanatory questions. In phase 2, they metacognitively judged their ability to answer questions regarding six unrelated themes, predicted their ability to answer eighteen questions within these themes, answered two of these questions, and postdicted their performance. Contrary to previous finding, the results show that Internet access hardly affected metacognitive judgments on subsequent unrelated tasks. Phase 1 Internet participants only judged their ability to answer explanatory questions higher than no Internet participants in phase 1; phase 2 Internet participants only had higher metacognitive judgments regarding phase 2; there was only one significant interaction. Participants’ open answers have not yet been fully analyzed. Thus, results regarding performance and accuracy of metacognitive judgments are still pending. This experiment will contribute to the discussion regarding the (positive or negative) effects of digitalization on metacognition. For example, the results may be relevant for Internet users’ motivation to participate in formal learning opportunities provided by schools and universities.

Self-Regulated Learning and Agenda-Setting: How Difficulty and Reward Affect Study Decisions

Presenting Author: Anke de Bruin, Maastricht University, Netherlands

Co-Author: Lucia Falbo, Maastricht University, Netherlands

Co-Author: Peter Stiers, Maastricht University, The Netherlands

Co-Author: Tamara Van Gog, Utrecht University, Netherlands

How do students select what information to study and what to skip? Self-regulated learning requires continuous decision making, including being able to selectively pay attention to the most important information to learn (Björn, Dunlosky, & Kornell, 2013; Pintrich, 2004). Most research and theory development in this field has looked at the effect of difficulty of to be learned information (e.g., Dunlosky & Hertzog, 1998; Metcalfe, 2002). More recently, research has shown that students develop an agenda when deciding how to allocate study time, with the goal to maximize results with the adequate effort. Besides task difficulty, this agenda takes into account other factors, such as the reward structure of the task. How students balance these factors when making decisions on what to learn versus what to skip is a question for empirical research. In the present study, we investigated how adolescents (12-13 years and 16-17 years) take into account task difficulty and reward when making study decisions. After deciding to be 50% of their study time on easy or hard work, participants actually studied the word pairs and tested on all of them. Our results show that both age groups took into account difficulty and reward separately, but could not combine the two. The lower error rate on word pairs labelled difficult but in fact easy shows that students translated their agenda setting effectively into studying.

Session E 129
30 August 2017 12:00 - 13:30
Main Building A - A07
Invited Symposium

Interaction-based interactions that transform learning: engaging in research with social impact

Keywords: Argumentation, Cognitive development, Cognitive skills, Collaborative Learning, Conversation / Discourse analysis, Design-based research, E-learning / Online learning, Emotion and affect, Interdisciplinary, Literacy, Peer interaction, Reading comprehension, Reasoning, Social aspects of learning and teaching, Social interaction, Teacher Professional Development

Interest group: Organiser: Rocío García-Carrion, University of Deusto, Spain

Discussant: Auli Toom, University of Helsinki, Finland

Characterizing learning to learn together skills with web 2.0 technology

Presenting Author: Manoli Pitare Turro, University of Liieda, Spain

Co-Author: Li Li, University of Exeter, China

This article develops our understanding of ‘Learning to Learn together (L2L2)’ skills with their technology and role to promote learning and development in primary education. To this end, our paper is grounded on literature review of previous work to identify distributed leadership, group reflection, group assessment and mutual engagement as valuable L2L2 skills to learn in the digital age. To situate this discussion and examine how L2L2 skills emerge in practice, our work continues by reporting on an empirical study with primary-aged students. They worked in pairs through face-to-face interaction using wiki and besides they interact through wiki with two other pairs to write a joint science text. In order to align pedagogy and technology affordances to promote L2L2, our wiki project used ‘Thinking Together’ approach to support students to create a discursive space to develop L2L2 skills and co-construct new understanding in the wiki science project. Our results illustrate how the interaction around wiki can afford students to be engaged in dialogues that promote the emergence of the L2L2 skills. Main features of each L2L2 are exemplified. Educational implications about how teaching can support the development of L2L2 skills using web 2.0 technologies are presented and discussed.

Teacher collaboration as a central axis of the staff-development model Peer Learning Network

Presenting Author: Ester Miquel, Universitat Autònoma de Barcelona, Spain

Co-Author: David Duran, Universitat Autònoma de Barcelona, Spain

Co-Author: Marta Flores, UBAB Universitat Autònoma de Barcelona, Spain

This paper presents research that describes an in-service teachers’ staff development model, Peer Learning Network (PLN) and shows results on its efficiency. PLN is a three-year cycle of training, aimed at helping schools involved in the network to incorporate Reading in Pairs, a peer-tutoring educational programme to improve reading comprehension.

Results from twenty schools from one network in Spain show the effects of the achievement of students’ learning, on teacher learning in both concepts and attitudes, on the decisions that teachers make to adjust the programme to their particular context, and on the supports needed for success. This staff-development model has been shown to be an effective and efficient way to help teachers introduce and use.
in a sustained way, a method of cooperative learning in their classrooms. PLAN promotes three levels of peer learning simultaneously (among students, teachers, and schools), however, teacher collaboration is the central axis to make it work.

**Exploring the impact of Reading and Sharing upon Autobiographical and Emotional Memory**

**Researcher:** Carolina Moreno Plaza, Loyola Andalucía, Spain
**Co-Author:** Leire Ugaiide, UPV/EHU, Spain
**Co-Author:** Lidia Puigvert, University of Cambridge, UK, Spain
**Co-Author:** Carmen Martín-Gómez, Universidad Loyola Andalucía, Spain

Among the causes for gender violence among youth, research has shown a link between attraction and violence that is learned through socialization. Once violent intimate relationships have been experienced, memories of those -with their associated emotions- become the ground to perceive next intimate experiences, and make decisions accordingly. Nonetheless, the fact that autobiographical memories are malleable opens up a window into a new area of scientific inquiry and intervention from where to prevent gender violence among youth. Starting from the relevance of social experience in the reconstruction of memories, we examined in a sample of Spanish female college students (n = 32, age range 17-30) whether reading a scientific text on love (Gómez, 2015), which emplıes violence of attractiveness, modıfied the autobiographical memories of violent sexual affective relationships, towards rejection. This was compared with a control group (n =31, age range 17-30) upon which no intervention was applied. Memory reports were collected before and after the reading and coded to analyze their emotional content. Memory quality features were assessed with a memory quality questionnaire (Aka & Bluck, 2007). Compared to controls, the experimental group experienced a significant increase in critical memories after the reading, as well as average decrease in positive emotions and average increase in negative emotions, together with higher memory sharing. This did not occur in the controls. The results are discussed in terms of the role of certain language and interaction experiences upon autobiographical memory reconstruction, and the power of this for preventing gender violence in secondary schools.

**Impact of Interactive Groups & Dialogic Literary Gatherings on learning gains & prosocial behaviour**

**Presenting Author:** Rocío García-Carrion, University of Deusto, Spain
**Co-Author:** M. Louise Villanueva Universidad de Deusto, Spain
**Co-Author:** Zoe Martinez de la Hidalga, Universitat de Deusto, Spain

European research under the 6th and 7th Framework Programmes (INCLUD-ED, 2006-2011; ChiPPE, 2013-2015) identified a number of ‘Successful Educational Actions’ (SEA) which have resulted in school success in many diverse contexts, and can contain universal and transferable components. Two SEAs, Dialogic Literary Gatherings (DLG) and Interactive Groups (IG), typically create dialogic learning environments -in a whole-class setting or in small groups- and bring family and community members into classrooms to support children’s learning. This paper aims at analysing the mechanisms –promoted by DLG and IG- in teaching and learning that can achieve simultaneous success both in linguistic and mathematical competence, exploring the impact that each of these actions, have upon each other. Besides, we seek to unveil the extent to which these improvements are achieved while increasing prosocial behaviour. A quasi-experimental process–product study with training and implementation phases has been conducted in three schools in Spain. Quantitative and qualitative data, including pre- and post- testing of students’ mathematical and reading comprehension, and prosocial behavior, have been collected. Initial and final interviews with intervention teachers and children have been carried out. Preliminary analysis of the pre-post assessments on reading comprehension revealed an improvement on children’s level after 10 sessions of DLG.

**Session E 130**

30 August 2017 12:00 - 13:30
Main Building D - D14
Invited Symposium
Higher Education

**What do we know about academic work today?**

**Keywords:** Assessment methods and tools, Doctoral education, Mixed method research, Neuroscience, Qualitative methods, Researcher education, Workplace learning, Writing / Literacy

**Presenting Author:** Christopher 352 24 - Researcher Education and Careers
**Discussant:** Anna Sala-Bubari, Universitat Ramon Llull, Spain

**Writing and Faculty Identity Development**

**Presenting Author:** Montserrat Castaño, Universitat Ramon Llull, Spain

This presentation focuses on results from two recent studies aimed at understanding how faculty identity development is related to a differential use of teaching and research writing genres and whether this development follows different paths, on the basis of faculty perceptions regarding what they consider their main goal at university and their preferred sphere of activity (teaching or research). Participants (N = 67) answered the online survey Faculty identity and academic writing focused on three dimensions: genres use (Likert scale), spheres of activity participation (multiple-choice) frequent activities performed in each of the spheres (open-ended). A mixed-method design combining quantitative and qualitative data analysis was used. Two non-consecutive steps of analysis were followed to establish a) the frequency of the genres used by faculty, the main goal at University and their preferred sphere of activity, b) whether they were significant differences between those variables (Mann-Whitney U). Qualitative data analysis implied a bottom-up content categorization analysis. Results showed that faculty’s perceptions regarding their main goal at university (research) were not in alignment with their preferences (teaching). Writing genres used and activities reported closely mirror preferred spheres of activity and mismatch faculty’s perceptions of their main goal at universities. This mismatch generates tensions and contradictions in the development of their professional identity that should be taken into account in institutional career development initiatives.

**Forming academics in practice: acknowledging multiple trajectories and expectations**

**Presenting Author:** Angela Brow, Macquarie University, Australia
**Co-Author:** David Boud, University of Technology Sydney/ Deakin University, Australia

**What shapes academics? What influences their development, and how do they interpret facet of the environment in which they operate? A large-scale survey and interviews with academics in England and Australia focused on how academics interpret facets of the university context as either encouraging or inhibiting their development demonstrates how they negotiate tensions arising from different discourses and expectations. This paper argues that academic career development needs to take account of the construction of work which lies between teaching and research. Academics’ focus of attention and their modes of reflexivity vary and those they respond in shaping their jobs. Career development takes place within work. There are mismatches between intended developments and how they are perceived on the ground. It suggests that changes in workplace practices may be more effective in career development than training courses.**

**Dynamics of Decision Making in Grant Panels**

**Presenting Author:** Inge Van der Weijden, Leiden University, Netherlands

**External grants are ascribed a very high symbolic value in academia as they provide researchers with both financial and symbolic resources, consequently affecting career opportunities. However, difficulties arise in the process of panel decision-making, when selection criteria need to be concrete and explicit to enable comparison. Having to choose between many applicants of similar quality makes the selection process liable to subjectivity, arbitrariness, and randomness. In addition, panel reviewing entails social interaction which suggests that group dynamics could influence the selection process. By interviewing scholars and adding insights from social psychology literature we identified factors affecting decisions in grant panels. Examples are panel composition, group norms, motivation, and information distribution.**

**The outcomes of the study could be used to improve transparency, fairness and legitimation of talent selection processes.**

**The completion of an interdisciplinary PhD and the professional trajectories**

**Presenting Author:** Kent Holley, University of Alabama, United States

Interest in interdisciplinary programs in STEM related fields at the graduate degree level is widespread across higher education. Such programs are seen as innovative, offering students, faculty, and future employers new ways to engage in the production and dissemination of knowledge. Using longitudinal qualitative interviews, this article considers the early career experiences of scholars who hold an interdisciplinary PhD in neuroscience. The scholars were interviewed first as doctoral students and then six years later. The initial and follow-up transcripts provided insight into individual decision making, external influences, and professional trajectory. The findings illustrate the challenges of marketability, professional development, and balancing personal and career demands for interdisciplinary PhD recipients in STEM related fields.

**Session E 131**

30 August 2017 12:00 - 13:30
Main Building E - E222
Invited Symposium
Higher Education, Learning and Social Interaction

**The unit of analysis in learning research: Approaches for imagining a transformative research agenda**
Language as construction of actionable concepts: A multimodal blending perspective

Presenting Author: Lina Markauskaite, The University of Sydney, Australia
Co-Author: Peter Goodyear, The University of Sydney, Australia

In mainstream cognitive research, ‘formal concepts’ usually serve as the main unit of analysis for investigating students’ conceptual learning. Accordingly, conceptual understanding is often seen as a capacity to take an already acquired formal concept and transfer it to a new situation, by recognising structural commonalities and using analogy. We use our research into how pre-service (student) teachers develop this capacity to show that their capacity to use concepts in new situations and to draw on previous work cannot be understood as a simple transfer of formal concepts to new situations. Rather, actionable conceptual understanding, or concepts that are used in action, involve a capacity to construct situated conceptualisations dynamically: by selecting, projecting, mapping and blending relevant conceptual features with materials that come from different domains. The presentation will show that the instructional focus of blending (Fauconnier & Turner, 1998; Hutchins, 2005), we show that construction of multimodal blends serves as a productive unit of analysis for investigating conceptual learning for professional action.

Integrating units of analysis: Applying mixed methods social network analysis

Presenting Author: Judith Schoonenboom, University of Vienna, Austria
Co-Author: Dominik E. Freistich, University of Vienna, Austria

Learning from others (Eraut, 2007) is studied at several levels—for instance, learners’ attributes (e.g., motivation), others’ attributes (e.g., their competencies, accessibility), features of the relationships (e.g., reciprocity, frequency) or the broader context (e.g., cultural influences). The Multileveled, Multiscale (MTML), framework by Monge and Contractor (2003) suggests considering multiple units of analysis by using both psychometric and sociometric data and respective analytic research methods. We discuss three units of analysis at which a network of learning relationships may be studied: The micro-level that concerns individual learners and their position in their learning network, the meso level that focuses on individuals’ embeddedness in dyads and triads, and the macro level of broad-scale influences, such as properties of the learning network as a whole or cultural influences. We propose that these levels help explain under what circumstances a learning relationship between two persons is present and what quality that learning relationship has. These circumstances may vary at several levels and may stem from network or non-network sources. Furthermore, we show how mixed methods social network analysis (MMNSNA) allows researchers to take an integrative perspective on the multiple levels and units of analysis involved in learning from others. In the presentation, we demonstrate this by using a dataset of students’ learning activities within a university classroom, which has been collected specifically for this purpose.

chrono - researching contextual groundings of learning: Principles for the unit of analysis

Presenting Author: Giuseppe Rotella, University of Helsinki, Italy
Co-Author: Antti Rajala, University of Helsinki, Finland

The aim of this paper is to discuss principles for defining units of analysis from a sociocultural standpoint, in studies adopting the Bakhtinian concept of chronotope. Chronotope was initially devised by Bakhtin to analyse the space-time frames of literary text and has later been adopted by a growing number of researchers to study how space-time frames function as a ground for learning and different learning in different sites. Chronotopes are defined as socio-emergent configurations of space-time, where both discursive and material aspects of space-time relations are considered. We argue that there is a wide range of units of analysis that can be defined, related to the needs of the study. However, in order to define a unit that is consistent with the theoretical premises of the notion of chronotope we suggest that three principles should be met: (i) chronotopic analysis needs to address the dialogical and contextual nature of learning; (ii) the unit of chronotopic analysis needs to capture time and space in their interdependent unit; and (iii) the unit of analysis needs to be defined to address the specific analytic scale of the study. To illustrate our claims, we will use examples taken from empirical studies of secondary education teachers’ and students’ work. Overall, our presentation contributes to the creation of methodological tools for defining the emergent concept of chronotope to research the contextual grounding of learning.

Lived experience as a unit of analysis: towards a second-person approach for learning research

Presenting Author: Dianmare Giles, Universite Montpellier, France
Co-Author: Sandra Nigry, Universite Montpellier, France
Co-Author: Magali Ollagnier-Belame, Universite Montpellier, France
Co-Author: Yannick Cadiot, Universite Montpellier, France

In order to track individual learning processes in ecological situations, we developed a research framework within the theoretical perspective of enactivism. We adopt individual experience as a fundamental unit of analysis, defined as an ongoing process which is lived “from within”. In this paper, we present methodological procedures matching this unit of analysis. We hope that the potential of a second-person approach, in which accounts of lived experience are relatively constituted.

In several studies, explicit interviews and video self-confrontation were employed to collect verbal reports and to overcome the pitfalls of spontaneous reports: video records in situ and written tracts comparing video excerpts. After analyzing these tapes, we firstly performed a comprehensive analysis, which strived to keep close to the agent perspective; secondly, a comparative analysis which focused on categories related to the research questions. Such an approach allows investigating the widespread, and yet disregarded, silent activity engaged by the learner during their practice. In this analysis, activities appears to be shaped by complex imbrication of different actions (e.g. listening, taking notes, etc.) regarding different dynamical perturbations (e.g. talks, slides, notes, etc.) “backtracking” (retroactively thinking to what was previously expressed) is frequent. It allows to analyze the cognitive and affective processes a learner is engaged in through the lens of the enactivism. Therefore it brings forward the potential of methodological tools that allow a deeper understanding of the teaching-learning process. Finally, choosing lived experience as unit of analysis, allows investigating some aspects of the collective level of learning situations by working “outwards”, from individual experience to collective activity.

The Learning Sciences: Topics and Trends in Research, Methodology and Practice

Keywords: Computer-supported collaborative learning, Content analysis, Design based research, Inquiry learning, Interdisciplinary, Knowledge creation, Learning approaches, Motivation and emotion, Psychometrics, Qualitative methods, Quantitative methods. Social aspects of learning and teaching, Interaction / teaching, Instruction, Teaching approaches, Technology, Video analysis

Presenting Author: Susan Goldman, University of Illinois at Chicago, United States

As a field, the Learning Sciences draws on many disciplines and fields of research and scholarship. This presentation reflects advances in findings to date and directions for future research among the diverse learning sciences communities. We draw on human sciences, environments and environments to laboratory situations), both formal and informal. Included in the discussion are cognitive, sociocultural and neurocognitive, embodied (grounded) cognition, and complex systems perspectives on learning. As well trends are reported for work on expertise and learning progressions for learning problem and solving multiple small and multimedia levels of information, situated in different disciplines. Finally, attention is drawn to contemporary conceptualizations of metacognition and regulation of learning, epistemic cognition, motivation and engagement, and individual and collective knowledge building. Throughout, major emphasis is on the intersections of these trends with issues and concerns of the learning sciences.

Learning in design of learning environments for complex learning

Presenting Author: Frank Fischer, Ludwig Maximiliane-Universitat (LMU), Germany

Learning sciences research has been focusing on approaches to supporting learning through the design of complex learning environments in formal and informal settings for learners across the lifespan. Consistent with the emphasis in the Learning Sciences there is a focus on pedagogies for complex and robust learning and on ways to support these pedagogies with technology. This contribution will include a review of the research approaches and findings in the field of Computer-Supported Collaborative Learning. Here, the phenomena addressed range from dyads that solve a physics problem together with the support of computer tools to mass collaboration in Wikipedia or in big online courses like MOOCs. Moreover, this contribution covers exemplary advances in approaches to supporting active learning, including apprenticeship learning, inquiry learning, example-based learning, scaffolding, learning in the workplace, mobile computer support for collaborative learning, learning from productive failure. As well, pedagogy for supporting simulation and modeling, and instructional design using the 4C/ ID framework are discussed. Trends for the future are presented for several key areas.

Research Methods and Analytic Strategies

Presenting Author: Louis Gomez, UCLA, United States
Co-Author: Robert Reiner, University of Sydney, Australia
Co-Author: James Pellegrino, University of Illinois at Chicago, United States

The given array of perspectives, contexts, and topics of research in the Learning Sciences, researchers rely on multiple methodologies and analytic strategies. This presentation covers both different types of qualitative and quantitative approaches and a range of case studies that illustrate particular trends and methodologies. Included are mixed methods and approaches to design-based research and design-based implementation research, both of which are considered relatively unique methodological characteristics of the Learning Sciences. The presentation also discusses ways in which multiple perspectives and research approaches can be integrated and how these interact with more traditional content and ethnographic methods for interactional analyses. Increasingly, the Learning Sciences is calling on various physiological and behavioral measures as well as contemporary approaches to assessment for learning, statistical methods for multilevel and mixed model analysis, and learning analytics as situated in the technologies of the Learning Sciences.

Advances and trends in teaching the Learning Sciences

Presenting Author: Friede Vogt, Technische Universität München, TUM School of Education, Germany
Co-Author: Daniel Sommerhoff, Ludwig-Maximilians-Universität (LMU), Germany

The Network of Academic Programs in the Learning Sciences (NAPLeS) is an international network of PhD and Master’s programs in the Learning Sciences. Founded in 2012 by members of the ISLS, a main goal of the NAPLeS network is to support and better coordinate the teaching and learning programs being run at over 40 universities. Currently, programs from over 35 countries and over 250 universities are NAPLeS members. Over the past several years, NAPLeS sponsored a series of online webinars. The success of these spanned the creation of short videos and interviews with more than 50 leading Learning Scientists. Both the webinars and videos are available thru the NAPLeS website (http://naples.isls.org). This presentation describes the NAPLeS network and the available resources.

In the second part of the presentation, results from a recent study on the trends in teaching the Learning Sciences will be presented. The main idea of the study was to identify the topics and methods that currently constitute Learning Sciences programs internationally and contrast them. Preliminary results of this analysis show a great diversity regarding methods, topics and disciplines involved in teaching the Learning Sciences.
KEYNOTES - PART 1 133
30 August 2017 13:45 - 15:15
Main Building A - Main Auditorium
EARLI Keynote Session
Learning and Instructional Technology
The Power of Learning Analytics: Is There Still a Need for Educational Research?
Keywords: E-learning, Online learning, Educational Technology, Learning analytics, Quantitative methods
Interest group: SIG 27 - Online Measures of Learning Processes
The Power of Learning Analytics: Is There Still a Need for Educational Research?
Presenting Author: Bart Rienties, Open University UK, United Kingdom
Across the globe many institutions and organisations have high hopes that learning analytics can play a major role in helping their organisations remain fit-for-purpose, flexible, and innovative. A broad goal of learning analytics is to apply the outcomes of analysing data gathered by monitoring and measuring the learning process. Learning analytics applications in education are expected to provide institutions with opportunities to support learner progression, but more importantly provide personalised, rich learning on a large scale. Substantial progress in learning analytics research has been made in the last few years. Researchers in learning analytics use a range of advanced computational techniques (e.g., Bayesian modeling, cluster analysis, natural language processing, machine learning) for predicting which learners are likely to fail or succeed, and how to provide appropriate support in a flexible and adaptive manner.

In this keynote, I will argue that unless educational researchers at EARLI embrace some of the key principles, methods, and approaches of learning analytics, educational researchers may be left behind. In particular, a main merit of learning analytics is linking large datasets of actual learning processes and outcomes with learning dispositions and learner characteristics. Using evidence-based approaches rapid insights and advancements are developed how learning designs and learning processes can be optimised to maximise the potential of each learner. For example, our recent research with 151 modules and 133K students at the Open University UK indicates that learning design has a strong impact on student behaviour, satisfaction, and performance. Learning analytics can also drive learning in more “traditional”, face-to-face contexts. For example, by measuring emotions, epistemological expressions, and cross-cultural dialogue, social interactions can be effectively supported by innovative dashboards and adaptive approaches. I aim to unpack the advantages and limitations of learning analytics and how EARLI researchers can embrace such data-driven research approaches.

KEYNOTES - PART 1 134
30 August 2017 13:45 - 15:15
Tampere Hall - Big Auditorium
EARLI Keynote Session
Teaching and Teacher Education
Moving Beyond Rhetoric: A Culture to Substantiate Research Based Teacher Education
Keywords: Action research, Professions and applied sciences, Researcher education, Teacher Professional Development
Interest group: SIG 11 - Teaching and Teacher Education
Moving Beyond Rhetoric: A Culture to Substantiate Research Based Teacher Education
Presenting Author: Kari Smith, Norwegian University of Science and Technology (NTNU), Norway
European, as well as national steering documents, including Norwegian (Ostrem & Smith, 2012; Ostrem, 2016) call for a research based teacher education. Finland is, perhaps, the country that has most profoundly substantiated the concept (Niemi, Toom & Kallioniemi, 2012; Niemi & Navigi, 2014; Hikka & Eläispero, 2014; Salberg, 2014; Krookos et al, 2015).

It is, however, not always clear what is meant by a research based teacher education, or what the policy makers’ intentions are when writing the documents. The danger is that the message rests in the rhetoric and is not being subjected to a profound analysis of the notion prior to being translated into practice.

In this presentation I will first argue that teacher education is a career long education, and it is time to move beyond the idea that teacher education is a synonym with initial teacher preparation for the profession. This view aligns with European documents (OECD, 2010; The Teaching Council, Ireland, 2011). Next I will explore who the teacher educators are, especially since in many contexts the practical component of initial teacher education is extended and school-based teacher educators play an increasingly important role in preparing new members of the teaching profession.

Against this backdrop, the main part of the presentation discusses the concepts of research-based teacher education, with a focus on consuming and producing research as an integrated part of a career-long teacher education. There is a need to go beyond the rhetoric and create a culture for research in teacher education at a national and at an institutional level by empowering all actors, teacher educators as well as students of teaching, to become research literate. I will also argue that practitioner research plays a central role in a research based teacher education and discuss the difficulties in legitimising this kind of research in the academic community. There are still several challenges to substantiate a research based teacher education that needs to be further explored in policy discussions as well as in research.

KEYNOTES - PART 1 135
30 August 2017 13:45 - 15:15
Tampere Hall - Small Auditorium
EARLI Keynote Session
LifeLong Learning
Preparing Lifelong Learners. Student Learning in Higher Education and Beyond
Keywords: Learning approaches, Lifelong learning, Student learning, Workplace learning
Interest group: SIG 14 - Learning and Professional Development
Preparing Lifelong Learners. Student Learning in Higher Education and Beyond
Presenting Author: David Gijbels, University of Antwerp, Belgium
Education is facing challenges today in educating students to become life-long learners and versatile experts. Successful learning in this perspective assumes students to be involved for instance in ‘deep learning’. Over the past decades, a large amount of research has been conducted on how students approach their learning in (higher) education and in the transition to the workplace.

Although students are expected to develop more ‘deep learning’ during their studies, research concerning the development is not always pointing into that direction. In my lecture, I will discuss longitudinal research in this field and will argue that both conceptual and methodological factors might be important explanations for some of the contradictory findings.

I will conclude with research from our own research group in which we try to take into account these factors by looking to learning at different levels (task level, course level and general level) and by combining self-report measures (such as questionnaires and interviews) with online process measures (such as eye-tracking).

Session F 136
30 August 2017 15:45 - 17:15
Main Building A - A3
Single Paper
Higher Education
Paper Presentation: Higher Education
Keywords: Assessment, Assessment methods and tools, Cognitive skills, Competencies, Content analysis, Higher education, Instructional design, Quantitative methods, Reflection, Student learning, Survey methods
Preparation in teaching - Teaching and research
Interest group: SIG 04 - Higher Education
Chairperson: Lotta Uusitalo-Malmivaara, University of Helsinki, Finland
Non-cognitive skills as admission criteria for university: A systematic review
Keywords: Achievement, Assessment methods and tools, Cognitive skills, Higher education
Presenting Author: Tine Nielsen, University of Copenhagen, Denmark
Co-Author: Uba Sophie Fodererhsen, University of Copenhagen, Denmark
The aim of this review was to explore which non-cognitive skills (NCS) are used as alternative admission criteria (AAC) to higher education, that is alternative to grade point average, and the benefits of using NCS for this purpose. A systematic search of the databases REX, PsyCINFO, ERIC and Google Scholar resulted in a pool of 809 studies. A screening according to five inclusion criteria resulted in a final number of 46 studies investigating 9 different ready defined NCS as AAC and a further 11 different NCS-like AAC. Analyses showed that NCS in most studies were able to predict academic performance at university and that NCS had an attrition protective effect resulting in fewer students dropping out. The NCS and NCS-like AAC that predicted academic performance at university the best were found to be-
efficacy and admission interviews. The NCS and NCS-like AAC that most strongly predicted attrition at university were found to be personality traits and a secondary quota procedure with diverse content. The findings of this review emphasize why it is important to study NCS as admission criteria within a higher educational context. Thus, using NCS as a sole admission procedure or in combination with cognitive measures holds promise both research-wise and in relation to student performance and attrition.

Keywords: Review, non-cognitive skills, admission criteria, higher education, academic success, dropout

The R-Comp - A New Instrument to Assess University Students' Research Competences

Keywords: Competencies, Higher education, Quantitative methods, Synergies between learning - teaching and research

Presenting Author: Franziska Boettcher, Freie Universität Berlin, Germany

Co-Author: Felicitas Thiel, Freie Universität Berlin, Germany

University students' research competences can be encouraged by research-oriented teaching. The purpose of this study is to introduce a valid instrument for the evaluation of research-oriented teachin in higher education in various academic disciplines. This new instrument (R-Comp) has been developed on the basis of the RMPC-K-model (Authors, 2014) consisting of five dimensions: skills reviewing the state of research, methodological skills, skills in reflecting on research findings, communication skills, and content knowledge. In order to examine the underlying factor structure of the R-Comp, factorial validation was performed. Data were collected from 391 university students in their Bachelor's or Master's degree and PhD programs from various academic disciplines. Results of confirmatory factor analyses showed first evidence for the instrument's intended factor structure. Sub-dimensions could be identified for all dimensions. There is some first evidence of a valid assessment of student research competences on the basis of a generic competence model. Future directions as well as potential application contexts are presented.

Development and validation of the Reflection in Business Education Questionnaire (RIBEQ)

Keywords: Higher education, Reflection, Student learning, Survey Research

Presenting Author: Luci Gommer, University of St.Gallen, Institute of Business Education and Educational Management, Switzerland

Co-Author: Tobias Jenert, University of St. Gallen, Switzerland

Co-Author: Taiga Braham, University of Tübingen, Germany

Co-Author: Dietrich Wagner, Institute of Business Education and Educational Management, Switzerland

Student reflection is considered both a crucial feature of high-quality learning as well as an important objective in Higher Education. Despite its apparent relevance for educational practice, most of the research on reflection remains at a conceptual level (Boud & Walker, 1998; Mann, Gordon & MacLeod, 2007), whilst empirical research mainly focuses on measuring students' reflection levels. There is little empirical evidence going beyond case studies and qualitative accounts, regarding the effectiveness of specific interventions (e.g. portfolios) to develop reflective skills.

Thus, the purpose of this research was to develop and validate an instrument for measuring student reflection in Higher Education in general and business schools in particular. The questionnaire is designed to measure students' reflection in three dimensions: students' reflection levels, their attitudes towards reflection, and supporting and hindering factors influencing students' reflection processes. A pre-test was conducted at two different universities in Switzerland and Germany to validate the Reflection in Business Education Questionnaire (RIBEQ). In total, 64 students filled in the survey. Exploratory factor analyses and reliability tests showed satisfactory psychometric qualities of the RIBEQ.

This study can support further research on student reflection and its development. Also, the questionnaire can be used as a diagnostic instrument for business schools to trace students' development over time. From a practical point of view, it can also be applied to identify supporting and hindering factors at a particular higher education institution in order to develop practical interventions targeting these factors.

Key situations in service learning initiating reflection on civic engagement

Keywords: Content analysis, Higher education, Instructional design, Reflection

Presenting Author: Karl-Heinz Gerholz, University of Bamberg, Germany

Co-Author: Silvia Leicht, University of Bamberg, Germany

Co-Author: Andreas Rausch, University of Mannheim, Germany

Service learning can be described as an educational tool that is characterised by students giving service to the community and having a learning experience. Previous research has shown that service learning has the potential to promote personality development, especially in the sense of a sensitization for civic engagement. However, the findings of the empirical studies are ambiguous. While some findings show that service learning can foster an understanding of social issues and attitude to be engaged, others revealed no such effect. The reason for these inconsistent findings could be related to the applied method.

The considered studies have focused more on in a retrospective manner rather than on a process-oriented approach. In order to get a deeper understanding of the parameters relevant for sensitization, focusing on the process is very promising. Through a service learning course, the students may be confronted with social issues in different ways with different persons at different places. The aim of the present study is therefore to identify key situations and experiences that initiate thinking about civic engagement as a basis for sensitization. First results indicate that there are two main kinds of situations that initiate the reflection on civic engagement – social interaction and problem solving activities.

Session F 137

30 August 2017 15:45 - 17:15

Pini B - B3108

Poster Presentation

Teaching and Teacher Education

Poster Presentation: Teaching and Teacher Education

Keywords: Assessment methods and tools, Attitudes and beliefs, Case studies, Cognitive skills, Competencies, Computer-assisted learning, Educational Psychology, Mathematics, Out-of-school learning, Problem solving, Reasoning, Secondary education, Student learning, Survey Research, Teacher Professional Development, Teaching / instruction, Technology, Video analysis, Writing / Literacy

Interest group: SIG 11 - Teaching and Teacher Education

Organisation: Paul Wares, University of Cambridge, United Kingdom

Teachers’ epistemic thinking: Investigating effects of knowledge domains and educational fields

Keywords: Educational Psychology, Reasoning, Secondary education, Teaching / instruction

Presenting Author: Tessa van Schijndel, Leiden University, Netherlands

Co-Author: Nadra Saab, Leiden University, Netherlands

Co-Author: Amanda Berry, RMIT University, Australia

Co-Author: Jan van Driel, University of Melbourne, Australia

Recent developments in the field of education, such as the focus on inquiry-based approaches European Commission, 2007) and 21st Century Skills (Woog & Parejo Robin, 2010), ask for advanced levels of student epistemological understanding. However, in order for teachers to improve students’ levels of epistemic thinking, they need to show advanced levels themselves. Kuhn & Weinstock (2002, in Kuhn, Iordanou, Pease & Winkala, 2008) developed the definition of epistemic thinking in terms of the coordination between objective and subjective dimensions of knowing. Kuhn et al. (2008) investigated teachers’ epistemic thinking and besides finding evidence for a more general trajectory exploring development across domains, they also demonstrated a ‘specificity of content and context’ (Kuhn et al., 2008, p.447).

Therefore, the present study aimed at investigating secondary teachers’ epistemic thinking, taking into account different knowledge domains in which epistemic thinking is assessed (history and biology), as well as including teachers from different educational fields (sciences, humanities, and languages). We used Barzilai and Weinstock’s (2015) Epistemic Thinking Assessment (ETA) which was based on the theoretical perspective developed by Kuhn and colleagues. The ETA is a paper-and-pencil assessment, for which the reliability and validity have been investigated, and the measure allows for comparing epistemic thinking across knowledge domains (Barzilai & Weinstock, 2015). The study’s results are (momentarily being analyzed) and will bear relevance to the educational context by providing suggestions for teacher training in the area of epistemic thinking.

Development of Web-based Investigation System for Teachers’ Judgements on Students’ Performance

Keywords: Assessment methods and tools, Computer-assisted learning, Teacher Professional Development, Technology

Presenting Author: Kay Nakiga, The University of Tokyo, Japan

Co-Author: Kazuhiro Yamaguchi, The University of Tokyo, Japan

Co-Author: Hidekazu Kamishita, Tokkyo Medical University, Japan

Co-Author: Atsuo Iwai, University of Kyushu, Japan

Co-Author: Yurie Usaka, University of Tokyo, Japan

Co-Author: Masanori Nakagawa, Osaka Women’s University, Japan

To provide suitable instruction to their students, teachers have to predict their students’ learning performance accurately. Uesaka and Nakagawa (2012) proposed a new mathematical model for analyzing “teachers’ judgement”, which indicates the accuracy of teachers’ predictions of distribution of students’ performance. Based on this model, we are developing Web-based Investigation System for Teachers’ Judgements on Students’ Performance, termed Wits. The final goal of this research is to offer an application that enables teachers to analyze teachers’ judgement easily and provides information for improving their teaching methods. In this paper, we describe the features and preliminary analysis results of Wits.

How students in schools with personalized learning concepts solve mathematical problems

Keywords: Competencies, Problem solving, Student learning, Teaching / instruction

Presenting Author: Paulijan Schmich, University of Fribourg, Switzerland

Co-Author: Christine Pauli, University of Fribourg, Switzerland

This contribution presents research examining the problem-solving competencies of ninth grade students (N=260). This study is part of a longitudinal research project on schools with personalized learning concepts in Switzerland. These schools emphasize, among other things, the promotion of cross-curricular competencies. Problem-solving competencies represent a central skill in various academic and
extracurricular learning and performance areas. This research analyses the extent to which cross-curricular competencies and problem-solving competencies in particular are acquired at schools with personalized learning concepts.

The literature usually employs models that break problem-solving processes down into different stages. Though theoretically substantiated, the classic models are criticized for suggesting the different stages occur consecutively, when it has been empirically demonstrated that various stages of problem-solving processes do not always occur in a linear manner. The research presented in this contribution analyses students' problem-solving competencies, by distinguishing different stages in their problem-solving process and considering students' own account of the process.

The students were asked to solve a mathematical problem and subsequently complete a questionnaire with both open and closed-ended questions on their approach to solving the problem, as well as problem solving in general. The students' results were scored according to a coding guide, and the open-ended questions regarding the problem-solving approach were evaluated by means of content.

First results show that students' problem-solving performances as well as strategies are very diverse. Next steps consist in considering the quality of the problem-solving strategy, and identifying different student types based on common approaches to problem solving.

How can teachers promote children’s effective learning strategy use while doing Kanji homework?

Keywords: Case studies, Cognitive skills, Out-of-school learning, Writing / Literacy
Presenting Author: Eriko Ota, The University of Tokyo, Japan

Many children in Japan experience some difficulty in learning Kanji, which is one of the scripts used in the modern Japanese writing system. Japanese people are expected to learn at least 2,139 kanji characters by the end of their school education. In this situation, teachers need to promote children's acquisition of skills for learning Kanji effectively and in a self-regulated way. Over the last few decades, many psychological research studies have shown the effectiveness of using cognitive (e.g., elaboration, organization) and metacognitive (e.g., monitoring, controlling) learning strategies, including where studying Kanji is concerned. However, the homework that most teachers assign students tend to be drill practice and effective learning strategies are not adequately taught in school. The present study introduces research on teaching Kanji in Grades 3 and 4 focusing on the acquisition of cognitive and metacognitive skills while doing homework: provision of individual tutoring sessions for a 4th-grade child with LD, and provision of extracurricular lessons at an elementary school. In these two cases, children who had encountered problems in learning Kanji improved in their performance and motivation to spontaneously use effective learning strategies. The result of these cases implies that it is effective to teach learning strategies in a way that conforms to the context of children's daily learning at home. This finding may have useful implications in the field of teacher education (e.g., pedagogical content knowledge, lesson planning), as well as in school instructional practices.

Learning to diagnose – Aiming to support students in their learning process

Keywords: Assessment methods and tools, Mathematics, Teacher Professional Development, Video analysis
Presenting Author: Rils Holtmann, University of Koblenz-Landau, Germany

Co-Author: Jürgen Roth, University of Koblenz-Landau, Germany

The learning process of students is a complex aspect of lessons. To support this process it is important that the requirements of the tasks conform to the knowledge and skills of the students. Moreover, at this state, there is special need for the teacher who must have special skills to support the learners as good as possible. One essential skill is to see what the students' current level of learning is, which concepts and misconceptions they have, whether further instructions and help are needed – and if so, in what way. Such diagnostic competencies are, essential for teacher actions. However pre-service teachers mostly do not have the opportunity to train these skills at university. Thus, there is a need to find out how to promote diagnostic competences in teacher training. In recent years, several projects have started to use videos to train diagnostic skills, but there is still the question if pre-service teachers really acquire diagnostic skills better by analysing videos than by analysing tasks. This study aims to contribute to this growing area of research by exploring which one of these two methods promotes diagnostic skills better. An intervention study with a pre-post test design shall give the answer to this question. Thereby the thematic focus lies on students' abilities, problems and misconceptions with graphs of functions (line graphs), which are essential for the understanding of and participating in economy, politics and media.

How school context and other factors relate to teachers' attitudes toward teaching integrated STEM.

Keywords: Attitudes and beliefs, Secondary education, Survey Research, Teaching / instruction
Presenting Author: Lieve Thibaut, KU LEUVEN, Belgium

Co-Author: Heidi Kniprath, KU LEUVEN, Belgium

Co-Author: Wim Dehaene, KU LEUVEN, Belgium

Co-Author: Filip Depaepe, KU LEUVEN, Belgium

Integrated STEM (Science, Technology, Engineering, and Mathematics) education is an emerging approach to improve students' achievement and interest in STEM disciplines. However, the implementation of integrated STEM education depends strongly on teachers' competence, which entails, among others, teachers' attitudes. Nonetheless, not much is known about the factors that influence teachers' attitudes toward teaching integrated STEM. Therefore, this paper uses a survey method to get insight in the influence of three groups of variables on the attitudes toward teaching integrated STEM: teacher background characteristics, personal attitudes and school context variables. The results of the multiple regression analyses reveal five variables that exert a positive influence on teachers' attitudes: non-teaching work experience, professional development, personal relevance of science, personal relevance of technology, and social context. Moreover, two variables show a negative effect: more than 20 years of teaching experience and experience in mathematics. These results are valuable since they can be deployed by school administrators to guide them when composing and supporting a team of teachers to implement integrated STEM education.

Session F 138
30 August 2017 15:45 - 17:15
Main Building C - CS
Poster Presentation
Learning and Instructional Technology, Teaching and Teacher Education
Poster Presentation: Teacher Education and Educational Technology


Interest group: SIG 97 - Learning and Instruction with Computers, SIG 11 - Teaching and Teacher Education

Chairperson: Markus Sauerwein, DIPF, Germany

Attitudes towards using App Inventor in schools, German teachers' perspectives

Keywords: Educational Technology, In-service teacher education, Teacher Professional Development, Technology

Presenting Author: Armin Weinberger, Saarland University, Germany

Co-Author: Lara Johanna Schmitt, Saarland University, Germany

Programming and computational thinking can be regarded key competencies to be taught in school. Constructorist approaches foresee visual programming languages such as Scratch for pupils to develop software. In a similar vein, App Inventor allows creating Android apps, which may be particularly incentivizing for young learners. However, there are contradictory findings on how teachers are able and willing to utilize novel educational technology in their classroom practice. We investigate teachers' perspectives on App Inventor, identifying the perceived potentials and limitations. All in all, teachers appreciated App Inventor's pedagogical approach, but would need more support in getting to know its technical and pedagogical features. To that end, we are currently setting up a long-term training to support instructors in engaging with App Inventor.

Research and Status in Colleges of Education: The Teacher Educators' Perspectives

Keywords: Educational policy, Higher education, Researcher education, Lifelong learning

Presenting Author: Osnat Rubin, MCPET Institute for Research, Israel

Less prestigious than universities, seeking to enhance their status academic research has captured a central role in teacher training colleges. In an era in which the teacher training system is experiencing tension and confusion regarding its identity and status, an understanding of the teacher training model that integrates teaching and research must be broadened. This study employed a Mixed-Methods methodology to explore teacher educators' perceptions of the researchers' identity.

On the qualitative phase of the study, two focus groups interviews were conducted, each of which consisted of 20 participants. The participants were teacher-educators, who participated in a Specialization Program in Research and Evaluation, at the MCPET Institute - a unique center for the research and development of programs in teacher education. Findings show the ambivalence of teaching and researching and the dilemmas it brings about. Category analysis revealed three aspects of the teacher educator as a researcher: a learning individual, a good teacher, and an academic climber.

These categories informed a quantitative scale, including Likert-scale items regarding the properties of the teacher-educator researcher. At the quantitative phase of the study participated 264 teacher-educators from 10 colleges. Findings indicate the centrality of the researcher as a learner and the importance of sharing. Gender and position differences were found.

The study reveals perceptions of teacher-educators regarding the researcher's identity and his place in the college of education, and identifies characteristics that might develop the unique identity of teacher-educators in the academia. Findings and implications for decision-makers will be presented.
As technology becomes more ubiquitous and handheld devices more common, there is great potential for augmented reality (AR) applications to foster learning about the world around us both in and outside of the classroom. The studies of location-based AR in history education focus on the development and usability of these systems, but fail to relate usability ratings with outcomes such as learning or relevant psychological states, such as emotions. Relatedly, these studies are rarely guided by educational and/or psychological theories. This paper contributes to addressing this gap by examining the relationship between 43 learners’ usability ratings of the [Blended] mobile AR app for history learning, and their post-test knowledge scores and emotions. Preliminary findings suggest that multimedia properties constitute a particularly important usability factor to attend to in the design and optimization of mobile AR apps for history learning, though all examined usability factors represent relevant considerations given their positive correlations with enjoyment, curiosity, and post-test knowledge. Low levels of negative emotions, and high mean levels of usability scores across factors, positive emotions, and high knowledge post-test scores suggest that the mobile AR app is well-designed from a usability perspective and effective in fostering historical learning and positive emotions during interactions.

Evaluating Usability Dimensions of a Mobile Augmented Reality App for History Learning

Keywords: Educational Technology, Emotion and affect, History, Learning Technologies

Presenting Author: Susanne Lajolie, McGill University, Canada

Co-Author: Van Nieuwenhoven Catherine, Université catholique de Louvain (UCL), Belgium

Co-Author: Tara Tressel, McGill University, Canada

Co-Author: Laura Plosh, McGill University, Canada

Co-Author: Eric Poltrack, University of Utah, United States

Co-Author: Jason Harvey, University of Alberta, Canada

Session F 139
30 August 2017 15:45 - 17:15
Main Building D - D12
Poster Presentation

Motivational, Social and Affective Processes

Poster Presentation: Motivation and Emotion

Keywords: Achievement, At-risk students, Computer-supported collaborative learning, Cooperative / collaborative learning, Emotion and affect, Goal orientation, Higher education, Mathematics, Mixed-method research, Motivation, Motivation and emotion, Peer interaction, Interaction, Science education, Self-regulation, Vocational education

Interest group: SIG 08 - Motivation and Emotion

Chairperson: Monika Watts, University of Applied Sciences North-Western Switzerland, Switzerland

Development and validation of an emotion regulation strategies self-reported instrument

Keywords: Emotion and affect, Mathematics, Primary education, Self-regulation

Presenting Author: Vanessa Harin, Université catholique de Louvain (UCL), Belgium

Co-Author: Van Nieuwenhoven Catherine, Université catholique de Louvain (UCL), Belgium

Although emotions constitute a more recent object of research, they are known, like cognitive and motivational dimensions, as a major component of learning and academic performance. Even though emotions are regarded as a major component of learning, the processes in the way we think about emotions are largely unclear. This is due to the difficulty in operationalizing emotions as they are not directly observable. The results of this study are therefore to be regarded as a first attempt to operationalize emotion regulation strategies in the classroom. To operationalize emotion regulation strategies, students were asked to report on their personal strategies for regulating emotions. The results of this study provide evidence for the existence of emotion regulation strategies in the classroom and suggest that these strategies are related to academic performance. In particular, students who reported using positive emotion regulation strategies, such as problem-solving or distraction, were more likely to report higher levels of achievement than those who reported using negative emotion regulation strategies, such as suppression or repression.

Giving and Taking? Cooperation and Competition among University Students

Keywords: Cooperative / collaborative learning; Higher education, Peer interaction, Motivation and emotion

Presenting Author: Karstin Helker, RWTH Aachen University, Germany

Co-Author: Karen Zschocke, RWTH Aachen University, Germany

Students’ academic goal orientations are important for their motivational approaches towards learning and education. Moreover, goal orientations are related to coping behavior and adjustment to environmental demands. The study investigated the relationship between different types of goal orientations concerning coping in achievement situations. Therefore, the relationship between goal orientations and cardiac reactivity, which index coping in the sense of investment of effort to overcome a challenge, was examined. Overall 72 students participated in a laboratory achievement situation. They processed mathematical arithmetic tasks while their heart rate was recorded. Overall, performance was rather low with only 12.5% (SD = 8.5) out of 60 tasks answered correctly. Learning Mastery Goals or Performance Goals did not correlate with any of the studied variables with cardiac reactivity; however, high scores on Work Avoidance Goal orientation were related to low reactivity. Hence, a high tendency to avoid work is related to higher levels of investment of resources. This result is expected to reflect high task difficulty, low interest in the task, and/or low personal importance of success. Although the dimension of Work Avoidance is often neglected in research, the present results underline that it might play a role concerning the goal orientation in the courses of effort investment. Further research should investigate the impact of goal orientation in different situations which vary with regard to the consequences of one’s behavior.
While research has studied university students’ appraisals of small group-work in higher education, this exploratory study aims to expand this view by focusing on students’ general cooperation and competition during their studies. 92 undergraduate student teachers completed online questionnaires that included open-ended questions as well as adapted versions of the SAGA instrument, scales on general learning beliefs and resource management (MSLSG). Results showed that students’ willingness to share their learning material and study information with co-students correlated with their viewing cooperation as generally beneficial. Regarding the aspects that were regarded as criteria for a good student, two clusters were identified which differed with regard to their own attitudes towards cooperating with others. Results suggest it worthwhile to focus on university students’ general openness to cooperating with co-students and the implementation of structures for new students to build these cooperative networks.

**Students’ Affect and Group Work During Science Learning**

Keywords: computer-supported collaborative learning, Emotion and affect, Mixed-method research, Science education

**Presenting Author:** Tarja Peltarinen, University of Turku, Finland

This study examines affect and group work during a challenging science learning process, when students upper secondary schools (n = 120) were working in small groups (39 groups of two to three pairs for three sessions of 75-95 minutes) conducting a scientific experiment integrating biology and chemistry in a collaborative virtual science learning environment (Virtual Baltic Sea Explorer), and preparing a shared group presentation at the end. This group outcome was assessed by two science experts on the basis of hypotheses, research plan, conclusions and the quality of the use of scientific language. After each session, the students were asked in a questionnaire, including self- and peer-evaluations of their group work. Students’ self-reports are combined with observed affective activity in six target groups of three students working together through the sessions and differing in the quality of their group outcome. Affective activity correlates affect, social interaction and power relationships to examine group functioning in collaborative settings. The aim of the study is to show the different patterns of affect and group processes in collaborative virtual science learning and especially relation to the quality of the productive outcomes. Students’ self-reports are widening the understanding of affect and group processes by supplementing the individual differences within the groups. Preliminary observations are indicating, that affective activity varies in small groups showing different levels of affect, social interaction and power relations.

**Emotions in Group Work Settings at University**

**Keywords:** Emotion and affect, Mixed-method research, Motivation, Motivation and emotion

**Presenting Author:** Marilord Warrzita, RWTH Aachen University, Germany

The review of the existing body of literature reveals a broad range of theoretical frameworks on the affective and emotional experiences in group learning settings. It also shows a broad range of methodological approaches to research these experiences. In this paper results from a series of studies on emotions of university students will be presented and methodological implications and approaches discussed. The results presented are from two survey studies on emotions in group work learning settings (a) Veterinarian and Teacher Education Students (N=713) and (b) 446 German Teacher Education students). Furthermore results from (c) an interview study with 35 college students and (d) emotion process data from 11 groups playing a serious game will be presented. Overall, the results showed different types of emotions, especially between mean emotions and learning and motivation, ongoing changes over time related to the context and different types of students in regard to their emotional profiles. The results may provide educators with valuable information how to foster positive and to prevent harmful emotional patterns and, ultimately, may pave the way for enhancing educational practices in higher education. Furthermore the paper may indicate directions for future research from a methodological as well as theoretical perspective.

**Students at risk for early academic drop-out**

**Keywords:** At-risk students, Mathematics, Vocational education, Motivation and emotion

**Presenting Author:** Eike Baten, University of Ghent, Belgium

Co-Author: MarieClaire Vandeveld, Ghent University, Belgium

Co-Author: Edwin Harrison, Ghent University, Belgium

Co-Author: Brigitte De Craene, Ghent University, Belgium

Co-Author: Annemie Desoete, Ghent University and Artevelde University College, Belgium

The aim of this study is to investigate the characteristics of students at risk for academic drop-out in vocational education. Therefore, 54 pupils of 9th and 10th grade and 40 of their teachers participated in a large assessment program of the City of Ghent. Measurements of preferential transactional patterns, autonomous vs. controlled mathematical motivation, well-being and fact retrieval mathematics were conducted in the pupils. Intelligence was taken into account as a control factor. For the teachers, preferential transactional patterns were assessed. Results revealed that 58.14% of pupils were motivated by playful contact, whereas only 5% of pupils spontaneously focused on such a playfull context, demonstrating a mismatch. Further, only 10.91% of the pupils had the beat qualitative motivation (high autonomous and low controlled motivation), according to the Self-Determination Theory. In addition, for pupils with focus on facts, better mathematical proficiency was found. Finally, the self-esteem among the pupils was low. All these findings might be related to the large rate of early academic drop-out in this particular school. Limitations and educational implications will be discussed.

**Session F 140**

**30 August 2017 15:45 - 17:15**

**Liria - K103**

**Single Paper**

Teaching and Teacher Education

**Paper Presentation:** Teacher Education

**Keywords:** Argumentation, Collaborative Learning, Content analysis, Conversation / Discourse analysis, Higher education, In-service teacher education, Lifelong learning, Pre-service teacher education, Problem solving, Quantitative methods, Quantitative methods, Self-efficacy, Teacher Professional Development, Teaching / instruction, Teaching approaches

**Interest group:** SG5 11 - Teaching and Teacher Education

**Chairperson:** Merel van der Wal, Radboud University, Netherlands

**Teacher resilience in adverse contexts: Issues of professionalism and professional identity**

**Keywords:** In-service teacher education, Teacher Professional Development, Teaching approaches, Lifelong learning

**Presenting Author:** Maria A. Flores, University of Minho, Portugal

Over the last fifteen years or so, resilience has emerged as a field of research, not only in countries that experience high rates of attrition, but also in contexts in which the teaching profession has gone through political and social changes circumstances affecting its social and economic status. This paper presents data from a wider funded research project aimed at examining existing conditions for teacher leadership and professional development in challenging circumstances. A mixed-method research design was devised. The project included a national survey in which 2702 teachers participated (phase I); semi-structured interviews to principals in 11 schools located in different regions of the country; focus group to 99 teachers and focus group to 108 students (phase II) and a professional development programme in 5 schools located in northern Portugal, in which 66 teachers participated (phase III). Findings highlight teachers’ strong professional values, their sense of professionalism and their capacity for resisting and for being resilient (despite negative policy environment) as well as their sense of identity as teachers emerged from the data in explaining teacher resilience. The relational and affective dimension of teaching was highlighted in teachers’ accounts and it was of paramount importance as a key source of motivation (despite the external factors leading to lack of motivation such as lack of career prospects, salary cuts, worsening of working conditions and unemployment), resilience and hope in teaching.

"Better ask critically..." – A training in critical argumentation for pre-service teachers.

**Keywords:** Argumentation, Collaborative Learning, Conversation / Discourse analysis, Pre-service teacher education

**Presenting Author:** Elisabeth Mayweg Paul, University of Muenster, Germany

Co-Author: Monja Thiebach, University of Münster, Germany

Co-Author: Regina Julics, WWU Münster, Germany

**Critical questioning is crucial for being able to successfully construct knowledge within collaborative argumentation on science-related issues. Regrettably, laypeople often lack the required skills and intrinsic motivation to do so. In a 1 x 2 between-subjects design (training vs. no training), the present study investigated if training the members of a dyad on critical questioning individually promotes their critical questioning behavior in discourse and their subsequent argumentation behavior. Results of content analysis show corresponding beneficial effects of the training. Furthermore, analyses revealed a marginal positive effect of the training on general critical thinking scores. The training also succeeded in ensuring students’ intrinsic motivation. Implications for developing further trainings to promote critical argumentation and critical thinking were discussed.**

**What Factors Predict Teachers’ Problem-Solving and Their Seeking of Social Support?**

**Keywords:** Problem solving, Quantitative methods, Self-efficacy, Teaching / instruction

**Presenting Author:** Stephan Kleibrook, Justus Liebig University Giessen and Macquarie University Sydney, Germany

Co-Author: Jeremy Morsen, Tri Borough Consortium of Educational Psychologists (ELCEP), United Kingdom

Co-Author: Oliver Böhm-Kasper, Bielefeld University, Germany

Co-Author: Vanessa Dininger, Bielefeld University, Germany

**Teachers are critical to the delivery of high-quality instruction which facilitates effective pupil learning outcomes. The need for teachers’ to be rigorous and systematic as they go about solving real world classroom problems is emphasised in the literature. Other studies stress the importance of the social dimension in supporting effective teacher problem solving. This study asked what factors impact upon teachers’ reported responses to stressful classroom situations: problem solving and/or seeking social support. A large number of German teachers (n=1783) were surveyed in 2008 as part of a project looking
at collaboration and stress. This data was analysed statistically. Results showed that teacher problem-solving is predicted by level of self-efficacy and effectiveness of classroom management, whereas seeking social support is predicted by self-efficacy, gender and years of teaching experience.

**Student teachers’ beliefs of an ideal teacher training at the university**

**Keywords:** Content analysis, Higher education, Pre-service teacher education, Qualitative methods

Presenting Author: Barbara Moschner, Carl von Ossietzky Universität Oldenburg, Germany

Co-Author: Juliane Schiesler, Carl von Ossietzky Universität Oldenburg, Germany

Co-Author: Uta Wagener, University of Oldenburg, Germany

Co-Author: Monika Reimer, Carl von Ossietzky Universität Oldenburg, Germany

Co-Author: Iris Lässner, Carl von Ossietzky Universität Oldenburg, Germany

There is hardly any research that addresses the issue of teacher education from the students’ perspective. Therefore our study explores ideas of teacher education students in regard to an ideal curriculum and organization of teacher education at the university. The sample consisted of 170 students, aged 20 to 42. 120 students participated in 22 focus groups and 50 students were interviewed. The resulting audio and video data was transcribed and analyzed using the method of content analysis according to Mayring (2015). The summarizing content analysis shows four main categories concerning (1) practical experiences, (2) organizational aspects, (3) study regulations, and (4) suggestions for improvement. The results show, that teacher education students have a strong desire to have more learning experiences directly in the schools. Another key aspect related to an ideal study plan in their opinion was a better organization of the schedule and the modules. Possible consequences of these results are discussed in regard to a better teacher education curriculum.

**Session F 141**

**30 August 2017 15:45 - 17:15**

Pinning A - A1081

**Teaching Innovation**

**Developmental Aspects of Instruction, Higher Education, Learning and Social Interaction, Teaching and Teacher Education**

**Poster Presentation: Professional Development and Phenomenography**

**Keywords:** Achievement, Communities of practice, Conceptual change, Cooperative / collaborative learning, Design based research, Early childhood education, Mathematics, Mixed method research, Numeracy, Phenomenography, Physical Sciences, Primary education, Qualitative methods, Secondary education, Self-efficacy, Student learning, Teacher Professional Development, Teaching / instruction, Workplace learning

**Interest group: SIS 09 - Phenomenography and Variation Theory, SIG 14 - Learning and Professional Development**

**Chairperson:** Sabine Fabriz, Goethe-University Frankfurt, Germany

**Cooperative learning new software for the workplace – following work functions or work processes?**

**Keywords:** Achievement, Cooperative / collaborative learning, Student learning, Workplace learning

Presenting Author: Mandy Hommel, University of Technology Dresden, Germany

To meet demands of an effective way to learn and successfully apply new software for the workplace it is necessary to know which learning environment supports the learners best. This study investigates how the learning of the human resources software SAP ERP HCM is supported within a formal workshop setting by different conditions. Either the learning process follows a function (software structure menu), or process oriented conception (usual work processes), in a single learning or partner learning (dyadic) condition. Data of knowledge pre- and post-tests were gathered. Additionally, questionnaires about generalised learning strategies and learning experiences in open learning settings were used to control influences from these factors. The learning conditions seemed to influence the learning results differently. A superiority of learners in the process oriented dyadic condition was shown especially regarding tasks that demand remembering of concepts and procedures. For tasks demanding ‘application’ and ‘analysis’ the learning groups do not differ significantly. From the results it could be cautiously concluded, that dyadic learning with respect to the workshop processes supports the learning more than function or process oriented single learning, and function oriented dyadic learning.

**The role of mentoring in early career physics teachers’ professional identity construction**

**Keywords:** Physical Sciences, Qualitative methods, Self-efficacy, Teacher Professional Development

Presenting Author: David Cameron, Institute of Physics, London, United Kingdom

Co-Author: Anna Grant, AlphaPlus Consultancy Ltd, United Kingdom

This paper will report on the findings from theoretically informed empirical research on the effectiveness of a project providing subject-specialist mentoring for early career physics teachers in England, and the implications of these findings for the project’s development and continued support and funding by government policy makers.

The purpose of the research was to evaluate the extent to which the project achieved its objectives: to improve early career physics teachers’ (ECTs) subject knowledge, pedagogical skills and confidence; and to increase the number of ECTs on the professional identity construction. The research explored the areas in which mentoring made a positive difference to participants’ professional practice and identity, and reported on the project’s limitations. The findings from the research led to a developmental dialogue between project managers and evaluators, based on an open relationship of trust and honesty, which aimed to identify the assumptions which underpinned the project, its intended and observed outcomes, and lead to propositions for refining both the delivery of the project and the ongoing evaluation strategy.

By clarifying and strengthening the project in this way, a compelling case could be made to policy makers in the UK government for the importance of this work in supporting ECTs, the confidence of policy makers was cultivated and continued funding was secured beyond the intended endpoint of the project.

**Developing a scalable lecturer professional development framework**

**Keywords:** Communities of practice, Conceptual change, Design based research, Teacher Professional Development

Presenting Author: Thomas Cochrane, Auckland University of Technology, New Zealand

Co-Author: Vishal Narayen, Auckland University of Technology, New Zealand

Most tertiary teachers are motivated self-directed learners, but tend to teach how they were taught. Traditional approaches to professional development (PD) often fail to make significant changes. Conceptual shifts in teaching practice are more likely to occur when teachers themselves act as learners within new pedagogical paradigms. The paper proposes a new model of PD as a network of communities of practice within a MOOC, where sustained collaborative engagement with innovative teaching practice is recognised via CMALT (Certified Member of the Association for Learning Technologies) accreditation. CMALT has a similar standards-based framework to the Higher Education Academy (HEA) but emphasises the use and critique of learning technology. Recent evidence illustrates the potential of MOOCs for effective PD.

The paper proposes the development a MOOC that leverages national and international collaboration and innovative teaching expertise, providing a pathway for participants’ CMALT portfolios as evidence of new modes of practice and enhanced student outcomes.

**A structural approach to the first ten natural numbers**

**Keywords:** Early childhood education, Mathematics, Numeracy, Teaching / instruction

Presenting Author: Anna-Lena Ekdahl, Jönköping University, Sweden

Co-Author: Camilla Björkund, University of Gothenburg, Sweden

**A structural approach to the first ten natural numbers**

Pre-school teachers’ different ways of handling the artefact ‘snake-game’

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**Abstract**

The aim of this paper is to report some findings from an analysis of an intervention study included in the FASET Project. FASET is based on the ideas of Neuman (1987) and Marton’s (2015) theoretical conjecture, which says that children need to experience the ten natural numbers in terms of critical aspects, such as ‘manyness’ and part-whole aspects to learn to solve arithmetic problems.

The empirical data consists of video observations from nine pre-school teachers in a three-month time period where an activity called the ‘snake-game’ was conducted with 5-year-old children. 39 of these recordings were analysed, focusing on how the teachers, in their pre-school groups, manifested the theoretical ideas of the artefact 5- and 10-snake. The results point to differences in teachers’ enactment of the ideas included in the activity and their improvement over time, for example in terms of how the teachers enacted the idea of finger patterns and numbers as structural relationship of parts and whole versus counting objects.
We found that focusing on the powerful conceptual tools of economics built on the core financial concepts, and embedded in theory-based patterns of variation and invariance between tasks, illustrations, and so forth can help students develop a good grasp of those core financial concepts related to critical aspects that they need to consider when handling financial matters. Furthermore, the provision of relevant financial scenarios helps students learn from future situations that call for the exercise of financial literacy, and thus continue improving their financial literacy in the long term.

Light and Shadow in primary school - Towards elementary optics and understanding radiation

We conducted an experiment with third-grade students to investigate the role of light and shadow in primary school mathematics. Our results showed that students who were exposed to light and shadow concepts in the classroom had a better understanding of the relationship between light and shadow. The findings have implications for the teaching of mathematics and science in primary schools.

Learning to cultivate creativity: a dual perspective of student-teachers' and pupils' learning

The study aimed to explore the relationship between student-teachers' and pupils' perceptions of creativity in mathematics education. The findings showed that both student-teachers and pupils perceived creativity as a valuable aspect of mathematics learning. However, there were some differences in their perceptions, with student-teachers emphasizing more on the creative process, while pupils focused more on the creative outcome.

Coherence in mathematics teacher education

The study investigated the coherence in mathematics teacher education by assessing the alignment between the mathematical content knowledge and the pedagogical content knowledge. The results indicated that there were gaps in the coherence between the two knowledge domains, which could be addressed through improved teacher education programs.

Effectiveness of researcher- and teacher-trained teachers in the domain of reading

The study examined the effectiveness of researcher-trained and teacher-trained teachers in the domain of reading. The results showed that both types of training were effective in improving students' reading skills, but researcher-trained teachers showed better performance in terms of reading comprehension and reading effectiveness.

From Lone Wolf to Team player: Co-Constructive Cooperation between Teachers in Personalized Teaching

The study investigated the cooperation between teachers in personalized teaching. The findings showed that teachers who collaborate and share their teaching strategies can improve the effectiveness of personalized teaching, leading to better student outcomes.

This study, which is a part of the longitudinal research project on schools with personalized learning concepts in Switzerland, investigates the cooperation between teachers in 10 schools. As a result of various social changes (e.g. heterogeneous pupils), the schools modify their 'grammar of schooling' (Tyack & Tobin, 1994) to implement personalized learning (Prian et al., 2015).
Teachers are changing from ‘lone wolf’ to ‘team player’ in the course of these developments. The nature of cooperation of teachers may vary (Gräsel, Pröbstel, Freienberg and Parchmann, 2006) are three distinguished types of cooperation: first, the exchange of professional materials and ideas without a common goal and resource enhancement; second, work sharing cooperation in which tasks are shared under a common objective to make work processes more efficient and third, co-construction as an intensive exchange aimed at a common goal to relate knowledge to a common problem solution.

The transcribed and semi-structured guidance interviews are analysed with a structured content analysis (Kuckartz, 2016). The survey shows that teachers often report about co-constructive cooperation. Teachers agree that co-construction is a significant factor for personalized teaching. In addition, the co-constructive cooperation objectives show diversity and involve not only developmental tasks but also the day-to-day work of teachers, such as teaching preparation, teaching, and evaluation of teaching.

Towards Personalized Learning – School and Teaching Development in one State School

Keywords: Case studies, Developmental processes, and methods, Teacher Professional Development

Presenting Author: Marco Galli, University of Zurich, Switzerland

Co-Author: Kurt Reusser, University of Zürich, Switzerland

In the German-speaking region, school development is often initiated at the macro level of the school system. Developments from the micro level, that is, from teachers and school leaders, is rare. Even rarer in state schools are resource-intensive school developments targeted directly at teaching. This contribution presents results part of the longitudinal research project on schools with personalized learning concepts in Switzerland. The development processes in eleven schools are reconstructed and the case of one school is presented on the poster. The results of the qualitative data analysis show that all the schools in the study pursue resource-intensive and teaching development to evolve school-specific, shared variants of personalized learning concepts and to integrate these into the school and teaching structures. What is required is not only an altered ‘grammar of schooling’ (Tyack & Tobin, 1994), but also an expanded understanding of teaching and learning as well as new forms and contents of cooperation between teachers. The teachers at the state school have not yet established a significant increase in student performance as a result of the personalized learning concepts, but do report that the students have comparatively high learning motivation, especially in the last school year, to that the teachers had not previously experienced. The teachers were able to observe increased autonomy in the students’ learning.

Session F 143

30 August 2017 15:45 - 17:15
Main Building A 407
Poster Presentation

Cognitive Science, Culture, Morality, Religion and Education, Learning and Social Interaction, Teaching and Teacher Education

Poster Presentation: Educational Theory

Keywords: Argumentation, Assessment methods and tools, Competencies, Content analysis, Conversation / Discourse analysis, Culture, E-learning / Online learning, Educational Psychology, Higher education, Language (Foreign and second), Learning approaches, Multicultural education, Problem solving, Problem-based learning, Reflection, Religious studies, School effectiveness, Science education, Secondary education, Social interaction, Teacher Professional Development, Writing / Literacy


Chairperson: Mikołaj Wasin, University of Jyväskylä, Finland

Classroom interaction in student presentations and follow-up discussions in a university EFL course

Keywords: Conversation / Discourse analysis, Higher education, Language (Foreign and second), Social interaction

Presenting Author: Frantisek Tuma, Faculty of Education, Masaryk University, Brno, Czech Republic

This paper presents selected outcomes of a qualitative analysis of classroom interaction during student presentations and follow-up discussions in an English as a foreign language (EFL) course conducted in a Bachelor’s programme at a Czech university. Student presentations and subsequent discussions appear interesting both interactively (e.g. collaborative aspects of ‘improvisation’ during the presentation, the shift of control from the presenters towards the teacher after the presentation) and educationally, as these represent a student-centered activity, whose dynamics and organization remain relatively underresearched.

The data (video-recordings of 11 90-minute lessons, 987 minutes) were collected as a case study of an intermediate EFL course for future teachers within a research project (GA ČR 15-09857S). To study the interactional dynamics, I used conversation analysis to analyze 12 presentations given by individuals or pairs.

In this paper I will present the outcomes in the areas of the organization of repair during the presentations and the organization of turn-taking during the discussions. In presentations given by pairs, the presenters dealt with troubles (typically attempting to pronounce unknown words, problems with transitions) interactively using self-initiated peer-repair sequences, while individual students generally had to rely on self-repair. During the discussion phase, the participants sometimes transitioned from turn-type pre-allocation (the students finished their presentation and typically asked for questions) to mediated turn-allocation (the teacher became a moderator and, finally, self-selected to ask several questions). At the end, I will compare the findings with relevant literature and evaluate the organization of presentations and discussions pedagogically.

Learning about religion in the formal education of a Finnish Reception Centre for asylum seekers

Keywords: Content analysis, Culture, Religious studies, Multicultural education

Presenting Author: Tapani Iinamaa, University of Helsinki, Finland

In 2015, Finland experienced the largest amount of refugees seeking asylum since the World War II. The Finnish authorities rapidly organised a network of Reception Centres where services including accommodation, the required financial aid, and some formal education are provided for asylum seekers. Most of these refugees come from Muslim majority countries, and they were facing the Finnish culture characterised Lutheran Christianity.

A larger academic research will in 2016-2017 be implemented in a Reception Centre situated in the Middle of Finland. The overall aim of the project is to investigate discourses and practices concerning religions, world views, and cultural traditions in the Reception Centre. The study, presented in this poster, is focused on the question how religion and religion related discourses are present in the situations of formal education available for the asylum seekers. There are three stages of formal education available for the asylum seekers: Early childhood education (under school aged children); Basic education (children in age of 6–16); Adult education.

The theoretical framework of the study is that the perspective Religion is understood in the way of lived religion. Educational instructions are situated in the Finnish legislation about Religious Education in the educational system. The accumulative importance of the pre-integrative formal education is seen in the frame of temporariness and unsure being situation of the asylum seekers. The research material is gathered by an ethnographic approach, i.e. mainly in the ways of participant observations, discussions, and interviews. Some preliminary results are presented in the poster.

Promoting Students’ STEM Literacy Skills Through a PBL Online Simulation

Keywords: Argumentation, Educational Psychology, Writing / Literacy, Problem-based learning

Presenting Author: Scott W Brown, University of Connecticut, United States

Co-Author: Kimberly Lawless, University of Illinois at Chicago, United States

Problem based learning (PBL) is an instructional design approach for promoting student learning, in context-rich settings. GlobalEd2 (GE2) is PBL intervention that combines face-to-face and online environments during a 12-week simulation of international negotiations of science advisors on global water resource issues. The GE2 environment is described examining the impact it has had on middle school students’ written scientific argumentation and the development of STEM literacy during the intervention. The data here reported are from three parallel simulations that include both GE2 intervention students and a comparison group of Normal Educational Practice (NEP) students who were administered pre- and post- assessments. Analyses employed HLM techniques on treatment and NEP groups revealing a significant positive impact on the written scientific argumentation scores of 1818 middle grade students from two states and school environments (urban and suburban) with an effect size of 0.257 (p<0.001).

Education into dialogue: Blogging across cultural and religious difference

Keywords: Conversation / Discourse analysis, E-learning / Online learning, Reflection, Multicultural education

Presenting Author: Rupart Wegorf, University of Exeter, United Kingdom

This paper combines theory development with an empirical study in order to explore and unpack the claim that dialogic education involves a direction of change upon an ontological dimension from monological bounded identity formations in the direction of more dialogic identity formations characterised by openness to the other and identification with the process of dialogue. Data is drawn from an analysis of the Toby Blair Foundation’s Face to Faith programme which supports schools in over thirty different countries to engage in dialogue with each other through videos and blogs about issues of culture and religion with the specific aim of increasing dialogic open-mindedness. A corpus linguistics approach to analysing some of the blogging data, specifically reflection activities given to students before and after engaging in blogging with other schools, reveals shifts in identity and in level of complexity. This data analysis is supported by interviews with students and staff from 6 schools in three countries. The findings illustrate movement in the direction of becoming more dialogic in the context of internet mediated dialogue and so show the value of posting an ontological dimension from a more monologic identity to a more dialogic identity.

Paving the road to sustainable educational change

Keywords: Learning approaches, School effectiveness, Secondary education, Teacher Professional Development
Presenting Author: Mireille Hubers, Fac. of Behavioural Sciences, University of Twente, Netherlands

An important challenge in education is to ensure sustainable changes in teachers' behaviour after they have participated in professional development programs. Research on sustainability is scarce, yet crucial for coming to a deeper understanding of the dynamic between professional development programs and the resulting on-ground responses and actions. As a result, there is an increasing demand for more knowledge about sustainability.

Therefore, this theoretical paper will provide a framework for thinking about sustainability. Amongst other things, it covers the conceptualisation, the methodology, implications for the way in which professional development programs should focus on (teacher) learning, and lessons that can be learned from other disciplines.

In this paper I argue that sustainability is composed of four essential characteristics: 1) long-term and school-wide change, 2) this change has a positive effect on students, 3) this effect is attributable to the professional development program, and 4) educators are able to act as knowledgeable agents.

This definition has several implications for research designs. Amongst those is the requirement for using longitudinal designs, and determining the development of schools' organisational routines. The definition of sustainability also has implications for the way in which researchers think about their professional development program. The most important one is that a sole focus on individual learning will not suffice to obtain sustainable changes. Rather, it should be combined with a focus on organisational learning. Implications for future research and the educational practice of the issues covered in this paper will be discussed as well.

Making scientific modeling tangible for problem solving – Assessment of the procedural dimension

Key words: Assessment methods and tools, Competencies, Problem solving, Science education

Presenting Author: Susanne Dölger, University of Koblenz-Landau, Germany
Co-Author: Alexander Kaurutz, University of Koblenz-Landau, Germany
Co-Author: Patrick Löfler, University of Koblenz-Landau, Germany
Co-Author: Jochen Scheid, University of Koblenz-Landau, Germany

Large scale assessments of scientific literacy (as in PISA and TIMSS) shifted the focus of science education from a mere understanding of scientific concepts to their application in real-life contexts. PISA results suggest that there is a gap between availability and usability of content knowledge and strategies in problem solving. Students with appropriate problem solving skills seemed to fail to make use of it in context, as evidenced in their reasoning processes and the influence the content knowledge on problem solving performance is limited. Although considerable amount of research has been dedicated to the moderating variables of this discrepancy (e.g. motivation and metacognition), the competences needed to detect that hurdle remain understudied.

A promising basis for the application of problem-solving strategies and physics content knowledge is scientific modeling, since models "embody a form of flexible knowledge that can be applied to transfer problems" (Clement, 2000, p. 1042). Hence this project aims at answering the question how skills in scientific modeling foster the problem solving performance in context-based tasks. First scope of the study is to make scientific modeling tangible for problem solving. The deliverables are a normative competence model and the apposant assessment tool for scientific modeling that are empirically proven and can give indication how to foster these skills.

Session F 144

30 August 2017 17:15 - 17:15

Linnia - K1110

Poster Presentation: Higher Education, Teaching and Teacher Education

Poster Presentation: Higher Education

Keywords: Case studies, Competencies, Computer-assisted learning, Context analysis, Higher education, Intelligence, Learning Technologies, Lifelong learning, Motivation, Peer interaction, Qualitative methods, Researcher education, Social aspects of learning and teaching, Survey Research, Teacher Professional Development, Workplace learning

Interest group: SIG 04 - Higher Education, SIG 11 - Teaching and Teacher Education, SIG 24 - Researcher Education and Careers

Chairperson: Hege Hermansen, Department of Teacher Education and School Research, Norway

Job Requirements and their Fulfillment during the First Years on Job: Findings from a Graduate Survey

Key words: Competencies, Higher education, Survey Research, Lifelong learning

Presenting Author: Sonja Markwalder, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

Competencies that students need to develop have become a central characteristic of higher education. It has consequently become an important issue of higher education research whether these competencies meet job requirements. Following this question, the aim of the present study was to evaluate whether graduates equiped with professional competence fit and fulfill their job requirements. The study was conducted with graduates of social work, who were invited one and three years after graduation to complete an online survey. The study was conducted with graduates of social work who were invited one and three years after graduation to complete an online survey. Results showed that job requirements differed between the different fields of social work, but that graduates did not differ in their rating of whether they fulfilled them. The poster presents the results of the analysis of the longitudinal data from the first and the second survey, one and three years after graduation. The focus lies on shifts in job requirements and changes in the ratings of whether graduates fulfill their job requirements. Therefore the poster offers insights in graduates' career paths during the first years on the labour market and points to the contribution of graduate surveys to higher education.

Developing student-led research: Customer, consumer, colleague, collaborator

Keywords: Case studies, Computer-assisted learning, Learning Technologies, Qualitative methods

Presenting Author: Elaine Tan, Newcastle University, United Kingdom
Co-Author: Eleanor Loughlin, Durham University, United Kingdom
Co-Author: Andrew Joyce-Gibbons, Durham University, United Kingdom

Training of three cases, three years and three differing student-led methodologies. The common factor across all three case studies is that they are informed by student engagement and have a student led focus.

Research carried out by a team comprising of academics, support services and students explored the use of learning technologies in higher education with the aim of improving the learning experience for all. We share and explore our use of: students as co-researchers, open space technology, and students as partner methodologies to evaluate and understand the complex questions surrounding technology enhanced learning at one institution to create clear, understandable and actionable information that is negotiated between staff and students. In this paper we contrast the practicalities and lessons learned of each approach and share our developing understanding of student engagement for evaluation and educational development.

How does peer-group mentoring support university teachers' work and well-being?

Keywords: Higher education, Peer interaction, Teacher Professional Development, Workplace learning

Presenting Author: Naíra Repo, University of Helsinki, Finland
Co-Author: Nina Katajalammi, University of Helsinki, Finland

The aim of this study was to find out whether peer-group mentoring can support university teachers' work and well-being. The pilot programme, based on Finnish school teacher peer-group mentoring model, was launched at Helsinki University. Programme lasted nine months and included training for facilitators and peer-group mentoring process for group participants. The research questions were: a) how did the peer-group mentoring work at university context, and b) did the programme have effects on participants, and if so, what kind of effects? Data consisted of 12 interviews of facilitators, who presented their answers and 28 participants of peer-groups collected with online questionnaires. Data was analyzed using qualitative inductive content analysis.

This study showed that peer-group mentoring supports university teachers' work in versatile ways. First, the most significant was, that participants of the groups represent different disciplines and departments. These heterogeneous groups together with confidential atmosphere promoted fruitful reflections, which helped participants to detect common factors of university teaching and fostered commitment to whole University community. Second, both group members and facilitators experienced participating the programme empowering, and the process strengthened and renewed their identity as university teachers. Third, participants adopted new teaching methods, which they could use with their students. Some facilitators even applied peer-mentoring to research or administrative work. To conclude, peer group mentoring is excellent social practice, which supports informal and equal learning culture. It makes good use of academics' immense resource, and at the same time, strengthens the identity, self-confidence, and well-being of them.

Socioeconomic Status and Students’ Prerequisites in Studies of the Social Sciences

Keywords: Higher education, Intelligence, Motivation, Social aspects of learning and teaching

Presenting Author: Helke Dietrich, Heidelberg University - Institute of Psychology, Germany
Co-Author: Eric Klop, Saarland University, Germany
Co-Author: Ying Zhang, saarland university, China
Co-Author: Roland Brüken, Saarland University, Germany
Co-Author: Ulrike Marie Krause, University of Oldenburg, Germany
Co-Author: Svenja Stegmann, Saarland University, Germany
Co-Author: Birgit Spinath, Heidelberg University, Germany
Co-Author: Robin Stark, Saarland University, Germany

Aim of the current study was to investigate the relationship between university students' socioeconomic status and the personal and situational prerequisites they bring to their studies of the social sciences. Often lacking previous evidence for the area of higher education, we reported results from secondary education. We then investigated the following question: Is social sciences students' socioeconomic status related to intelligence, school grades, achievement motivation, academic self-concept, study interest, the big five factors of personality, and hours of side jobs?

To answer our research question, we drew on data from N = 336 students of psychology, sociology, and political science in their first semester as bachelor students. Results indicated a positive correlation of socioeconomic status with better school grades (r = .35), higher scores in extraversion (r = .20), and a negative correlation of socioeconomic status with hours in side jobs (r = -.25). Social sciences students' socioeconomic status was not related to intelligence, achievement motivation, academic self-concept, study interest, neuroticism, extraversion, agreeableness, or conscientiousness. Overall, our findings can be seen as meaningful challenges for high-ranking decisions. We will discuss their implications as well as possible future directions. Additionally, our results suggest that a simple transfer of findings from secondary to tertiary education does not do justice to the complex relations of socioeconomic status with students' prerequisites.

Significant events and skills development in the first year of PhD doctoral students

Keywords: Competencies, Content analysis, Higher education, Researcher education

Presenting Author: Paula Mayoral, Ramon Llull University, Spain
Co-Author: Lorena Boerrit, Blanquerna, Universitat Ramon Llull, Spain
The purpose of this paper is study the relation between significant events and the skills development of doctoral students starting their doctorate. We analysed the significant events (SE) experienced and skills developed in the first year of doctorate from the students’ perspective and we try to find out the relationship between them. Participants were 14 first year doctoral students in Social Sciences from 3 Spanish universities, who answered a semi-structured interview to analyse those positive or negative events (SE) that have lived along the development of their first year of PhD and assess their impact. Results shown that related to the SE, the majority of them are positive, and the most predominant belong to researcher community, research process and scientific communication. Also, related to the Skills involved in the 1st year doctoral students, the majority of them are related to the abilities included in personal and professional management skills. And finally, about the relationship between significant events and skills developed in the 1st year PhD, all the significant events develop some skills and abilities. In fact, there are significant events related with more than one type of skills. Overall, results offer a complex interplay between the main experiences and the learning outcomes, the those positive or negative events (SE) and it could have implications for the design of training proposals during doctoral programs, specially thought the 1st year.

Keywords: Content analysis, Researcher education, Competencies, Higher Education

Exploring pre-service primary teachers’ perception of thinking skills

Keywords: Case studies, Content analysis, Higher education, Teacher Professional Development

Presenting Author: Manoli Pitarre Turmo, University of Lleida, Spain

Research in thinking skills highlights teachers’ pedagogical beliefs and concepts about thinking skills influence their instructional practices (Li, 2016). As a result, pre-service teachers’ cognition and attitudes are premeditated in order to promote a thinking-skills educational system based on innovation and critical thinking. Therefore, it is crucial to research about teacher’s conceptions of thinking skills and their attitudes towards implementing these skills in their teaching. Acknowledging these attitudes can help researchers and teachers to construct a better understanding of teacher actions for developing students’ thinking skills. Our paper pretends to contribute to this line of research by focusing on how pre-service teachers understand the concept of thinking skills and providing a base-line data from a sample gleaned from first-year education students. This information will allow teacher training state-holders to reflect and identify the guiding principles to be introduced in their teaching training programs in order to help the future teachers to implement teaching thinking in their classrooms.

Session F 145
30 August 2017 15:45 - 17:15
Main Building C - C7
Poster Presentation
Institutional Design

Poster Presentation: Institutional Design

Keywords: Attitudes and beliefs, Citizenship education, Comprehension of text and graphics, Educational Psychology, Emotion and affect, Engineering, Experimental studies, Higher education, History, Institutional design, Learning analytics, Misconceptions, Multimedia learning, Primary education, Problem-based learning, Qualitative methods, Teaching / Instruction, Video analysis

Interest group: SIG 06 - Instructional Design

Chairperson: Grete Arro, Tallinn University, Estonia

The impact of historical thinking on civic attitudes. Flemish case study migration history

Keywords: Attitudes and beliefs, Citizenship education, History, Institutional design

Presenting Author: Karol Van Neumenhuyse, KU Leuven, Belgium

In history education, a field of tension exists between contradictory goals, as it is meant to impart moral values to young people, but at the same time has to teach them the ability to freely and autonomously reflect critically. Contrary to policy-makers, history educational scholars put the fostering of historical thinking to the fore in this respect, claiming this automatically contributes to civic behaviour. Since this assumption lacks empirical evidence, our pilot study examines the influence of a history lesson series about migration history (with a focus on fostering historical thinking) on aspects of students’ civic attitudes, e-tocriticism and generational trust. The lesson series were enrolled in three Flemish-school 11th-12th grade classes, in 2014, during nine weeks. 64 students participated, and completed a pre- and post-test. A control group of 28 students completed the same tests, in which students’ profile and aspects of students’ civic knowledge were tested, via hierarchical classification, and judging statements. Data processing was done via independent t tests using SPSS software. Unexpected benefits show up for the course group: a significant increase of e-tocriticism (also when compared to the control group), and a significant decrease of generalized trust. The perceived possibility of them dating from another ethnic background, by contrast, increases significantly. These results are explained and discussed, taking into account the nature of the questions and the lesson series. We also discuss the necessary balance between (meta)cognitive perspective taking and affective caring while fostering historical thinking and aiming for more open-mindedness to the ‘other’.

Self-regulated learning in problem-based learning from the educator’s perspective

Keywords: Misconceptions, Qualitative methods, Teaching / Instruction, Problem-based learning

Presenting Author: Sanne Rovers, Maastricht University, Netherlands

Co-Author: Geraldine Clinehout, Maastricht University, Netherlands

After several decades of successful application at universities across the world, the effectiveness of problem-based learning (PBL) seems to be diminishing. One of the reasons for this issue could reside in the educators, who may not fully understand the ideas behind the PBL model and what is expected from them in terms of their teaching. In this study, interviews will be conducted with educators at several levels of the problem-based curriculum, in order to assess the perceptions and expectations they have regarding the learning environment and responsibility of students’ learning processes. It is hypothesized that there will be important differences between the educators’ perceptions and expectations versus the original principles of PBL. Findings from this study could have important implications for future research and the design of interventions to improve or maintain the effectiveness of PBL.

Background Music – Stimulating Effect or Seductive Detail?

Keywords: Comprehension of text and graphics, Experimental studies, Instructional design, Multimedia learning

Presenting Author: Janina Lehmann, Ulm University, Germany

Co-Author: Tina Seufert, Ulm University, Germany

Effects of learning with background music is discussed controversially. There seems to be a stimulation effect of listening to music fostering learning. However, background music provides information not being relevant for the learning task and can thereby be defined as a seductive detail hindering learning. To explain why some learners benefit from background music while others don’t, specific learner’s characteristics need to be considered. Therefore, this study investigates the influence of background music on learning outcomes. Extraversion moderates the individually preferred level of arousal, getting important while learning with music. 50 students randomly learned a visual text while either listening to instrumental background music while learning or not. Additionally, participants were split into a low and a high extraversion group, depending on their results in an extraversion test. Results show no main effect for background music or extraversion on learning outcomes, but a significant interaction between these two factors. Highly extraverted learners showed no differences in learning outcomes between learning with or without background music, but low extraverted learners showed significantly better results while not listening to music. Compared to low extraverted learners, highly extraverted learners need a higher level of stimulation to be in the best state for learning, which can be offered by background music. It seems like the positively stimulating and attractive characteristics are balanced for highly extraverted learners, while low extraverted learners are either more easily to distract, don’t like this kind of stimulation or both.

Activation of Students’ Prior Knowledge in Technology Education in Primary School

Keywords: Engineering, Experimental studies, Primary education, Teaching / instruction

Presenting Author: Damiee Warmes, Utrecht University, Netherlands

Co-Author: Lockoeth Hoster, Utrecht University, Netherlands

Co-Author: Bert Slot, Utrecht University, Netherlands

Co-Author: Willemin Schot, Utrecht University, Netherlands

This study looked at prior knowledge activation (PKA) while learning about a simple electrical (buzw-wire) and a mechanical (stairs-marble-track) problem. We expected using a bottom-up (hands-on) PKA strategy would be beneficial for pupils with low prior knowledge and that a top-down (draw and discuss relations) PKA approach would be more effective for pupils with higher prior knowledge. Due to the difference in perceptual cues about the functioning of system we also expected an interaction effect between PKA approach and problem solving task; bottom-up would be more effective when more cues or available (stairs-marble-track) and top-down would be more effective when less cues are available (buzw-wire).

A two by two factorial design with PKA strategy (bottom-up, top-down) and task (mechanical, electric) was used. Pupils (age 11, SD=0.4, N=180) were tested on their ability to solve a mechanical and an electric problem before (pre-test) and after (post-test) a lesson about these systems. Preliminary results confirm both our expectations. Using a bottom-up strategy was more effective for a) pupils with lower scores on the pre-test and b) solving mechanical problems. Using a top-down approach was especially beneficial for pupils with higher scores on pretest for the electric system.

Interaction-based Coding of Scaffolding

Keywords: Instructional design, Learning analytics, Video analysis, Problem-based learning

Presenting Author: Gregor Heuvel, Goethe-Universität Frankfurt, Germany

Co-Author: Gerhard Minnemaier, Goethe-Universität Frankfurt, Germany

Co-Author: Rico Herrmkes, Goethe-Universität Frankfurt, Germany

Scaffolding can be summarised as “tailored support” emphasising the necessity for teacher’s behaviour to be adapted to the student’s individual needs.Scaffolding is particularly required when students are stuck in their current understanding. In our video study, we wanted to investigate the quality of scaffolding by analyzing teacher-student interactions. For this, we developed a coding instrument conceptualising both sides of the interaction as variables: the student’s task progress (Student Level of Attainment) and the teacher’s support (Teacher Strength of Intervention). By relating both variables to each other, we devised rules for determining contingency as the quality of scaffolding, based on the “Contingent Shift Principle”. Our methodology proves effective for discerning contingent from non-contingent interaction.
patterns (micro-scaffolds). In order to correlate contingent scaffolding with learning outcomes, we conducted an empirical study using a Pre-Post-Design, including a 1-year follow up. Inter-rater-reliabilities for each coding step as well as results of the empirical part of study are presented. Is there an Interplay of Emotional Design and Learning with Inference Prompts? Keywords: Educational Psychology, Emotion and affect, Higher education, Instructional design Presenting Author: Sabrina Navrati, University of Mannheim, Germany Co-Author: Tim Kühl, University of Mannheim, Germany Co-Authors: Steffi Heitjä, Technical University of Dresden, Germany

Self-generated learning (SGL) activities are one way to support learners' comprehension of new learning material. SGL activities, such as answering inference-prompts, foster learners to work more actively and intensively on learning materials, which in turn may result in deeper comprehension. One aspect that might affect the effectiveness of this learning strategy is the emotional state of learners. Emotional states are recognized as important learning design elements such as color and themes in instructional design (van Merrienboer and Sweller). It is assumed that positive emotional states enhance intrinsic motivation and support the use of productive problem-solving and creative learning strategies. This in turn is supposed to be especially beneficial for self-generating tasks, such as answering inference-prompts. Contrary, negative emotional states lead towards rigid, analytical, and declarative learning strategies that might be particularly good for already given information, such as text. This study aims to explore the interplay of learning with (inference) prompts versus no inference-prompts and Emotional Design (positive vs. neutral vs. negative). Learners in a positive emotional state should benefit from learning with inference-prompts compared to better showing learning opportunities. Contrary, learners in a negative emotional state should benefit from learning without inference-prompts compared to inference-prompts. Learners in a neutral state should profit from learning with inference-prompts (but not in the same extent like learners in a positive emotional state) compared to no inference-prompts. Data collection is in progress. The results will be presented at the conference.

Session F 146

30 August 2017 15:45 - 17:15
Linnà: KT09
Poster Presentation: Cognitive Science, Developmental Aspects of Instruction, Instructional Design, Learning and Social Interaction
Poster Presentation: Learning and Development in Early Childhood
Keywords: Assessment methods and tools, Atlas-risk students, Cognitive development, Early childhood education, Educational attainment, Educational policy, Language (L1, Standard Language), Literacy, Motivation, Out-of-school learning, Parental involvement in learning, Primary education, Quantitative methods, Reasoning, Science-education, Social interaction, Student learning, Teaching / instruction, Writing / Literacy
Interest group: SIG 05 - Learning and Development in Early Childhood, SIG 10 - Social Interaction in Learning and Instruction
Chairpersons: Charalampos Charalambous, University of Cyprus, Cyprus

Preschool from Age Two: The perspectives of parents and teachers
Keywords: Early childhood education, Educational policy, Quantitative methods, Teaching / instruction
Presenting Author: Adriana Wiegrová, Tomas Bata University, Czech Republic
Co-Author: Peter GAVORA, Tomas Bata University, Czech Republic

In the Czech Republic preschools have traditionally provided education for children between the ages of three and six. This research responds on the new initiative of the Ministry of Education in the Czech Republic which issued a positive standpoint concerning acceptance of two years old children to preschools if conditions are favourable. This study concentrates on a sample of preschools which provide education for children of two and parents of these children. The purposes of the study are threefold: (1) To identify the key motives of parents to enrol their children into preschool and their view of the preschool’s education programme; (2) To find out how teachers adopt their processes to meet the developmental requirements of two years old children; (3) To determine the degree by which families and infrastructure setting for young children care for the interests of 15 preschools in the Zlin Region of the Czech Republic which provide education for children from age two to six. Preschools were selected to represent different areas, suburbs, and villages in the region. Three research methods were used: a questionnaire for parents, a questionnaire for teachers and a preschool setting description form. Final data will be presented at the conference.

Developing combinatorial reasoning among third grade pupils
Keywords: Cognitive development, Primary education, Reasoning, Science education
Presenting Author: Zofia Gabriela Szabó, University of Szeged, Hungary
Co-Author: András korom, University of Szeged, Hungary

The study looks at combinatorial reasoning, which is a skill playing an important role in problem solving, and experimental and scientific reasoning. Even though the fostering of thinking skills is an important task, few training programs focus on the development of combinatorial reasoning in a science context. The aim of our research was to develop a training program for the improvement of combinatorial reasoning in science and to analyse its effectiveness among third grade Hungarian students.

Our training program is based on Csapo’s (1998) theoretical model and focuses on the development of six combinatorial tasks. It contains 54 combinatorial tasks, with a story line embedded in a science context. The training experiment was led by the students’ regular teachers, who used our methodology.

To assess the effectiveness of the 6-8 week program, we assigned students to experimental (N=92) and control (N=73) groups, and measured their combinatorial reasoning competence with an online test (Csapó, Plastor & Molnár, 2015) before and after the training program.

The results show that combinatorial reasoning improved significantly in both groups. The mean improvement in the experimental group (17.9%) was more than twice the size of improvement in the control group (8.2%). The effect size of the training program was moderate (Cohen’s d=0.57), and the program had a greater impact on students having lower initial skills.

Our findings indicate that the combinatorial reasoning training program had the desired effect, and the science context could be successfully combined with combinatorial operations.

Individual and environmental factors interacting in vocabulary of elementary school children
Keywords: A-risk children, Language (L1, Standard Language), Parental involvement in learning, Social interaction
Presenting Author: Christian Müller, Institute of Psychology, Germany
Co-Author: Sebastian Poleszek, bristol university, United Kingdom
Co-Author: Bettina Reitzbach, Goethe-Universität Frankfurt, Germany
Co-Author: Gerhard Buettner, University of Frankfurt, Germany

The present study examined interactions effects of individual and environmental factors on predicting expressive vocabulary of mono- and bilingually elementary school children and with special focus on effects of family socio-economic status with I.Q. As individual factors non-verbal intelligence scores and short memory of words and non-words were assessed. As environmental factors, measures for social-economic-status and family language input regarding usage of society’s language at home were chosen. The sample consisted of 148 German elementary school children aged six to nine years. By structural equation models and stepwise regression, we found linear associations on predicting expressive vocabulary by all assessed individual and environmental factors (except for sex). Family language input at home in particular was highly related to vocabulary development. Additionally, interactions for non-verbal intelligence and family language whilst controlling other factors in this population were found suggesting that the impact of the ratio of German being spoken in the family on vocabulary development was less pronounced in children with higher non-verbal intelligence and particularly strong in those with a lower non-verbal IQ.

Oral text abilities of children attending kindergarten: development of a measurement instrument
Keywords: Early childhood education, Language (L1, Standard Language), Student learning, Writing / Literacy
Presenting Author: Iris Dinkelmann, Thurgau University of Teacher Education, Switzerland
Co-Author: Katharina Kirchhober, Thurgau University of Teacher Education, Switzerland
Co-Author: Dieter Ifer, Thurgau University of Teacher Education, Switzerland
Co-Author: Claudia Halb Christ, Thurgau University of Teacher Education, Switzerland

Based on theoretical assumptions and recent research, no one questions the importance of higher level literacy abilities as needed for reporting experiences or inventing stories for successful academic learning. These abilities - we conceptualise them as "oral text abilities" - develop long before formal reading and writing instruction takes place in school. However, they considerably vary across children dependent on their family background. Although there is clear empirical support for the assumption that these abilities can be fostered systematically in formal education, recent research shows a lack of awareness and instructional practices among kindergartened children. As we plan to conduct an intervention study (testing effects of intervention on oral text abilities), in this pre-study, we develop an instrument to measure oral text abilities of kindergartened children. Approximately 10 four- to six-year olds are videotaped while relating a silent animated movie in a standardized setting. The videos will be transcribed and the anonymous transcriptions will be rated on a five-point Likert scale (manual-based). Our poster (a) will document collection, rating as well as analysis procedures, and (b) will report the results concerning the factorial structure of the instrument.

Playful assessment of cognitive development in young children
Keywords: Assessment methods and tools, Cognitive development, Early childhood education, Educational attainment
Presenting Author: Corrie Urringsl, Maastricht University, Netherlands
Co-Author: Kirsten van Zanten, University of Technology and Economics, Netherlands
Co-Author: Lex Borghans, Maastricht University School of Business and Economics, Netherlands

School achievement tests and observations can be time consuming and it is debatable which aspects of development are precisely measured with tests and how objective observations are. The current study moves away from these traditional assessments of cognitive ability by exploring the potential use of play to assess cognitive development. We will focus specifically on executive function in young children aged 5-6 years old. For this purpose a wooden maze is transformed into an ‘assessment tool’. A combination of the new measurement instrument, a standardized test battery and children’s school test scores will give an insight into the exploratory research question whether and to what extent it is possible to assess (an aspect of) cognitive development using play. Results of the pilot study will be reported, which will be used to set up a larger arrangement.

Print exposure, independent reading and reading fluency among Finnish school-aged children
Keywords: Literacy, Motivation, Out-of-school learning, Quantitative methods
Presenting Author: Hanna Pihló, Niki Mäki Institute, Finland
Co-Author: Paula Sains, Niki Mäki Institute, Finland
Co-Author: Mikko Aro, University of Jyväskylä, Finland

In the present study 310 students from grade levels 2 to 5 (age 9-9.6 yrs, std=1.15) filled out a daily activity diary for one week. The reading-related activities were then analyzed and divided into two groups: independent reading and print exposure. Independent reading consisted of book reading, magazine/newspaper and comic reading. Print exposure consisted of homework, reading from a device and watching
Motivational commercials for framing learning: A large-scale goal-framing intervention

Keywords: E-learning / Online learning, Educational Psychology, Motivation, Presentation

Co-Author: Luke K. Fryer, University of Vermont, United States
Co-Author: Paul Ginnis, University of Sydney, Australia

Research has consistently demonstrated that the quality of students' motivation is a far better predictor of future learning processes and outcomes than the quantity. While experimental research has suggested that the quality of student motivation can be manipulated for short periods, intervening in student motivation on a broader scale has been pursued less often. The current study undertakes an intervention using short motivational commercials to stimulate students' intrinsic motivation.

The intervention consisted of a series of four short videos, each featuring a different scenario that highlighted the benefits of learning. The videos were designed to be engaging and visually appealing, with a focus on providing students with clear, actionable steps they could take to improve their motivation. The videos were distributed to students in a randomized order, and their impact on students' motivation was measured using a pre- and post-test design.

Results showed that students who watched the intervention videos reported significantly higher levels of motivation compared to those who did not. The videos were found to be effective in increasing students' intrinsic motivation, with improvements lasting up to one month post-intervention.

How do cognitive and emotive factors predict academic performance in secondary school children?

Keywords: Achievement, Emotional skills, Emotion and affect, Student learning

Co-Author: Enrica Donolato, University of Padova, Italy

Co-Author: David Geldré, Liverpool John Moores University, United Kingdom

Co-Author: Irene C. Mammarella, University of Padova, Italy

Academic success is linked with important personal and everyday life outcomes. Several studies focused on the role of cognitive factors such as intelligence and working memory in predicting academic performance. There is also abundant evidence on the role of emotive aspects, and in particular, anxiety, on school achievement. Finally, the role of personal factors, such as self-esteem and resilience, has also been noted. However, to the best of our knowledge, only few studies considered the joint role of these factors on academic achievement in children. In the present study, we studied development children attending sixth and eighth grades were presented with measures of WM, intelligence, anxiety, depression, self-esteem and resilience and academic achievement (including mathematics and reading measures). Results, using structural equation models showed that, for cognitive aspects, intelligence mediates the relationship between verbal and visuospatial WM and both mathematics and reading literacy. Moreover, risk and protective factors were highly correlated. Interestingly, risk factors only predicted mathematical literacy, while emotive protective factors only predicted reading literacy.

Overall, the present model explained a large portion of the variance both in mathematics (i.e., 89%) and reading literacy (i.e., 73%). Both theoretical and practical implications will be discussed.

Intra-individual variation in homework effort: Analyzing the effect of gender and conscientiousness

Keywords: Educational Psychology, Emotion and affect, Out-of-school learning, Parental involvement in learning

Co-Author: Brigitte Brisson, German Institute for International Educational Research (DIFP), Germany

One of the most discussed topics in terms of school is homework. Teachers often argue that homework serves as a valuable tool for students to gather deep knowledge about given subjects and for themselves to evaluate students' learning process. Recent research indicates that homework effort and emotions significantly affect its efficacy. It is supposed that homework effort and emotions are not stable within individuals but fluctuate depending, for instance, on individual student characteristics and the characteristics of the homework assignment. However, research on the reasons for intra-individual variation in homework effort and emotions is still rare. On the inter-individual level, students' gender, personality traits, and parental support have been shown to predict homework effort and emotions. The present study aims to investigate fluctuation rates of homework effort and emotions within students during a period of three weeks. Parental support, gender, and conscientiousness will be assessed as predictors of intra-individual variations in homework effort and emotions. The experience sampling method (ESM) is used to assess data on students' homework effort and emotions right in the moment of the homework experience in a sample of 624 students in Grade 5. Time series analysis is used to assess intra-individual variations in homework effort and the influence of parental support, students' gender, and conscientiousness on such variations.
Intervening to promote engineering student success in technical, non-major, required barrier courses

Keywords: Achievement, Engineering, Higher education, Motivation

Presenting Author: Jennifer Hueman, University of Oregon, United States
Co-Author: Katherine Nelson, Rowan University, United States
Co-Author: Kat Cheng, Arizona State University, United States

The current project examined engineering students’ motivation at the beginning of the semester (baseline) and at the end of the semester (final), and whether an intervention was beneficial for motivation development. Motivational variables included Future Time Perspective Connectedness (FTPC), Endogenous Perceptions of Instrumentality (PIEN), Utility Value (UV), Interest, and Belongingness (BEL). Students (N = 257) were randomly assigned to a control group or intervention group. Results indicated that engineering students who identified more with their engineering career at beginning of semester (baseline FTPC and BEL) viewed their ‘non-major class’ (Introduction to Biology) as more instrumental for future goals during baseline (PIEN). However, this career identity was not associated with end of semester motivation in class UV, Interest. Instead, both baseline and final PIEN were significantly positively associated with final UV and Interest. Interestingly, for engineering students taking a non-major course, PIEN, UV and Interest dropped over the semester (baseline vs. final) regardless of the intervention. Our findings imply the importance in sustaining motivation in engineering students when taking non-major courses.

Session F 148
30 August 2017 15:45 - 17:15
Pinni B - B3116
Poster Presentation
Higher Education, Instructional Design, Learning and Social Interaction

Poster Presentation: Argumentation, Dialogue and Reasoning

Keywords: Argumentation, Case studies, Collaborative Learning, Design based research, Doctoral education, Higher education, Literacy, Metacognition, Mixed-method research, Qualitative methods, Quantitative methods, Reasoning, Researcher education, Science education, Secondary education, Student learning, Workplace learning
Interest group: SIG 16 - Metacognition, SIG 24 - Researcher Education and Careers, SIG 26 - Argumentation, Dialogue and Reasoning
Chairperson: Ari Heritonen, Sophiahems medeltidsprogram, Sweden

Regulation of Collaboration: Regulatory Knowledge and Performance in Problem-based Learning

Keywords: Collaborative Learning, Higher education, Metacognition, Mixed-method research
Presenting Author: Jun Oshima, Shizuoka Univ., Japan
Co-Author: Hitoku Oshima, Shizuoka University, Japan
Co-Author: Takashi Shibata, Shizuoka University, Japan

We conducted a study by fusing the questionnaire and performance analysis approaches for elucidating the relationship between prior knowledge of collaboration and regulatory performance in collaborative learning. We first constructed four collaborative learning scenarios to ask students how they would behave in the situations presented and conducted it before their collaboration. We then used a CSEL system to support and record students’ reflections on their regulatory performance. Online logs and field notes were used as process data. Among 188 university students participating in a project-based learning curriculum, 13 high-regulatory performance and 18 low-regulatory performance students were selected as a sample for the analysis. A test of questionnaire scores revealed that scores by high-performance students were significantly higher, suggesting that prior knowledge influences regulatory performance in collaborative learning. Case studies based on online logs and field notes revealed that students with high prior knowledge used facilitative co-regulation strategies to improve their group regulatory performance when perceiving a socio-emotional challenge, and that students with high prior knowledge used self-regulatory strategies when perceiving a socio-cognitive challenge.

The aim of this study is to develop instruction to enable students to learn to detect and analyze disagreements among multiple conflicting texts. We developed and investigated the effects three forms of instruction intended to promote better reasoning about disagreements in multiple document tasks. 1) Instruction focused on “Causal Analysis” (CA) directed students to analyze causal expressions in documents. 2) Instruction focused on “Disagreement Detection” (DD) taught students to identify disagreements among the causal relationships in addition to identifying causal expressions. 3) “Disagreement Explanation” (DE) instruction included the components of CA and DD but additionally taught students about common explanations for disagreement, such as having access to different evidence. Ninety-three Japanese students were trained under one of these three conditions in two weekly sessions and then in a third session wrote a comprehensive essay regarding a set of conflicting texts about dieting methods. The result showed that the students who received DD and DE instructions reached different conclusions from those who received only CA instruction. This indicates the effectiveness of training students to detect disagreements. This paper discusses the potential of DD and DE instructions which encourages students to reason more deeply about disagreements among conflicting information in multiple documents. We also discuss future needed directions to promote better reasoning about disagreements in multiple documents.

Today we live in a complex environment in which new technologies keep emerging, promising to simplify everyday life. But some of these technologies seem to prompt negative feelings among the population, even though experts consider them to be harmless. At the same time, the perception of hazardlessness of new technologies is not only influenced by our knowledge about these technical developments. In fact, quite a number of factors determine the individually perceived risk. The present study aims to investigate how personal opinions and values, personal characteristics like anxiety, or varying sources of information influence students’ perceptions of risk in the field of Genetic Engineering (GE).

How we arrive at specific perceptions is part of a decision-making process. Within this process arguments are considered to come to a personal conclusion about whether a certain technology represents a possible threat for us. Based on this framework, we will examine if and how much individual risk perception of GE in students can be altered by a teaching unit that consists of an argumentation training on the issue of GE in food production.

Promoting collaboration with scripts and architectural design in start-up companies

Keywords: Case studies, Collaborative Learning, Design based research, Workplace learning
Presenting Author: Atsu Mylärinen, University of Oulu, Finland
Co-Author: Pia Markkanen, University of Oulu, Finland
Co-Author: Akku Vääräniemi, University of Oulu, Finland

Start-up companies might encounter challenges in their regulatory knowledge creation processes. Reasons for these challenges may be a consequence of spatial limitations and undefined ways of collaboration. The objective of this research project is to analyse how to create a work environments that support innovation and collaborative knowledge creation in start-up companies. Through studying collaborative knowledge creation and architectural features from employees’ perspective, it is possible to influence innovativeness of start-up companies. This proposal presents the current research project and further enlightens the development of upcoming phases based on the analysis of the collected data. Design based research is used to study prospects and challenges of working environments and these features are developed through concept design and pilot experiments in start-up company premises. A selection of different qualitative and quantitative methods are implemented to triangulate different aspects of employees’ collaborative work and work environment.

Exploring dialogue transformation in hybrid classrooms

Keywords: Design based research, Mixed-method research, Reasoning, Secondary education
Presenting Author: Jo Inge Johansen Frøydag, IPED, Norway

This poster reports on a PhD project that explores how dialogues are being transformed in hybrid classrooms. The project is part of a larger research collaboration, Digitalised Dialogues Across the Curriculum (DIDDAC), between the University of Oslo and the University of Cambridge, where design-based interventions are used to investigate how classroom dialogues and the use of digital technology come together to foster the development of 21st century skills, particularly collaboration and critical thinking skills (evaluating and integrating information, forming ideas, and justifying and communicating in and across knowledge domains).

Teachers and students will use a microblogging tool, Talkwall, which was designed to facilitate classroom discussion. Talkwall provides new ways to construct, distribute, organise and integrate knowledge, both individually and collectively, in a safe, localised environment (Rasmussen & Hagen, 2015). Therefore, it has the potential to expand the dialogic space (Wegerf, 2007). This expanded space is also a hybrid space, in which the dynamics between oral, written and digital dialogues are played out between the participants.

Research questions
1. How are dialogues transformed when they fluctuate between the analogue and digital arenas of hybrid classrooms?
2. To what extent do these transformations change the preconditions for meaningful participation in joint knowledge construction?
3. To what extent do these transformations contribute to the development of critical thinking and collaboration skills?

A combination of qualitative and quantitative methods will be used to investigate these questions on individual, social and cultural levels of analysis.

Session F 149
30 August 2017 15:45 - 17:15
Pinni B - B3110
Poster Presentation
Instructional Design
Poster Presentation: Instructional Design and Reading Comprehension

Keywords: Achievement, Cognitive skills, Comprehension of text and graphics, Computer-assisted learning, Educational Psychology, Experimental studies, Higher education, Instructional design, Knowledge creation, Mixed-method research, Multimedia learning, Pre-service teacher education, Reading comprehension, Secondary education, Self-regulation

Interest group: SIG 02 - Comprehension of Text and Graphics, SIG 06 - Instructional Design

Chairperson: Anne van Hoogmoed, University of Groningen, Netherlands

Relating information of different teacher knowledge components: Effects of writing tasks and prompts

Keywords: Comprehension of text and graphics, Instructional design, Pre-service teacher education, Reading comprehension

Presenting Author: Thomas Lehmann, University of Bremen, Germany

Co-Author: Benjamin Rott, University of Duisburg-Essen, Germany

Co-Author: Florian Schmidt-Borchardt, University of Bremen, Germany

This paper reports on an experiment that examined the effects of essay writing tasks and task-supplemental prompts on pre-service mathematics teachers’ integration of information from multiple documents that pertain to the core components of their professional knowledge. The study rests on findings about the efficacy of argument tasks and prompts, as well as methodological approaches for assessing information integration in multiple-documents learning settings. Also, the study builds on teacher competence models that include three conceptually different knowledge components, that is, content knowledge (CK), generic pedagogical content knowledge (PCK), and pedagogical content knowledge (POK). Hence, unlike the material used in most prior multiple-documents studies, the documents used in the present research pertained to these components and, hence, originated from different domains. The CK text included subject-matter knowledge on mathematical proving. The POK text included conceptual educational knowledge about information processing and the design of lessons. The PCK text included knowledge about pupils’ difficulties in mathematical reasoning and proving. A 100 pre-service teachers for mathematics in primary schools took part in a laboratory experiment or an argument writing task (factor 1), and either task-supplemental prompts or no prompts (factor 2). Results of a category driven analysis of participants’ essays suggest that pre-service teachers’ construction of an integrated mental model across the core components of their professional knowledge can be facilitated by argument tasks and prompts. Within-domain knowledge acquisition was not interfered by stimulating integration processes. Results are discussed within the realm of multiple-text understanding.

Educating trainee teachers through video modeling to manage confirmation bias in decision making

Keywords: Educational Psychology, Higher education, Instructional design, Pre-service teacher education

Presenting Author: Suzan van Brussel, Avaris Hogeschool / Avans University of Applied Sciences, Netherlands

Co-Author: Miranda Timmersma, Avaris Hogeschool / Avans University of Applied Sciences, Netherlands

Co-Author: Peter Verkoekhan, Erasmus University Rotterdam, Netherlands

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When people make judgments, they use mental shortcuts. These heuristics frequently yield accurate judgments but can give rise to systematic thinking errors of inductive reasoning known as cognitive biases (Nickerson, 1998; Twersky & Kahneman, 1974). A particularly pervasive bias is confirmation bias (Nickerson, 1998). This refers to the unconscious selectivity in the acquisition and use of evidence in the search for information. In primary school education, confirmation bias amongst teachers might have negative consequences for pupils. Hence, it is important to prevent confirmation bias in primary school teachers. To achieve this goal, instruction to trainee teachers should aim at reducing confirmation bias and helping them in making fair decisions in the classroom.

Previous findings (e.g., Koriat et al., 1980; Lord et al., 1994; Morewedge et al., 2015) suggest that instruction based on the consider-the-opposite (COS) technique might be effective in preventing confirmation bias. Furthermore, findings from the instructional design literature (Van Gog & Rummel, 2010; Hoogerhuij et al., 2014) suggest that video-based modeling may be suited to deliver a COS instruction. However, it is an open question whether a video-based modeling COS instruction should use authentic or generic tasks. In the present study we address this question for trainee teachers by examining an authentic video-based modeling COS instruction to a more video-based modeling COS instruction. Based on the existing literature on CT (e.g., Abrami et al., 2015), we hypothesize that authentic instruction will produce the best performance on practiced final test items and non-practiced final test items.

Should pictures be drawn during a lesson or presented already-drawn?

Keywords: Comprehension of text and graphics, Experimental studies, Instructional design, Multimedia learning

Presenting Author: Leonora Cooper, Utrecht University, Netherlands

Co-Author: Elisabeth Koster, Utrecht University, Netherlands

Pictures are often used to accompany a verbal explanation. These pictures can be drawn during the explanation or presented already drawn. There has been little research up to now into which of these methods is most effective. Investigating this can yield interesting results for education. In this current study, we let undergraduate students watch an illustrated narration about early embryonic development. The illustrations are either drawn during the lesson or presented already-drawn. In the second condition, there is a hand drawing or pointing at the pictures, or no visible hand. We measure retention of the presented information and collect interest ratings. The results will be discussed in light of Mayer’s multimedia principles.

Poking the cognitive process of tracing in learning via think aloud.

Keywords: Achievement, Educational Psychology, Experimental studies, Instructional design

Presenting Author: Paul Gins, University of Sydney, Australia

Co-Author: Michael Tang, University of Sydney, Australia

Based on empirical studies demonstrating pointing-based gestures may act to guide visual attention while learning (e.g. Dodd & Shumbrides, 2009; Fischer & Hoelten, 2004), and experimental research inspired by Montessori’s (1912) sandpaper letters (e.g., Kalkenin, Pinet, & Géartiz, 2011), a series of studies (Aghostino et al., 2015; Hu et al., 2015; Gins et al., 2015) have found explicit instructions to point the illustrations are either drawn during the lesson or presented already-drawn. The pictures can be drawn during the explanation or presented already-drawn. There has been little research up to now into which of these methods is most effective. Investigating this can yield interesting results for education. In this current study, we let undergraduate students watch an illustrated narration about early embryonic development. The illustrations are either drawn during the lesson or presented already-drawn. In the second condition, there is a hand drawing or pointing at the pictures, or no visible hand. We measure retention of the presented information and collect interest ratings. The results will be discussed in light of Mayer’s multimedia principles.

Effects of modality of feedback presentation on post-feedback behavior in task-oriented reading

Keywords: Cognitive skills, Computer-assisted learning, Reading comprehension, Self-regulation

Presenting Author: Amelia Mara, University of Valencia, Spain

Co-Author: Vicenta Avila, University of Valencia / Interdisciplinary Research Structure for Reading Research (ERI) Lectura, Spain

Co-Author: Eduardo Vital-Abacar, Universidad de Valencia, Spain

We tested two different modalities of feedback presentation (oral and written-feedback) in a computer-based educational environment for 4th and 8th graders. We investigate to what extent the modality of presentation has an effect on the post-feedback behavior and on performance as well, in a task-oriented reading situation. Additionally, we are also interested in to test the role of general comprehension and working memory level of students. We expected that (a) oral feedback will benefit students in post-feedback behavior and in performance and (b) this kind of feedback will be especially useful for less-skilled students in working memory. As this is an ongoing study, results will be presented at the conference.

Examining Collective Inquiry and Knowledge Advances in a Knowledge Building Environment

Keywords: Computer-supported collaborative learning, Mixed-method research, Secondary education, Knowledge creation

Presenting Author: Yoyao Tong, The University of Hong Kong, China

This paper examined the role of a designed computer-supported knowledge building environment on domain knowledge, nature of Knowledge Forum® (KF) contribution, and explanatory and collective inquiry in KF. Participants were forty Grade 9 students studied in a Chinese language and literature course in a Hong Kong secondary school. Students worked in a computer-supported knowledge building environment used Knowledge Forum® (KF), an online discussion platform, to engage in the collective inquiry and pursued of idea improvement. Analyses indicated that there is a significantly post-pre improvement in domain knowledge; as well, students also viewed their experience in knowledge building classroom more positively in terms of collaboration and learning approaches. Correlation analysis suggested that KF participation, KF engagement, students’ explanatory inquiry, views of collaboration and learning approaches were correlated. Furthermore, regression analysis showed that students KF participation, rise above efforts, and KB explanatory inquiry predicted students’ domain understanding. Implications of examining the knowledge building environment on students’ views on collaboration, approaches to learning and knowledge are discussed.

Session F 150

30 August 2017 15:45 - 17:15
Main Building - E322
Poster Presentation
Anatomical knowledge

Poster Presentation: Assessment Methods and Tools

Keywords: Achievement, Assessment methods and tools, Attitudes and beliefs, Cognitive development, Cognitive skills, Comprehension of text and graphics, Higher education, Interdisciplinary, Learning analytics, Mathematics, Misconceptions, Mixed-method research, Motivation, Numeracy, Primary education, Problem solving, Secondary data analysis, Student learning

Interest group: SIG 61 - Assessment and Evaluation, SIG 137 - Methods in Learning Research

Chairperson: Marts Blikstad-Balas, ILS, University of Oslo, Norway

Assessing in partnership: Involving students in formative assessment.

Keywords: Assessment methods and tools, Higher education, Mixed-method research, Student learning

Presenting Author: Elly Vermunt, Zuyd Hogeschool, Netherlands

Co-Author: Dominique Sluijsmans, Zuyd Hogeschool, Netherlands

Balancing the formative and summative function of assessment in higher education is a challenging task for teachers. The aim of this study is to increase students’ learning by involving them actively in the cyclic assessment process by means of formative activities. For this purpose, we distinguished three research phases. In the first phase, we conducted a literature review. The aim of this review was to indicate which formative activities are effective with regard to the six steps in the assessment process. We found that generating assessment criteria together with students and self-assessment on a draft are effective
activities. They provide valuable feedback to the students during the phases of defining learning outcomes and assessments. Peer-assessment is a valuable activity during the steps of test taking and analysis. Involving students in understanding the assessment results provides feed forward for future learning.

In the second research phase, we investigated students' and teachers' perceived formative value within the steps of the assessment process. Results from interview data reveal that students find it difficult to understand the assessment criteria and the required standards. Based on this finding, we conducted an experimental study in the third research phase. This study examines the effect of student involvement in defining assessment criteria on students' performance and motivation. Preliminary results show that engaging students in setting the assessment criteria and the required standards and applying these to exemplars is beneficial for their learning and performance.

Comparing the consequences of various measurement error presentations in test score reports

Keywords: Assessment, Formative assessment, Test scores, Comprehension of test results, Graphics, Mixed-method research, Primary education

Presenting Author: Dorien Hopster-den Ottor, University of Twente, Netherlands

Co-Author: Saskia Wolfs, Cito, Netherlands

Co-Author: ThaoEigen, Cito/University of Twente, Netherlands

Co-Author: Bernard Velkamp, University of Twente, Netherlands

This paper aims to determine (1) to what extent the presentation of measurement error information results into different educational decisions, and (2) users' preferences relating to the various presentations. The study compares four presentation formats: truth, CI/TV, CI/TV, no error, and no measurement error. A mixed-method design was used, consisting of a survey experiment, think-aloud protocols and focus groups. In the survey experiment, the presentation formats were systematically varied. Each format represents the test score report of a hypothetical student. Participants were asked to assign each student to a group (I, II or III) or to indicate that they need additional information for this decision. Qualitative data from think-aloud protocols and focus groups were gathered to obtain deeper analysis and interpret the findings of the survey. Preliminary results of 77 preservice teachers show that the presentation of error seems to little influence decisions of participants. However, participants prefer the formats with error more than the format without error.

Symbolic number processing and mathematical achievement in adults

Keywords: Achievement, Cognitive skills, Mathematics, Numeracy

Presenting Author: Josefine Oriarta, University of Salamanca, Spain

Co-Author: Laura Martí, University of Salamanca, Spain

Co-Author: Rosario Sánchez, University of Salamanca, Spain

Co-Author: University of Salamanca, Spain

Co-Author: Lieven Verschaffel, KU Leuven, Belgium

Co-Author: David Muneez, National Institute of Education / Nanyang Technological University, Singapore, Singapore

The development of numerical abilities and math-related skills, both in children and adults, has become a heavily researched topic in the last years. Some of these studies have shown that the performance in symbolic number processing tasks relate to math achievement, although it is not still clear what mechanism is responsible of this relation. It could be either the automatic symbol processing, or the access to magnitude representation from the symbols. To answer this question, in the current study we used three different symbolic number processing tasks with adult participants: 1) number comparison, whose measure of "numerical distance effect" would reflect, indirectly, the access to magnitude representation 2) pure symbolic processing and 3) one task of direct access to magnitude (from symbols to magnitudes). As measures of arithmetic achievement two tests were used: arithmetic fluency and mental calculation. It was conducted a hierarchical regression analysis taking into account the intelligence, processing speed and verbal and spatial working memory. This analysis showed that the three measures of symbolic number processing contributed to the variance of arithmetic fluency even when the effects of non-numerical abilities were controlled for. On the other hand, only the access to magnitude representation contributed to the variance on mental calculation. These results suggest that arithmetic achievement is built upon the abilities to automatically process symbols and to access to their magnitude, although this relationship is mediated by arithmetic achievement measures.

Procedural and Conceptual Knowledge: Problems in Definitions and Assessment

Keywords: Assessment methods and tools, Cognitive development, Mathematics, Problem solving

Presenting Author: Christian Hartmann, Ruhr University Bochum, Germany

Co-Author: Nikol Rummet, Ruhr University Bochum, Institute of Educational Research, Germany

Co-Author: Julia Erdmann, Ruhr University Bochum, Institute of Educational Research, Germany

Domain-specific knowledge can be divided into different types of knowledge. In research on learning in mathematics, a commonly used typology is that of conceptual knowledge (CK) and procedural knowledge (PK). Research on CK and PK comprises a debate on the developmental interrelations between these two knowledge types. In the current work we claim that conclusions on these interrelations are not possible so far: different definitions lead to different operationalizations. This accounts for differences in measurement, which makes it impossible to generalize across studies. Furthermore, results of a large amount of studies use operationalizations that do not allow for a clear distinction between the two knowledge types. Supporting this finding, factor analyses were so far not able to extract two latent factors. Instead intercorrelations between measurements of CK and PK are high. This paper looks at commonalities across and differences in assessment and underlying definitions of CK and PK as well as different views of their interrelations. Problems emerging from these differences in definitions and assessment and from certain ways of assessment are discussed. We envisage a reconceptualization of CK and PK involving a systematic review of literature from research on learning an instruction as well cognitive psychology.

Translating between temporal representations for human interaction

Keywords: Interdisciplinary, Learning analytics, Mixed-method research, Secondary data analysis

Presenting Author: Kristine Lund, University of Lyon, France

Co-Author: Matthieu Guignard, University of Lyon, France

Co-Author: David Shaffer, University of Wisconsin-Madison, United States

Traces of human interaction that come from recordings of audio and video data can be organized into temporal representations that have different affordances. In this contribution, we look at the affordances of two different representations, and at how translating between them can give added insight into the data being analyzed. To illustrate this, we use audio data of a discussion analyzed for its emotional characteristics. An initial groundup analysis divided the discussion into four phases. In what follows we examine this original analysis using two different tools: a histogram representation that shows the temporal distribution of indicators of engagement, and epistemic network analysis, an aggregated representation that shows how the pattern of associations among these indicators differ among the phases. We look at the interaction between these representations by show how it points to third translation of the data that re-anchors the interpretation of the data back into the temporally contextualized human interaction.

Although this data is not from a pedagogical task, we argue that the analysis of emotion is a key component of knowledge construction. The ability to use multiple representations to characterize the emotional components of coded human interaction data is thus potentially an important tool in the study of learning.

When Strategic Graphical Interpretation Fails: The Influence of Prior Belief and Political Identity

Keywords: Attitudes and beliefs, Comprehension of text and graphics, Misconceptions, Motivation

Presenting Author: Ian Thacker, University of Southern California, United States

Co-Author: Neil Jacobson, University of Southern California, United States

Co-Author: Robert Danielson, University of Southern California, United States

Co-Author: Gale Sinatra, University of Southern California, United States

This study investigated whether understanding difficult science concepts such as climate change or vaccination risk is a function of learners’ inability to parse complex scientific graphics, or a function of their prior beliefs and political identity. We asked 120 Americans drawn from an online environment to read the famous “hockey stick graph” depicting global temperature change over time (mann et al., 2008). We randomly assigned participants to view one of three versions of the data in the “hockey stick graph” relating to global temperature change over time, housing prices over time, or the number of diagnosed cases of childhood autism over time. Results revealed that in general participants in all conditions had a difficult time interpreting the graph, yet when the graph was labeled as portraying temperature change over time, their political identity was predictive of how they interpreted changes in the data. In other words, in the absence of understanding, prior beliefs, and political identity predicted the kinds of causal inferences that they ascribed to rates of change in a graphical display but only when the graph depicted climate change. These results highlight the importance of research addressing the role of prior perspectives in the meaning making process of socially and politically charged topics.

Session F 151
30 August 2017 15:45 - 17:15
Main-Building A - A 08
Poster Presentation

Educational Policy and Systems, Motivational, Social and Affective Processes

Poster Presentation: Motivation and Educational Evaluation

Keywords: Assessment methods and tools, Attitudes and beliefs, Culture, Educational policy, Educational Psychology, Emotion and affect, Experimental studies, Goal orientation, Motivation, Motivation and emotion, Primary education, Quantitative methods, School effectiveness, Special education, Survey Research, Teaching / instruction

Interest groups: SIS 08 - Motivation and Emotion, SIS 23 - Educational Evaluation, Accountability and School Improvement

Chairperson: Angelika Kulberg, University of Gothenburg, Sweden

“I don’t feel alone”: Young girls’ emotional bonds with media

Keywords: Attitudes and beliefs, Culture, Primary education, Motivation and emotion

Presenting Author: Susan Bellman, Curtin University, Australia

There are concerns regarding the use and impact of media in relation to girls and young women, but there is relatively little research focusing on the experiences and perceptions of young girls.
This paper reports some of the findings of a larger, five phase, feminist, mixed research study in a small Australian school. Interviews with educators (n=5), parents (n=7) and young girls (n=14) were analysed using a phenomenological approach to elicit key themes for each group. Common and contrasting perspectives were then identified. Adults felt that media were powerful and pervasive but also expressed some reservations about the proliferation of media and the representations of girls and women. The adults set boundaries and enabled various levels of access for the young girls who showed strong emotional and intellectual engagement with a variety of media. While further research is needed to examine children’s views, the findings point to some recommendations for parents and educators as well as a broader conceptualisation of the position of media in our society.

Teachers’ Emotions: lesson, student-group and teacher effects
Keywords: Emotion and affect, Quantitative methods, Qualitative methods, Instruction, Motivation and emotion
Presenting Author: Lars-Erik Malberg, University of Oxford, United Kingdom
Co-Author: Reinhard Pekrun, Ludwig-Maximilians-Universität (LMU), Germany
Teaching can be an inspiring profession potentially leading to positive emotions and a sense of accomplishment. At the same time it can be a stressful profession, reflected in negative emotions and exhaustion. Teachers’ emotions are associated with experiences in lessons, student groups, relations with colleagues and parents of students, and personal characteristics. Following Pekrun’s (2006) control-value theory we posited that emotions would be related to situation-specific mastery experiences, student engagement in lessons, and teachers’ trait characteristics. Going beyond previous studies of teachers’ emotions we investigated situation-specific positive (emotions felt in the lesson) and negative emotions (anxious and hostile affect) in 1055 lessons with 385 student groups of 43 teachers in England. We collected situation-specific measures of these variables toward the end of each lesson using an electronic questionnaire in handheld computers (Personal Digital Assistant). An initial four-factor model was specified using two-level and three-level Bayesian structural equation models in Mplus: vitality (enthusiastic, energetic), positive affect (calm, relaxed), anxious affect (nervous, tense), and hostile affect (angry, frustrated). We included predictors at the lesson-level (situation-specific mastery experiences and perceived students’ behavioural engagement and engagement with learning) and teacher level (teacher self-efficacy, teacher experience, sense of accomplishment, and exhaustion). At the lesson-level vitality and positive affect were positively associated with mastery experiences and student engagement. Anxious and hostile affect were negatively associated with mastery experiences and student engagement. At the teacher-level vitality and positive affect were associated with a sense of accomplishment. The effect of praise by friends on intrinsic motivation
Keywords: Educational Psychology, Experimental studies, Goal orientation, Motivation
Presenting Author: Kysuake Kakinuma, Doshisha University, Japan
Co-Author: Ayumi Tanaka, Doshisha University, Japan
Much research has demonstrated that people who receive ability-focused praise tend to hold to entity theory (a view of intelligence as a fixed trait), and their intrinsic motivation decreases. People who receive effort-focused praise hold to incremental theory (a view of intelligence as malleable), and their intrinsic motivation increases. However, these studies focused on praise by top-position individuals (e.g. teacher, parent, experimenter). The current research examined whether ability or effort praise by friends also affected intrinsic motivation. We used a friendship situation in which the students worked on the same task to measure motivation (e.g. students take the same tests in the classroom). Thus, participants and confederates worked on the same task, and confederates praised participants for their performance. Results suggested that effort praise could positively affect intrinsic motivation, although praise did not affect theories of intelligence. The finding partly supports the idea that praise by friends affects intrinsic motivation.

Emotion regulation and achievement emotions in elementary school children: longitudinal data
Keywords: Emotion and affect, Primary education, Quantitative methods, Motivation and emotion
Presenting Author: Daniela Raccanello, University of Verona, Italy
Co-Author: Margherita Bordini, University of Verona, Italy
Co-Author: Angelica Moi, University of Padova, Italy
Co-Author: Stephanische Lichtenfeld, Ludwig-Maximilians-Universität, Munich, Germany
The role played by achievement emotions in influencing students’ wellbeing and performance is increasingly gathering attention within the psychological literature (Pekrun & Linnenbrink-Garcia, 2014). However, little is still known about how achievements emotions may affect achievement outcomes. Based on how achievement emotions changed over time, we investigated whether achievement emotions can predict the development of students’ achievement emotions. Fifty-five students were asked to complete two self-report inventories before the end of each lesson using an electronic questionnaire in handheld computers (Personal Digital Assistant). An initial four-factor model was specified using two-level and three-level Bayesian structural equation models in Mplus: vitality (enthusiastic, energetic), positive affect (calm, relaxed), anxious affect (nervous, tense), and hostile affect (angry, frustrated). We included predictors at the lesson-level (situation-specific mastery experiences and perceived students’ behavioural engagement and engagement with learning) and teacher level (teacher self-efficacy, teacher experience, sense of accomplishment, and exhaustion). At the lesson-level vitality and positive affect were positively associated with mastery experiences and student engagement. Anxious and hostile affect were negatively associated with mastery experiences and student engagement. At the teacher-level vitality and positive affect were associated with a sense of accomplishment.

Distribution of resources: A quantitative study on loci of action in elementary schools
Keywords: Educational policy, Primary education, Quantitative methods, Special education
Presenting Author: Jennifer Lambrecht, University of Potsdam, Germany
Co-Author: Stefanie Boss, University of Potsdam, Germany
Co-Author: Thorsten Henke, University of Potsdam, Germany
Co-Author: Katja Bogda, Universität Potsdam, Germany
Co-Author: Nadine Spöner, University of Potsdam, Germany
As 167 state parties ratified the Convention on the Rights of Persons with Disabilities, they are to ensure that children with special educational needs (SEN) receive the support required to participate in the general educational system. Hence, in many countries educational politicians allocate additional resources to inclusive schools. When those resources are distributed within schools, the underlying logic of action might differ from the one intended and between schools. In our study we focused on the question to what extent underlying logics and between-distribute personal resources differ between schools, even though they act under the same political conditions. The sample to address this question consisted of N = 76 primary schools, that received the same personnel quotas. In a standardized questionnaire, school principals assessed their own school (path A) and many students with administrative relevant attributes (e.g., SEN) learned in a class and b) how many resources from specific personnel quotas were present in that class (e.g., two hours from quota for students with SEN). Underlying logics were assumed if significant relations between personnel quotas and students attributes occurred. Preliminary analyses revealed high variance in the correlation coefficients between schools. Further analyses are being conducted to identify schools that use similar patterns of loci of actions.

The impact of evaluation context, motivation and social desirability on school self-evaluation data
Keywords: Assessment methods and tools, Educational policy, School effectiveness, Survey Research
Presenting Author: Jorich Faddar, University of Antwerp, Belgium
Co-Author: Jan Vanhove, University of Antwerp, Belgium
Co-Author: Jan De Maeyer, University of Antwerp, Belgium
School self-evaluation (SSE), as a means to enhance educational has gained a prominent position in many education systems. An SSE process is characterised by collecting data on a school’s functioning, where a judgement is made upon in order to take decisions within the framework of school development. These data are often collected by administering questionnaires among teachers working in the school. However, in order to obtain quality data it is vital that respondents are motivated to fill in the questionnaire, and avoid to respond socially desirable, both in a development or accountability evaluation context. This study aims to examine to what extent respondents’ motivation and tendency towards socially desirable responding is affected by the evaluation context, and to what extent there is an impact on SSE results. An authentic SSE with a quasi-experimental design has been set up in an educational service organisation in Flanders (Belgium). Findings show that evaluation context has no significant impact. However, variance in respondents’ motivation and tendency towards socially desirable responding has indeed an effect on SSE results. The paper discusses the findings for theory development within the field of SSE research and the implications for SSE practitioners.

Session F 152
30 August 2017 15:45 - 17:15
Pinn B - B3111
Poster Presentation
Developmental Aspects of Instruction, Instructional Design, Learning and Instructional Technology, Learning and Social Interaction
Poster Presentation: Metacognition and Writing
Keywords: Achievement measurement, Cognitive development, Cognitive skills, Collaborative Learning, Computer-supported collaborative learning, Developmental processes, E-learning / Online learning, Educational Psychology, Instructional design, Language (L1-Standard Language), Learning analytics, Literacy, Metacognition, Misconceptions, Professions and applied sciences, Reading comprehension, Self-regulation, Teaching/ instruction, Writing / Library
Presenting Author: Sigríður SIG 16 - Metacognition
Chairperson: Sanna Järvelä, University of Oulu, Finland
Uncertainty monitoring of open-ended and true-false questions in primary school children
Keywords: Cognitive development, Cognitive skills, Metacognition, Reading comprehension
Presenting Author: Martina Steiner, University of Bern, Switzerland
Co-Author: Claudia Roebbers, University of Bern, Switzerland
Co-Author: Vanou van Loon, University of Bern, Switzerland
Co-Author: Natalie Guggisberg, University of Bern, Switzerland
This research examined primary school children’s ability to give accurate confidence judgements (CJs) after answering two different types of text related questions. A special focus was laid on age differences in uncertainty monitoring. In Ito’s presented study children younger group; 2nd grade; older group; 6th grade) read six expository texts and answered two open-ended and three true-false (T-F) questions for each text. In addition, both age groups performed similar CJ tasks for each answer and T-F questions. An age-related progression in uncertainty monitoring was observed in open-ended questions, with older children giving lower CJs to incorrect answers than younger children. Children for incorrect answers in T-F questions were similar across both age groups and markedly higher than CJs for incorrect answers in open-ended questions. Together these findings suggest a developmental progression in terms of uncertainty monitoring when answering open-ended questions. Moreover, the results showed a difference in uncertainty monitoring depending on the question type, with CJs following T-F questions were more positively biased across both age groups than CJs following open-ended questions.

**Learners’ Self-Regulatory Behaviour and its Relation to Designs of Blended Learning Environments.**

**Keywords:** e-learning, Online learning, Instructional design, Learning analytics, Self-regulation

**Presenting Author:** Stijn Van Laer, KU Leuven, Belgium

Co-Author: Jan Ellen, KU Leuven, Belgium

Instruction via blended learning environments, and the large variety of online and face-to-face interventions that came with it, has become increasingly popular in the last few decades. However, the conditions under which such environments are successful remains unclear. Studies suggest that blended learning challenges learners’ self-regulation. Yet little is known about learners’ self-regulatory behaviour in these environments and how this relates to their design. This limited understanding is problematic since the effectiveness of a learning environment is determined by it. The aim of this study was therefore to identify learners’ self-regulatory behaviour profiles in blended learning environments and to relate them to the design of these environments. To do this, we first captured learners’ self-regulatory behaviour in six blended learning courses (n=137). Trace data was analysed for frequency, diversity and sequences. Three user profiles were identified (internal regulator, external regulator and mis-regulator), confronted with the literature and related to performance. Subsequently the design of each of the learning environments was described, using a framework based on seven blended learning environment attributes that support self-regulation. Although this study focuses mainly on the online component of the learning environment, the results indicate that fewer learners with an undesirable profile (mis-regulators) are identified in courses which have thoughtfully integrated self-regulatory design attributes. This finding highlights the need to integrate attributes that support self-regulation in the design of blended learning environments. This contribution will further elaborate on the user profiles identified and addresses implications for the design of blended learning environments.

**Integrating direct instruction and discovery learning based on Thinking-after-Instruction approach**

**Keywords:** Achievement, Educational Psychology, Metacognition, Misconceptions

**Presenting Author:** Tatsushi Fukuya, Gunma University, Japan

Co-Author: Shinya Ohtaki, University of Tokyo, Japan

Co-Author: Shintaro Ichikawa, University of Tokyo, Japan

This study tried to examine the effects of a Thinking-after-Instruction (TAI) approach, which integrate teachers’ direct instruction and students’ discovery learning (Ichikawa, 2004). Fifty-six Japanese 8th-grade students taking five day science classes were assigned to three groups: TAI group, semi-TAI group, and Thinking-before-Instruction (TBI) group. In the classes, TAI students received teachers’ direct instruction while TBI students received the same instruction and was explained what teachers explained in pairs to check their own comprehension, tried to discover the solutions of deepening comprehension tasks, and described what they understood and did not understand. In the semi-TAI group, students engaged longer in the deepening comprehension task instead of checking comprehension. Before receiving teachers’ direct instruction, TBI students tried to discover the solutions of basic concept tasks but did not work on comprehension checking and self-evaluation. Post-test results demonstrated that TAI students showed better performance on the basic concept test and deepening comprehension test than other groups.

**Development and automatization of the writing process in Chilean school students**

**Keywords:** Cognitive development, Developmental processes, Educational Psychology, Writing / Literacy

**Presenting Author:** Elvira Jirásk, Universidad de Chile, Chile

Co-Author: Carmen Sotomayor, Universidad de Chile, Chile

A good writer deploys cognitive skills such as planning, reviewing, and monitoring of his writing process in order to produce a coherent text meeting the communicative objectives of the task at hand. Achieving this requires the automatization of certain processes such as graphomotor execution and orthography, all of which make up the use of working memory capacity. Recent research has suggested that this automatization implies a release of cognitive resources, allowing students to develop the higher-level processes involved in written production. This presentation will show the results of an ongoing research project aimed at studying the automatization of the writing process in Chilean students. The final sample will include students from 3rd, 6th, and 9th grades. Written productions will be recorded and analysed using natural language processing and will allow to assess writing speed and other relevant variables. A Thinking Aloud protocol will be also included to observe and understand how the writing process unfolds. We will also assess students’ working memory capacity and the development of ideas in the written productions. The main hypothesis is that increased automatization will be associated with higher-level processes in writing and more complex development of ideas in the written text.

**A cognitive perspective of how authors and author-to-be describe their writing processes**

**Keywords:** Language (L), Standard Language, Literacy, Teaching / instruction, Writing / Literacy

**Presenting Author:** Victoria Johansson, Lund University, Sweden

In this qualitative examination of writing development, the attention is on how good adult writers develop into even better writers. Knowledge about advanced learning and development are important tools for understanding teaching and learning at all levels. This paper examines the writing development through an in-depth interview study of university students on a two-year creative writing program. We compare these students’ writing, planning, reviewing, and monitoring the reader, at the beginning and the end of the program. In addition, these results are compared to established authors reasoning around the same theme. The authors are discussed in relation to Hayes & Flower’s model of cognitive processes during writing, and Kellogg’s notion of ‘knowledge craters’, as being an advanced developmental stage of writing competence. Results suggest that the gap between the authors and the students is observable during the education. Further, we can see how the authors-to-be develop from self-centred writers who are engaged in expressing themselves through the text, to authors that are consciously using the text to evoke reactions in the readers. Further, many of the authors-to-be describe how they have come to appreciate the planning and reviewing processes of writing, which is in line with how the established authors describe their writing processes. This study gives a contribution to the field of life-long learning and development of writing. It will also add important knowledge for the development of teaching methods for adult writers.

**Socially Shared Metacognition in a Project Based Learning Environment: A Comparison Study**

**Keywords:** Collaborative Learning, Computer-supported collaborative learning, Metacognition, Professions and applied sciences

**Presenting Author:** Niki Bobrowski, University of North Carolina at Chapel Hill, United States

Co-Author: Kayley Lyons, University of North Carolina at Chapel Hill, United States

Co-Author: Jacqueline McLaughlin, University of North Carolina at Chapel Hill, United States

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Despite an increase in research on socially shared regulation of learning (SSRL), there remains a dearth of studies on socially shared metacognition (SSM). As a research community, we still lack understanding concerning how groups co-construct metacognitive knowledge, skills, and experiences. In this study, we analyzed video recordings from group meetings comprised of students enrolled in their second year of a health professions degree program. Six groups of students volunteered to participate in a pilot using a new mobile application (app) that teaches student groups individualized strategies to address identified areas of improvement. This analysis has informed the development of a coding scheme that characterizes the socially shared metacognitive processes of small groups in a project based learning environment. Using log data collected from the app, we distinguished which groups ranked highest and lowest overall for metacognitive experiences (ME), and then examined differences in the SSM processes between these groups. Finally, we studied how these processes changed over time. Initial findings show promising instances of SSM present in several groups. These will be explored in more depth throughout the course of the study and upon its completion.

**Session F 153**

30 August 2017 15:45 - 17:15

Pin B - B3117

Poster Presentation

**Teaching and Teacher Education**

**Poster Presentation: Teaching Approaches**

**Keywords:** Attitudes and beliefs, Citizenship education, Cognitive skills, Collaborative Learning, Competencies, Higher education, Interdisciplinarity, Knowledge creation, Metacognition, Mixed-method research, Professional teacher education, Qualitative methods, Reflection, Teacher Effectiveness, Teacher Professional Development, Teaching / instruction, Teaching approaches, Video analysis

**Interest group:** SIG 11 - Teaching and Teacher Education

Co-Author: Ann-Carlia Evelson, Uppsala University, Sweden

**Linking the unlikable – transdisciplinary collaboration between universities and business**

**Keywords:** Citizenship education, Collaborative Learning, Interdisciplinary, Knowledge creation

**Presenting Author:** Petra Sibbroeker, Institute for Ecological Economics/ Regional Centre of Expertise on Education for Sustainable Development Vienna (RCE Vienna), Austria

Co-Author: Claudia Lintner, Free University of Bolzano, Italy

Co-Author: Johanna Bernhardt, Terra Institute, Italy

Co-Author: Marco Reckmann, University of Voehla, Germany

Sustainable development needs the active participation and collaboration of many different actors in society. Clearly there is a need for new learning settings supporting solution strategies responding to
current challenges manifested in ecological, social, political and financial crises. Transdisciplinary collaboration between universities and business enable both parties to respond to many challenges deriving from global transformation processes. Their potential to overcome the existing theory-practice gap and promotion of sustainable innovations is an essential contribution for the transformation towards a sustainable society. The theoretical framework is built on the concepts of transdisciplinarity, transformative education, science-society interfaces and sustainability-driven entrepreneurship. The paper asks how education for sustainable development in general and for sustainability-driven entrepreneurship in particular can be fostered by creating and implementing innovative collaboration forms between universities and business. The empirical data is based on 75 qualitative semi-structured interviews conducted with entrepreneurs and university teachers. Three good practice examples of collaboration formats are discussed in detail. The findings illustrate different solutions and key features applied by regional knowledge alliances of heterogeneous stakeholders. The experimental formats are oriented towards three core aspects of a transformative learning approach (1) demand driven integration of sustainability topics (2) innovative learning methods and (3) transdisciplinary learning spaces. Further it is explained how understanding, sharing and promoting those features can help to upscale collaboration strategies to a transnational scale. In sum, the paper provides valuable bridging strategies helpful for political and societal decision-making as it elaborates on mutual learning processes of rather detached worlds – universities and business.

The role of beliefs in teacher education. Reflecting on pedagogical beliefs

Keywords: Qualitative methods, Reflection, Teacher Effectiveness, Teacher Professional Development

Presenting Author: Eveline Christof, University of Innsbruck, Austria, Austria

This contribution will focus on the factor of teacher beliefs and their role in teacher education. Beliefs, attitudes or subjective theories play a key role in teachers’ actions and their behavior in the classroom.

Teacher training at the university is limited by breaking up these strong behavior-determining elements. This is the background for the unchanged passing of patterns about the structures of school in general and about teaching and learning in particular from one generation of teachers to the next. (cf. Böhmke 2004, Richardson 1996, Zeichner 1986)

Professional teacher education has to provide different settings for teacher students to reflect upon their beliefs about school, teaching and learning. Reflection is a central topic at all teacher training institutions.

Teacher training institutions developed different ideas and concepts in order to implement some forms of reflection in teacher education. (i.e. Rothers 2012, von Felten 2005, 2011) This contribution shows the implementation of a method which is experimentally applied in the field of teacher education at the University of Innsbruck to stimulate students’ reflective competence. Moreover, first results of the application of the method are presented. Central research question: How can teacher students reflect upon their pedagogical beliefs during their teacher education studies to develop a professional self.

How do situated competences in classroom management develop over teacher education?

Keywords: Competencies, Higher education, Pre-service teacher education, Teacher Professional Development

Presenting Author: Barnabettis Gold, University of Erfurt, Germany

Co-Author: Manfred Holodynski, University of Muenster, Germany

Classroom management problems are important stressors of beginning teachers and experienced teachers (Veenman, 1984), and student teachers claim to be ill-prepared for dealing with student misbehavior and misattitude (Jones, 2006). Therefore, one important aim of teacher education is to be situated and practice-oriented. The aim of the present longitudinal study was to investigate whether professional vision and strategic knowledge of classroom management, as two situated and practice-relevant classroom management competences, develop over bachelor and master studies as well as over the practice phase in teacher education (the Referendariat in Germany).

183 primary student teachers participated in their first and their fifth or sixth bachelor semester. Further 102 primary student teachers from several German universities participated in their first and last master semester as well as at the end of their Referendariat.

Latent change analysis with respect to the professional vision of classroom management indicated a significant latent increase from the beginning to the end of the bachelor studies (θ = 0.39) as well as from the beginning to the end of the master studies (θ = 0.68). There was no significant latent change from the end of the master studies to the end of the Referendariat.

The strategic knowledge of classroom management did not significantly change during the university phase of teacher education. From the end of the master studies to the end of the practice phase a significant latent increase occurred (θ = 0.25).

Teachers’ Epistemic Cognition in Classroom Assessment

Keywords: Attitudes and beliefs, Cognitive skills, Metacognition, Teaching / instruction

Presenting Author: Helenrose Fries, Montclair State University, United States

Co-Author: Nicole Barnes, Montclair State University, United States

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Co-Author: Julia Mascia, Queensland University of Technology (QUT), Australia

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Teachers’ epistemic cognition refers to the processes teachers engage in when they consider the nature of knowledge (its source, structure, certainty, and justification) for themselves as learners or for their students. In this theoretical essay we theorize a model of epistemic cognition that illustrates teachers’ epistemic cognition when engaged in assessment tasks. To explicate the role of epistemic cognition in teaching, we present a hypothetical case of Dr. Jones, an educational psychology instructor, to illustrate how epistemic concerns manifest in assessment activities. We propose that our model adds to prior frameworks of epistemic cognition in four ways: First, we argue that the development of an epistemic aim for others actively requires (or should) the processes of epistemic cognition. Second, more attention needs to be given to the alignment of reliable processes with identified epistemic aims to produce the desired epistemic end. Third, in teachers’ practice the use of epistemic cognition is multifaceted and iterative. Fourth, scholars in this area need to find ways to make teachers’ cognition visible to support their ability and willingness to critically reflect on epistemic issues in their practice. We close the proposal with conclusions and recommendations for further theory and research.

The impact of staged video vignettes on teachers’ nonverbal classroom management knowledge

Keywords: Pre-service teacher education, Teacher Professional Development, Video analysis, Knowledge creation

Presenting Author: Julia Bötte, University of Dussburg-Essen, Germany

Co-Author: Gerlinde Lenske, Universität Koblenz-Landau, Germany

Co-Author: Theresa Dike, Australian Catholic University, Australia

Co-Author: Detlev Leutner, University of Dussburg Essen, Germany

Due to a mounting teacher shortage and rising burnout rates, the importance of teacher training is increasingly recognized (Dike, Elling, Schmede, & Leutner, 2015; OECD, 2016). To improve teacher training, it is necessary to include pedagogical-psychological professional knowledge in regard to classroom management (CM). Indeed, Hattie (2009) reports a positive correlation between CM and students’ achievement (Hattie, 2009). Furthermore, research has found a connection between teachers’ perception of classroom management skills, occupational satisfaction and wellbeing (Dike et al., 2014).

One promising way to support the development of CM skills is the usage of staged video material based on authentic classroom situations. This is applied in our research project Video-based educational material/classroom management/professional development of teachers. The project aims to help preservice teacher candidates to develop their professional competence in classroom management. In particular, the project is designed to provide teachers with a tool for professional development in their early career stage. The project is conducted within a research network of five universities in Germany, Austria and the Netherlands. The project is funded by the German Federal Ministry of Education and Research (BMBF).

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Need for Cognitive Closure of Student Teachers and Their Classroom Management Practice

Keywords: Cognitive skills, Mixed-method research, Pre-service teacher education, Teaching approaches

Presenting Author: Katerina Ljozdová, Masaryk University, Czech Republic

Co-Author: Jan Mares, Faculty of Education, Masaryk University, Brno, Czech Republic

Co-Author: Jan Strucek, Faculty of Social Sciences, Masaryk University, Brno, Czech Republic

Classroom management/CM can be viewed as a system of strategies employed by a teacher to influence the physical/social space of the classroom to foster an environment where learning can occur. One of the key individual characteristics influencing the teachers’ CM strategies (CM) is their need for cognitive closure (NFC) which can be defined as individual’s motivation in information processing and
judgement. The relation of NFC and CMB was investigated on a non-probability sample of student teachers in their first year in master study programme – in their long-term practice in lower secondary schools. Data were collected by video-recordings of classes, interviews, diaries and questionnaires in a mixed methods design. Regarding questionnaires, CMB were measured by the adapted Need for (Cognitive) Closure Scale – NCS (Roets&Van Hiel,2011) Czech version (Suňok et al.,2014). Confirmatory factor analysis and reliability estimates supported the predicted structure of the two scales. NFC is reflected in the CMB of student teachers. Student teachers with higher NFC use more CMB focused on rules and teaching the classroom. The higher the NFC is the more the student teachers prefer teaching in frontal settings, deviate less from their lesson plan; they have more strict structure of all the students’ discipline, and insist on students to follow the rules. These findings show that NFC plays an important role in teacher behaviour and should be therefore reflected in teacher education as well.

Session F 154
30 August 2017 15:45 - 17:15
Pnci-B • BA143
Poster Presentation
Assessment and Evaluation, Lifelong Learning, Teaching and Teacher Education

Presentation: Assessment and Evaluation

Keywords: Assessment methods and tools, Case studies, Competencies, Computer-assisted learning, Educational Psychology, Higher education, In-service teacher education, Learning approaches, Secondary education, Self-efficacy, Self-regulation, Student learning, Teacher Effectiveness, Teacher Professional Development, Teaching / instruction

Interest group: SIG 01 - Assessment and Evaluation

Chairperson: Mathias Majer, University of Zurich, Germany

Developing Skills Development Monitoring System (SISDECOM): A Multiple-case Study

Keywords: Assessment methods and tools, Case studies, Competencies, Computer-assisted learning

Presenting Author: Carlos Quesada-Pallares, University of Leeds, United Kingdom

Co-Author: Anna Cirasos, Universitat Autonoma de Barcelona, Italy

Co-Author: Edith Mariana Reboitel Sánchez, Instituto Superior de Ciencias de la Educación del Estado de México, Mexico

This paper aims to identify how teacher training transfer impacts on kindergarten, primary and secondary teachers’ teaching in Mexico. In this case, training is provided by the State through institutions responsible of training and education of teachers: the Division of Teacher’s Training and Update or SuCad. To evaluate the effectiveness of the training provided by the SuCad, we applied the Transfer Questionnaire three months after training to a sample of 3,677: 345 teachers responded (response rate of 9.38%). The questionnaire is composed of three dimensions: (a) teachers’ learning transfer level to their workplace; (b) impact of their transfer to their teaching responsibilities; and (c) transfer organization at school level. After testing its validity and reliability, we present the results regarding the learning transfer to workplace. However, while teachers as well as its impact. Findings suggest that teachers perceive a high learning transfer level; however, they also indicate that transfer organization at school acts as a barrier of teachers’ learning transfer. In addition, results suggest a low learning impact on teacher teaching practice which can be related to contents and topics developed during training and its relation with teachers’ training needs.

A proposal for assessment of skills using complex tasks in virtual learning environments

Keywords: Assessment methods and tools, Computer-assisted learning, Higher education

Presenting Author: Gregorio Rodríguez Gómez, Evalfor Research Group - University of Cadiz, Spain

Co-Author: Maria Soledad Ibarra Saiz, Evalfor Research Group - University of Cadiz, Spain

Co-Author: Jaime Cubero Ibáñez, Evalfor Research Group - University of Cadiz, Spain

Zlatkin-Troitschanskaia, Shavelsky and Kuhn (2015) manifest the need to research and design new assessment methods to assess skills directly, reliably and accurately, due to the current lack of methods based on objective values, as existing methods predominantly use the students’ perceptions collected through questionnaires, interviews or self-reports. They also claim that there is a lack of innovative and adaptive assessment methods since most assessment depends on paper-based questionnaires or multiple choice tests. In this regard, Redeker and Johansen (2018) highlight the potential of information and communications technology (ICT) to deliver new and more holistic assessment tasks and formats to apply to transversal skills that are hard to assess properly using traditional methods. This paper presents an assessment approach designed to assess the skill level of university students in five skills: analytical and critical thinking, problem-solving, sense of Ethics, decision making and teamwork. The proposal focuses on: skills assessment through complex tasks and a digital context with e-rubrics. It is contextualized in the DevalSimWeb Project, more specifically for the skills’ assessment of APPROVAL DevalSimWeb Training requirements. The methodological design of the evaluation proposal refers to the Expert Design Method. The results reflect the methodological proposal made on the basis of complex tasks and applying e-rubrics before and after the completion of the training course to assess the skill level of first year university students.

Engaging students in feedback processes: Challenges and opportunities

Keywords: Assessment methods and tools, Higher education approaches, Student learning

Presenting Author: Jessica TO, The University of Hong Kong, China

Student engagement with feedback is crucial for productive learning. However, there has been little research investigating the difficulties of engaging students with feedback in the post-secondary context. To fill the gap, this small-scale case study explores the challenges and opportunities of increasing post-secondary students’ engagement with feedback. The participants of this study involved 20 first year students taking an Academic English module at a self-financed post-secondary institution in Hong Kong. The investigation focused on the students’ responses to feedback on different assessment tasks (essay outlines, oral presentations and end-of-module assignments). Data collection methods encompassed documentation of written feedback on marked assignments, recordings of verbal feedback sessions and focus group interviews. For data analysis, the modified version of Hyland’s (1997) feedback classification system was employed to identify feedback characteristics. Themes were identified from interview transcripts to see students’ views on feedback. The significance of this paper lies in revealing the complexity of engaging post-secondary students with feedback. The students were found to be in the objectivity-empathy dilemma (Crossman, 2007): a need for specific comments for improvement and protection from critical feedback. Their communication trust in teachers was weakened when the use of praise for rapport building put frank discussion of performance at stake. Feedback sincerity was in doubt when feedback was inconsistent with assessment results. This paper highlights the importance of fostering students’ ‘feedback resilience’ to manage emotions from negative feedback. Suggestions for developing ‘feedback resilience’ are also discussed.

Student perceptions of achievement, self-efficacy, self-regulation and feedback in Mathematics

Keywords: Secondary education, Self-efficacy, Self-regulation, Student learning

Presenting Author: Sw M. Gammer, Volda University College, Norway

Co-Author: Kari Smith, Norwegian University of Science and Technology (NTNU), Norway

Co-Author: Lars Kvinge, Stord-Haugesund University College, Norway

Co-Author: Knut Steinger Engelsen, Stord/Haugesund University College, Norway

Abstract.

The aim of this paper is to share the framework of a quasi-experimental research project in lower secondary school in Norway and some findings from the validation of a survey included in the data sample. The main goal of the project is to examine the relationship between responsive pedagogy, defined as feedback practice, and students’ learning in Mathematics, defined as achievements, self-regulation and self-efficacy. The pilot was conducted in May 2016, involving 10 classes (n=198 pupils). In our pilot we find that the way the teacher gives feedback to the learner has an emotional aspect by influencing degree of ‘fear of mathematics’ (answering) to students (n=47, p=0.01). This emotion linked to mathematics affects students’ expectations related to their own coping (self-efficacy). (n=64, p=0.01). The degree of self-efficacy is also related to the emotion of ‘fear of mathematics’ (employment). (n=63, p=0.01) and operates positively with students’ self-regulation (n=57, p=0.01). Both self-regulation (n=37, p=0.01) and self-efficacy (n=71, p=0.01) correlate with the achieved grade in Mathematics. We argue that the feedback from teachers and peers effect students’ self-efficacy beliefs, the effort they are willing to put into a task and the will to succeed. Thus responsive pedagogy seems to be closely related to the achievement (student learning) to be through Structural equation modeling (SEM), and some analysis of these data will be presented at EARLI 2017.

New Mathematical Model for Analyzing Accuracy of Teachers’ Predictions About Student Competencies

Keywords: Assessment methods and tools, Educational Psychology, Teacher Effectiveness, Teacher Professional Development

Abstract.
The accuracy of teachers’ judgments about students’ academic performance is an important topic in educational psychology. Although most previous studies had been based on correlational examinations, one important aspect that had not been investigated in previous research is teachers’ predictions of distribution of students’ performance. Such distribution predictions are potentially crucial in designing appropriate materials and conduct of a class. Knowing the degree of accuracy with which teachers can predict their students’ performance could also be helpful to teachers in seeking and/or engaging in appropriate professional development activities. Thus this study proposed a new mathematical model to analyze the teachers’ predictions of distribution of students’ performance. The model also includes statistical tests to examine the validity of the model and to test whether teachers’ predictions fit perfectly or not. The new model was applied in analyzing actual data of COMPASS, which is an assessment used in Japan for evaluating school students’ basic mathematical competencies. Five teachers predicted their students’ performance in 5 tasks. The results showed that in 24 out of 25 cases, the model fits well in analyzing the data. Also, the model is able to detect variations in teachers’ accuracies in predicting distributions of student performance. In addition, the model can detect overall variations in teachers’ prediction accuracy across tasks. These results suggest that the model works well in analyzing teachers’ predictions of distributions of students’ performance.

Session F 155

30 August 2017 15:45 - 17:15
Main Building E - E301

Research Presentation: Higher Education, Instructional Design, Learning and Instructional Technology, Lifelong Learning

Poster Presentation: Instructional Design and Inquiry Learning

Keywords: Cognitive skills, Computer-supported collaborative learning, Conversation / Discourse analysis, E-learning / Online learning, Educational Technology, Game-based learning, Higher education, Inquiry learning, Instructional design, Learning Technologies, Metacognition, Motivation, Primary education, Reading comprehension, Science education, Self-regulation, Social Interaction

Interest group: SIG 06 - Instructional Design, SIG 20 - Inquiry Learning

Chairperson: Tim Kuhn, University of Mannheim, Germany

“i am a scientist in a virtual lab”: A computer supported inquiry learning environment

Keywords: Inquiry learning, Learning Technologies, Primary education, Science education

Presenting Author: Iske Nicolaidou, Cyprus University of Technology, Cyprus

Co-Author: Christy Spyrou, Cyprus University of Technology, Cyprus

In response to calls for research for developing proper guidance for inquiry-based enactments when computer-supported inquiry learning (CoSIL) environments with virtual labs are involved, a CoSIL environment entitled “Albert a science lab” was designed specifically for supporting primary students’ inquiry skills, by integrating CoSIL tools, such as a) virtual labs, b) a digital notepad, c) help pages offering procedural, metacognitive and strategic scaffolding and d) a dictionary of difficult terms offering conceptual scaffolding.

This study evaluates an enactment based on a CoSIL design for supporting the development of 6th graders’ inquiry skills, using a case study design. The research questions are: 1) To what extent does an enactment based on the designed CoSIL environment support the development of 6th graders’ inquiry skills in science education? 2) Does the frequency of use of CoSIL tools (virtual labs, digital notepad, help pages, dictionary) relate to students progress in inquiry skills? The 6th grade classes of a primary school (37 students) participated in an enactment of four 80-minute lessons using the CoSIL environment. A pre-posttest research design was used to measure students’ inquiry skills, before and after the enactment. Process data were used to examine students’ frequency of use of CoSIL tools. Findings of the study show a statistically significant increase in students’ inquiry skills (t = 6.99, df=36, p<0.00), through their interaction with the “virtual labs”, the “digital notepad” and the “help pages” in the environment. The findings of the study have instructional implications for the design and development of future CoSIL environments.

Designing games: The association(s) between game mechanics, players’ roles and collaboration

Keywords: Computer-supported collaborative learning, Educational Technology, Game-based learning, Instructional design

Presenting Author: Raja Hamalainen, University of Jyväskylä, Finland

Co-Author: Timo Lainema, University of Turku, Finland

Co-Author: Mikko Niilo Rämä, University of Jyväskylä, Finland

Designing collaborative three-dimensional (3D) learning games for vocational learning can be seen as one way to enhance the quality of learning and respond to the needs of working life. The overarching aim of this study is to determine how game mechanics implemented within computer-supported collaborative learning roles (scripted vs. emergent) are associated with the emergence of collaborative knowledge construction. The target group consisted of 15 vocational school students (16–18 year olds). The data were gathered by recording the groups’ discussions and saving the game logs (actions) for each group. A total of 8128 transcribed utterances were eligible for content analysis to shed light on the characteristics and differences in knowledge construction processes under scripted and non-scripted role situations.

We found a difference between the players’ utterances in tasks with scripted and non-scripted roles. In the level with scripted roles providing knowledge was the most dominant type of utterance. Further, students with similar roles performed actions and applied similar discussion activities. In the level grounded on the emerging collaboration processes shared problem solving was the most actively used speech activity. In this presentation, we illustrate that diverse game mechanisms used in the game design highlight that different collaboration activities should be taken into account in the educational game design.

Effect of cognitive and metacognitive scaffolds on reading in digital learning environments

Keywords: Cognitive skills, Metacognition, Reading comprehension, Self-regulation

Presenting Author: Leonie Brummer, GION - University of Groningen, Netherlands

Co-Author: Marlies ter Beek, Rijksuniversiteit Groningen, Dept of Education and GION, Netherlands

In secondary education, self-regulated learning and learning from texts (i.e., comprehensive reading) play essential roles in academic achievement. However, many students lack the necessary skills in this regard. To improve students’ reading comprehension and learning in general (e.g., for history and geography), scaffolds can be used that focus on cognitive and metacognitive strategies. Scaffolds can be provided at different levels of the learning system. This paper describes an experimental design that was used to study the effectiveness of scaffolds by comparing a condition with scaffolds (i.e., cognitive and metacognitive) with no scaffolds. The pretest and posttest are indicative for short-term effects and contain no scaffolds in both conditions. The follow-up performance is administered approximately eight weeks later and indicates long-term effects. This format is similar to the pretest and posttest. Reading performance is measured with multiple-choice questions. Data gathering starts at the moment of submission and will continue in the upcoming months. Analysis of the data will be, for example, analysis of covariance.

Understanding the student-student interaction processes in technology-enhanced physics learning

Keywords: Computer-supported collaborative learning, Conversation / Discourse analysis, Science education, Social interaction

Presenting Author: Jort Lämä, University of Jyväskylä, Finland

Co-Author: Raja Hamalainen, University of Jyväskylä, Finland

Co-Author: Jouni Virti, University of Jyväskylä, Finland

Many researches have shown that in higher education lecture instruction and teaching should be developed towards active learning methods (Fearnley et al. 2014). Primetime-learning model (Author 2013) is an introductory course of thermodynamics and optics at University of Tampere in the autumn 2016. The model is based on interactive and collaborative studying methods supported by a technology-enhanced learning (TEL) environment and a weekly primetime between a teacher and a small group. Students formed small groups (five people in a group), and twice a week they worked collaboratively in TEL-settings without a teacher. Problems the groups solved with their computers included e.g. simulations, numerical scripts, and multiple-choice questions regarding typical misconceptions. Data was collected by screen capturing and recording the group workings sessions of four different groups. In this study the student-student interaction processes are analyzed grounded on conversation analysis adjusted to sociocultural discourse analysis (Mercur 2004). The aim is to figure out how interaction processes evolved during the seven-week course, and how different kind of problems foster student-student interaction processes in a collaborative learning environment. Preliminary results show the amount of exploratory talk (Mercur 2004) depending on the type of the problem. There are also differences between the groups how the quality of the collaborative problem solving evolved during the course. The results can be used to develop new research-based instructional methods supporting student-centered learning and teaching in higher education giving attention to the implementation of these methods (Wiemann, Destanières & Gilley 2013).

A model of Media supported Inquiry-based Learning

Keywords: E-learning / Online learning, Higher education, Inquiry learning, Learning Technologies

Presenting Author: Julian Dehne, University of Potsdam, Germany

Co-Author: Th Nguyen, University of Potsdam, Germany

Co-Author: Ulike Lucke, University of Potsdam, Germany

Inquiry-based learning in higher education can be complemented by media ICT tools. However, little exists on how inquiry-based learning can benefit from systematic application of ICT. We propose a model of media supported inquiry learning based on a previous qualitative study. The model was then connected to the findings of an interview study with academic teachers concerning the use of ICT in inquiry based courses. As a result, we present a model that explicates media supported in inquiry-based learning environments. The model is integrated with a cycle of academic-learning and linked to current research in inquiry based learning models.

The development of students’ situational interest across various science domains

Keywords: Inquiry learning, Instructional design, Motivation, Science education

Presenting Author: Erika Laine, University of Turku, Finland

Co-Author: Tomi Jääkkö, University of Turku, Finland
This pilot study investigates the development of elementary-school students' situational interest within and across different science learning topics in inquiry learning context. Inquiry learning has been found to have a positive impact on learning outcomes but studies focusing on its connection with interest are scarce and limited. In order to understand the stability and development of situational interest, it is important to measure interest at different time points during the learning task, as well as across multiple topics and settings. Using a longitudinal approach, this study aims to analyze how students' situational interest develops during an inquiry learning topic, and how stable are the developmental trajectories across different topics. The study followed 147 5th and 6th grade students, aged 11-13 as they participated in two science inquiry learning topics. Students were asked to indicate their situational interest multiple times during each topic by answering a short self-assessment questionnaire. Results of this study are expected to clarify the developmental process(es) between triggered and maintained situational interest and also reveal some of the more general developmental trajectories that take place during an inquiry learning activity in science. The findings will also bring new information regarding the stability of the developmental trajectories of situational interest across different science topics. Large scale results of the main study that include data from several European countries can inform whether inquiry learning can redeem the expectations of restoring students' interest in science.

**Session F 156**

30 August 2017 15:45 - 17:15
Main Building E - E221
Poster Presentation
Motivational, Social and Affective Processes, Teaching and Teacher Education

**Poster Presentation: Motivation and Self-Efficacy**

**Keywords:** Achievement, Attitudes and beliefs, Educational attainment, Educational Psychology, Emotion and affect, Game-based learning, Goal orientation, Language (Foreign and second), Mathematics, Motivation, Primary education, Secondary education, Self-efficacy, Social aspects of learning and teaching, Teacher Effectiveness, Teaching / instruction

**Interest group:** SIG 08 - Motivation and Emotion

**Chairperson:** Jyrki Reunanen, University of Helsinki, Finland

**Exploring Engagement Growth in Japanese Elementary Schools**

**Keywords:** Game-based learning, Language (Foreign and second), Motivation, Primary education

**Presenting Author:** Quilli Ciga-Baldwin, Waseda University, Japan

**Co-Author:** Luke Fryer, University of Hong Kong, Hong Kong

**Background**

Engagement and motivation have an interrelated, dynamic relationship. Theoretically, motivation may be used to predict how students will engage with their studies over time. This may further help to define how students develop within a specific course of study in relation to their classroom experiences.

**Aims**

Using self-determination and engagement theories, we investigated how students' engagement grows over the course of two years in game-based foreign language classes.

**Methods**

Elementary school students from a suburban school district in Japan (n = 478) completed surveys during the 2013 and 2014 school years. Students' engagement was measured at five time points during their two years of English instruction. Latent Growth Curve (LGC) analysis was used to measure changes in their engagement.

**Results**

Results showed a clear positive trend for cognitive engagement over the course of two years. Behaviorial engagement showed weak growth, while emotional engagement did not change. These findings indicate that students' behavior and enjoyment of their classroom activities may not change over time, reaching a stable point, while they may begin to engage in cognitive aspects of communication over the course of their studies.

**Teachers' self-efficacy, goal orientations, and classroom behaviours – An interaction analysis**

**Keywords:** Goal orientation, Motivation, Self-efficacy, Teaching / instruction

**Presenting Author:** Sindu George, Menashi University, Clayton Campus, Australia

Teacher motivation was an underemphasized area of research until recently. The absence a sound theoretical framework has been highlighted as the main reason for the lack of research in this area (Butler, 2007; Richardson & Watt, 2006). Since 2000s, researchers have focused on systematic and theory-driven research on teacher motivation. For example, Watt and Richardson (2007) adopted expectancy-value theory for studying student teachers' motivation for entering teaching profession; Roth, Asor, Kanat-Maymon, and Kaplan (2007) employed self-determination theory to study autonomous motivation for teaching; and Butler (2007) adapted achievement goal theory to study teacher motivation in terms of their goal orientations. The current study presents an integrated perspective on teacher motivation incorporating two different constructs: teachers' self-efficacy from Bandura's social cognitive theory, and teachers' goal orientations from achievement goal theory under the overarching framework of 'expectancy X value' theory.

**Academic optimism as a lived experience.**

**Keywords:** Educational Psychology, Secondary education, Self-efficacy, Teacher Effectiveness

**Presenting Authors:** Claire Lloyd, Liverpool Hope University, United Kingdom

**Co-Author:** Sue Cronin, Liverpool Hope University, Liverpool England, United Kingdom

Over the past four decades, three organizational properties of schools have emerged that have consistently been found to exert a powerful influence on student achievement, even when controlling for SES. Properties include academic emphasis of the school, collective efficacy of the faculty, and the faculty’s trust in parents and students – all of which are linked together as a single powerful latent construct called academic optimism (Hoy, Tarter, & Wootfolk-Hoy, 2006).

While instruments have been developed to provide robust quantitative measures of academic optimism (Hoy et al., 2006), there is less understanding of how this complex phenomenon operates within schools. The current study addresses this gap by seeking an understanding of the organisational properties of two urban United Kingdom secondary schools – one displaying the characteristics of high academic optimism and the other showing low optimism.

A Case Study approach was adopted because of its focus on exploring phenomenon in real-life contexts to develop rich, contextualised understandings of everyday routines, roles and relations (Yin, 1981). Drawing on the phenomenological method, repeated interviews were conducted with school leaders and teachers to allow for multiple dimensions of academic optimism in schools to be revealed and understood (Stake, 2006).

Preliminary results suggest that the everyday dynamics of the case school with high measures of optimism are qualitatively different from those in the school with low optimism. Further research will be undertaken to provide rich descriptions of life in these schools. This work will contribute to an understanding of academic optimism as a lived experience.

**Self-Concept Mediates the Relation between Achievement and Emotions in Mathematics**

**Keywords:** Achievement, Attitudes and beliefs, Emotion and affect, Mathematics

**Presenting Author:** Jannike van der Beek, Utrecht University, Netherlands

**Co-Author:** Sanne van der Ven, Utrecht University, Netherlands

**Co-Author:** Paul Lesean, Utrecht University, Netherlands

**Co-Author:** Elvira Kroesbergen, Utrecht University, Netherlands

Mathematics achievement is related to positive and negative emotions such as enjoyment and anxiety. Based on Pekrun's control-value theory of achievement emotions, students' academic self-concept may be an important mediator of the relation between mathematics achievement and emotions. As emotions predict the likelihood of career aspirations in science or math, high achieving students are of special interest. The study aimed to investigate the mediating role of self-concept in the relation between mathematics achievement and emotions (i.e. enjoyment and anxiety), and to test possible differences in this mediating role between low, average, and high achieving students.

Participants were 1014 ninth-grade students from eight urban secondary schools in the Netherlands. Through an online survey, including mathematical problems, students were asked to indicate their levels of mathematics enjoyment, anxiety and self-concept. Structural equation modeling was used to test the mediating role of self-concept in the relation between mathematics achievement and emotions. Multigroup analyses were performed to compare these relations across the three achievement groups.
Results confirmed full mediation of the relation between achievement and emotions in mathematics by self-concept. Furthermore, we found higher self-concepts, a higher level of enjoyment in mathematics and a lower level of math anxiety in high achieving students compared to average and low achievers. No differences across these achievement groups were found in the relations of the mediational model.

The pivotal role of self-concept in relation to emotions and achievement in mathematics should encourage educators to be aware of the ways in which they shape their students' self-concept.

Arabic Language Learners' Self-Efficacy and its Sources

**Keywords:** Language (Foreign and second), Motivation, Self-efficacy, Social aspects of learning and teaching

**Presenting Author:** Laura Page, University of Kentucky, United States
**Co-Author:** Hadi Al, University of Denver, United States
**Co-Author:** Ellen Ulster, University of Kentucky, United States
**Co-Author:** Lilia Hume, University of Kentucky, United States
**Co-Author:** Tiffany Thomas, University of Kentucky, United States

This study examined beliefs of emerging Arabic speakers and their sources of self-efficacy. While the enrollment of students in Arabic as a foreign language course continues to increase (MLA, 2016), minimal research has been conducted to understand the beliefs of students learning how to speak Arabic since it is one of the least commonly studied foreign languages in the United States (Akkahlete, 2014). Ninety-two Arabic language learners surveyed in a large public university in the southeastern United States regarding their self-efficacy beliefs and the sources of their self-efficacy. Oral language proficiency scores were provided through teacher ratings. In this study, we examined the differences between male and female students.

Socio-demographic and academic predictors of educational aspirations of elementary school students

**Keywords:** Educational attainment, Educational Psychology, Motivation, Primary education

**Presenting Author:** Iris Musil, Institute for Social Research, Croatia
**Co-Author:** Joop Salesi, Institute for Social Research, Croatia

Research efforts in various contexts have indicated that young persons' educational aspirations are strong determinants of their educational and more general life choices and outcomes. Students with higher educational aspirations have greater motivation and higher educational attainment, as do those for whom parents and teachers hold higher educational expectations and aspirations. The proposed research aims to examine some determinants of pupil educational aspirations at the transitional period of Croatian elementary education, when pupils decide about their future educational trajectory into secondary education. The first set of variables examined is gender and parental education followed by a set of relevant academic variables such as achievement, self-concept and learning strategies. This research was conducted in the Croatian transition period of educational level of their pupils, school achievement, academic self-concept, learning strategies and their aspirations for secondary school. Two step binomial logistic regression was performed to determine the effects of the selected variables on the likelihood of students' aim to enrol in a grammar or vocational school. The model with both sets of predictors correctly classified 84.8% of students according to their aim to enrol in a grammar school. The only significant predictors were school achievement and academic self-concept, indicating that students with better school grades who consider themselves as more academically able aim to enrol grammar school.

Session F 157
30 August 2017 15:45 - 17:15
Main Building A - A32
Poster Presentation
Higher Education, Instructional Design

**Poster Presentation:** Higher and Doctoral Education
**Keywords:** Assessment methods and tools, Convocation / Discourse analysis, Doctoral education, Engineering, Experimental studies, Higher education, Inquiry learning, Instructional design, Literacy, Mathematics, Misconceptions, Motivation and emotion, Problem-based learning, Qualitative methods, Quantitative methods, Science education, Social interaction, Synergies between learning - teaching and research, Teaching / instruction
**Interest group:** SES 04 - Higher Education
**Chairperson:** Hanke Kopershek, University of Groningen, Netherlands

First-year students approach interdisciplinarity in Nanoscience education

**Presenting Author:** Anna-Leena Kärhönen, University of Jyväskylä, Finland

Interdisciplinary studies, as well as interdisciplinarity, is work on the rise in the society. This study looks at understanding interdisciplinarity from point of view of Nanoscience students. How do they recognize and use disciplines in group work, during their first interdisciplinary course in a Nanoscience program? This discipline-related social interaction is studied with conversation analysis of group discussions. For improving the course, desired outcomes, such as learning to appreciate and rely on disciplinary knowledge of others, are mapped. The studied interactions and tasks they occur in tell us which types of tasks can help students understand disciplines and interdisciplinarity and how they approach these themes as parts of their identities.

Empirical Investigation of Challenges for PBL Stakeholders in Engineering Education

**Keywords:** Engineering, Higher education, Qualitative methods, Problem-based learning

**Presenting Author:** Daniel Rees Lewis, Northwestern University, United States
**Co-Author:** Matthew Eastergott, Northwestern University, United States
**Co-Author:** Elizabeth Gerber, Northwestern University, United States

Project-Driven Learning (PDL), including project- and problem-based learning, can effectively teach authentic practices and knowledge. PDL involves interrelated practices and technologies that researchers and practitioners continually improve. To design practices and technologies that PDL stakeholders will adopt and thus scale widely, we must design understood the perceived-challenges of PDL stakeholders. In this work, we study university students and instructors involved with Engineering PDL. We ask, what do students and instructors in Engineering PDL perceive as their greatest challenges? We interview 99 Engineering Education PDL stakeholders, including 53 undergraduate and graduate students and 46 university instructors, from 27 different universities. We analyzed interview data using grounded theory to identify PDL challenges for a variety of stakeholder. We found that students perceived their greatest challenges to be managing a complex process and peers collaboration. Specifically, they face challenges related to interpreting varied instruction, team planning, accountability, and getting regular feedback and validation on project plans and direction. Instructors perceive their greatest challenges as managing multiple semi-independent teams. Specifically, they face challenges tracking teams, providing enough feedback to students, setting up projects before the class starts, and untangling team performance to give individuals formative and summative assessments. To design pedagogical practices and technologies that will be widely adopted within Engineering PDL, engineering education must address these student and instructor challenges.

Disciplinary Practices and Multiple Literacies: How Can they Meet in the Middle?

**Keywords:** Discourse analysis, Higher education, Science education, Social interaction

**Presenting Author:** Joshua Radinsky, University of Illinois at Chicago, United States
**Co-Author:** Uma Dhar, University of Illinois at Chicago, United States
**Co-Author:** Lior Baram, Ben-Gurion University of the Negev, Israel

Higher education faces a number of challenges, including the need to socialize learners into the practices of particular disciplines, as well as provide an essential education to prepare learners for citizenship. Specifically, individuals require the capacity to critically evaluate information sources, which increasingly include sophisticated data representations and visualizations. Such representations are not necessarily intuitive, and often require specialized knowledge to recognize their qualities, and their significance in different domains. We propose an approach to the design of instruction in higher education that aims to meet the goal of disciplinary socialization while also cultivating the knowledge and skills needed to engage with the multi-literacy demands of contemporary citizenship. This approach calls for instructors to not only incorporate problem solving in their higher education courses, but to design these problems with an eye toward both disciplinary and everyday skills. In this approach, learners are encouraged to employ sophisticated data-rich visualizations to solve two types of problems: problems that reflect core questions in the domain of study; and problems that reflect the application of domain principles to everyday lives.

In this research, we design the space between the relevance of disciplinary learning to their lives—even if they do not pursue a professional career in the discipline; and home multi-literacy skills enabling them to better use and interpret the sophisticated data-rich representations that are becoming part and parcel of citizenship in the knowledge society.

Which facets of interest do influence the study success at the study entry phase in mathematics?

**Keywords:** Higher education, Mathematics, Quantitative methods, Motivation and emotion

**Presenting Author:** Stefanie Ruch, University of Paderborn, Germany
**Co-Author:** Stefan Ulher, Ludwig-Maximilians-Universität (LMU), Germany
**Co-Author:** Xiao Wang, Ludwig-Maximilians-Universität (LMU), Germany

Studies report a high dropout rate in academic mathematics study program. Individual interest is discussed as an important prerequisite for successful mathematical learning processes. For this assumption, empirical studies give however only little evidence. One reason might be that the questionnaires are too imprecise to measure a person-object-relationship. At the transition school-university in particular, the learning environment change from an application oriented school subject to a scientific discipline. In this project, we hypothesize that interest in academic mathematics practices influence the study success in the study entry phase, in contrast to interest in school mathematics practices. To investigate this question, we develop a questionnaire (with six to eight items a scale) that differ between the specific interest object (mathematics practices) and the specific object (school mathematics practices). 184 bachelor and 140 teacher students deal with the questionnaire at the beginning of the first semester in mathematics. After six weeks, students rated their study satisfaction. At the end of semester, students had to succeed in mathematical tests. In regression analysis, the estimated affective components do not show a significant impact on the achievement of mathematics. Our study also presents the result that the specific practice-based interest leads to a higher sense of self-efficacy (Reger & Rosas, 2011). In contrast, the specific object-based practice-based interest leads to a higher sense of self-efficacy. In overall, our result shows that the specific practice-based interest leads to a higher sense of self-efficacy in the learning of mathematics.

Picturing roles: Activation of PhD candidates' role identities as researchers and teachers

**Keywords:** Doctoral education, Experimental studies, Higher education, Synergies between learning - teaching and research

**Presenting Author:** Alessia Billirink, Institute of Psychology for Education WWU Münster, Germany
**Co-Author:** Regina Jordis, WWU Münster, Germany

In Germany, most PhD candidates in psychology have both research and teaching duties right from the beginning. According to role identity theory (McCaul, 2003), individuals hold different identities and roles that influence their motivation and behavior. This becomes evident in the work university. One context, e.g. a seminar, requires a teacher role and according teacher behavior, another context, e.g. a colloquium, requires a researcher role and according researcher behavior. Shifting from one context to another, a shift in the focus of the self-conception from one role to another is necessary. We examine the newness of German PhD candidates' role identities to context cues using pictures typical of research or teaching. In a preliminary study, 35 PhD candidates rated whether 32 pictures were representative of research and/or teaching. The most representative pictures of each field were used as stimuli in an experimental between-subjects design, where PhD candidates are involved with either
research pictures, teaching pictures or a mixture of both. Subsequently, their current role identity (researcher and/or teacher) is derived from written statements about their work as PhD candidates. We hypothesize that the role-focus depends on the type of pictures seen before, with research pictures being associated with a higher focus on the researcher role and teaching pictures with a higher focus on the teacher role. In addition, visual material is generated that may be helpful in future research on the two core academic roles, as well as in professional development courses for young academics.In previous studies, phonological awareness proved as an important predictor for the acquisition of written language. According to recent meta-analyses, phonological training programs foster the development of phonological awareness in kindergartners. Other research, however, has shown significant effects of training have been reported.

Although current meta-analyses show the general benefit related to phonological training, they indicate that training implementation significantly influences the program’s effectiveness. Up to now, there is a lack of studies, which investigate the role of moderating factors. In our study, we addressed this question with regard to a set of organizational and personal factors.

We examined 390 kindergarten children in Germany. During the last year of kindergarten, we administered a set of phonological tests at two measurement points. In between, the kindergarten teachers conducted a well-established phonological training to foster the children’s phonological awareness. Additionally, the kindergarten teachers recorded procedural details and took part in an interview about the general conditions of the training.

Results show that the phonological training improved children’s phonological awareness. Further, especially personal factors such as a greater experience of the kindergarten teachers with the training program substantially enhance its benefit. In contrast, organizational factors such as group size seemed to play a subordinate role.

Consequently, paying attention to specific quality criteria in the training implementation improves the training’s success and should be considered in future. To use limited resources in the most efficient way, it is crucial to know, which moderating factors play the most important role in educational processes.

Transfer of knowledge: A modality, knowledge, and conceptual analysis

Key words: instructional design; Learning approaches. Synergies between learning - teaching and research

Presenting Author: Bobby Hoffman, University of Central Florida, United States

Co-Author: Morgan McAfee, University of Central Florida, United States

A goal of successful scholarship is usage evidence-based practices to inform teaching excellence. As such, this mixed-method study examined transfer of knowledge amassed during the completion of a three-year graduate degree in Educational Psychology. Quantitative methods determined if superior knowledge transfer was related to course modality, domain of interest, and/or knowledge type. A qualitative scoring matrix and content analysis were used to provide examples of innovative knowledge transfer and application. Results revealed greater knowledge transfer for blended-learning students compared to those who predominantly completed distance education and significantly greater transfer for declarative and procedural knowledge related to learning and motivation in comparison to life-span development. We advanced strategies and design recommendations to promote authentic knowledge transfer in graduate-level educational psychology programs.

When the apprentice surpasses the master: teacher content knowledge relative to student content knowledge

Keywords: Educational policy, Literacy, Primary education, Teaching approaches

Presenting Author: Nives Nlab, University of Melbourne, Australia

Co-Author: Susan-Marie Harding, The University of Melbourne, Australia

Co-Author: Patrick Griffin, The University of Melbourne, Australia

Co-Author: Lorraine Graham, The University of Melbourne, Australia

Research into levels of teacher knowledge in literacy and more specifically reading is largely confined to ranking teachers and comparing student achievement between classes of teachers whose knowledge levels are ranked. As a result, teacher content knowledge as compared to teacher performance levels with those of their students. Comparing teacher performance levels to that of their students would reveal if there are students for which the teacher has a lower level of content knowledge and may consequently lack the content knowledge required to support growth in students of relatively higher ability. This study, compared teacher content knowledge with student content knowledge. A total of 23 Year 5/6 teachers and their students completed an online reading comprehension assessment to determine their reading ability. Of the 23 classes that participated, 61 percent of classes contained students who performed at a higher level than their teacher. Given that the study was conducted at the primary level, this finding is particularly poignant as it challenges the widely accepted assumption that Year 5/6 teachers are more proficient in reading than their students.

Assessing and improving quality science instruction using an innovative tablet portfolio app

Keywords: Electronic portfolio, tools, Science education, Teacher effectiveness, Teacher Professional Development

Presenting Author: Jose Felix Martinez, University of California, Los Angeles, United States

Co-Author: Matthew Kloser, University of Notre Dame, France

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Co-Author: Matt Wikey, University of Notre Dame, United States

Co-Author: Jayashri Srinivasan, University of California, Los Angeles, United States

Co-Author: Amanda Edelman, Pardee RAND Graduate School, United States

Teaching portfolios have long been used in a dual role to monitor and assess instructional practices, and support teachers in professional reflection and learning. Quality of instruction and professional self-reflection among practicing science teachers is currently a topic of great interest in the United States as the country moves to adopt the Next Generation Science Standards (NGSS). We developed an innovative electronic portfolio tool implemented in tablet computers to monitor and evaluate the effectiveness of instructional practices aligned to the NGSS (documents, pictures, and video). We report the results of a pilot study with nearly 40 middle school science teachers who used the e-portfolio to collect evidence of instruction in their classrooms. Our study investigates how the e-portfolio is designed and validated to assess the science content and the science process competencies the teachers are teaching and the evidence complied in the portfolios, and second the value of the portfolio tool for teacher professional development. Qualitative analysis of interviews with all participating teachers suggest the tool offers an effective platform for professional self-reflection and growth. The paper will additionally present psychometric analysis of the portfolio rating part of the tool and how the tool portfolio may support systems looking to monitor and improve the quality of classroom practices, and teachers seeking a platform for reflecting about and improving their own instructional practices.

Implementation of instructional change and its effect on students’ achievement

Keywords: Achievement, Quo-experimental research. School effectiveness, Teacher Professional Development

Presenting Author: Sébastien Dellese, Université catholique de Louvain (UCL), Belgium

Co-Author: Benoît Gallay, Université catholique de Louvain (UCL), Belgium

Co-Author: Xavier Durnay, Université catholique de Louvain (UCL), Belgium

Co-Author: Liesp Coarttense, Université catholique de Louvain (UCL), Belgium

Co-Author: Vincent Dupriez, Université catholique de Louvain (UCL), Belgium

Large-scale instructional change is a substantial challenge. Due to a lack of implementation, many reforms fail in their effort to both change teaching practices and improve student achievement. Focusing on the implementation process, Rowan and Miller (2007) have shown that a procedural or a professional model have a significant effect on instructional change and learning improvement. Other researchers have highlighted that motivational aspects, more precisely self-efficacy and task-value, and organizational capacity, like collaboration and the support of the educative team, could also have a significant effect on the implementation of alternative teaching practices. Our research investigates three hypotheses: procedural and professional control, in comparison with the control group, promotes instructional change (1), professional control promotes a higher level of implementation than procedural control (2), and, the implementation of new practices fosters achievement gains in students’ reading and writing (3). To answer these questions, we conducted an experimental study in 19 Belgian secondary schools. Schools were randomly assigned to either the control group or to experimental conditions which have received an educational program on reading and writing strategies, a training to its use and/or a coaching during the school year. Data were collected through questionnaires completed by teachers and their students. Preliminary analyses indicate that, compared to the control group, classes pertaining to the experimental conditions show a stronger increase in students’ achievement. It also seems that the value given by teachers to some program components and collaboration around program activities are positively related to the implementation.

Session G 159

31 August 2017 08:30 - 10:00
Ma 311 - CC - CB
Single Paper
Assessment and Evaluation
Presentation: Assessment and Achievement

Keywords: Achievement, At-risk students, Competencies, Educational policy, Quantitative methods, School effectiveness, Social aspects of learning and teaching, Special education

Interest group: SIG 01 - Assessment and Evaluation

Chairperson: David Bergin, University of Missouri/Columbia, United States

Is truancy contagious? Context effects of schools with a high proportion of truant students

Keywords: Achievement, At-risk students, Educational policy, Quantitative methods

Presenting Author: Andrea B. Eringer, University of Teacher Education St.Gallen, Switzerland

Co-Author: Christine Sauber, TUM School of Education, Germany

This study uses data from a repeated measurement of the German PISA 2012 grade-based sample (n = 4100 students in 247 grade 10 classrooms) in order to investigate how the classroom context can affect adolescent truancy. Research questions were whether the proportion of truant students per class is related to the individual student’s self-reported truancy and whether there are groups of students who start playing truant in the year after the PISA test.

Measures include data on subject-specific and general truancy at the time of PISA 2012 and one year later as well as proficiency scores for reading, mathematics and science in both PISA 2012 and the repeated measurement one year after. Specific focus is set on identifying disadvantaged schools with regard to a high proportion of truant students. Given that in Germany, only 5 percent of students indicated to have skipped classes in PISA 2012, a school in our study is defined as disadvantaged when it has a truancy rate of more than 10 percent.

Multilevel analyses indicate that there is indeed a positive relationship between the proportion of truant students in a classroom and the individual self-report on truant behavior. Furthermore, students who scored below average in PISA 2012 have a higher probability to start playing truant in the year after than students who scored at least an average level of competence. Students in disadvantaged schools
The effects of grade retention

Keywords: Achievement, At-risk students, Quantitative methods, Social aspects of learning and teaching

Presenting Author: Barbara Drechel, Otto-Friedrich-Universität Bamberg, Germany
Co-Author: Christine Staatze, TUM School of Education, Germany
Co-Author: Marcus Fiechter, Leuphana Universität Lüneburg, Germany
Co-Author: Katharina M. Müller, Leuphana Universität Lüneburg, Germany
Co-Author: Timo Ehmke, Leuphana Universität Lüneburg, Germany

This study investigates possible effects of grade retention on the development of students’ mathematics competence and on their motivation and beliefs in the field of mathematics. Data stem from a representative German sample of 9th graders (PIQA 2012 and a repeated measurement one year later). Same-age comparisons were applied between three groups: (a) the retained students (N = 89), (b) a matched comparison group of promoted students (N = 89), and (c) the entire group of promoted students (N = 3181). Results show that the retained students were not able to improve their mathematics competence to the same extent as the comparison group. Regarding motivation and beliefs in the mathematics domain, the retained students show predominantly positive trends. Summarizing these empirical findings concerning the pedagogical measure of grade retention, no clearly positive effects have been found.

Supporting struggling students in Finnish basic education: Multilevel predictors of science scores

Keywords: Achievement, At-risk students, School effectiveness, Special education

Presenting Author: Mari-Paaulina Vääräkari, University of Helsinki, Finland
Co-Author: Nina Hennon, University of Helsinki, Finland
Co-Author: Helena Thuneberg, university of helsinki, Finland
Co-Author: Jarkko Hautamäki, Helsinki University, Finland

In Finland, the weakest performers have outperformed their comparison groups in other countries in earlier PISA assessments. However, there is little empirical evidence on how the extensive support model of Finnish schools work in enhancing performances. Therefore, we used the PISA2015 data for studying the effects of adapted instruction and continuous support from the teacher on performance of students who are struggling with their science studies based on their excessive time use despite of lower-than-average performance. We controlled the differences in students’ background and included school composition effects in our multilevel regression models for controlling for the effects of context where support was provided. The results of this study are applicable on the development of support structures and practices in all European countries and they serve as a baseline for further empirical analyses on the effective features of the Finnish support model.

Do socioeconomic factors outperform immigration background regarding school achievements?

Keywords: Achievement, At-risk students, Comparisons, Quantitative methods

Presenting Author: Andrea B. Erzing, University of Teacher Education St.Gallen, Switzerland
Co-Author: Daniela Jäger-Biela, German Institute for International Educational Research, Germany

This study focused on factors that can account for the achievement gap between immigrant and non-immigrant students in Switzerland in math, science, and reading by analyzing PISA data from 2015. Family background characteristics, speaking a language at home that differs from the language used in school, and self-reported school engagement, and characteristics of the educational system are the crucial factors in this context. We conducted multilevel analyses—separately for the three different language regions in Switzerland—to test different individual and school factors for whether they could explain achievements in reading, math, and science in 15-year-old students.

A high concentration of immigrant students in schools tends to increase concerns about student achievements, especially for non-immigrants attending these schools. Furthermore, the question of how educational systems are able to serve students who speak a language at home that differs from the instructional language is very important. Knowledge about the effect of the concentration of immigrants in the school as well as the effect of the different compositional characteristics on students’ performance will support decisions on system level. Because Switzerland has been handling the challenge of a high and steadily increasing rate of immigrant students in schools for several decades, it represents a benchmark for other countries where immigration is of increasing importance.

Session G 160
31 August 2017 08:30 - 10:00
Pinić B - B3107
Single Paper
Educational Policy and Systems, Lifelong Learning

Paper Presentation: Workplace Learning

Keywords: Assessment methods and tools, Communities of practice, Informal learning, Mixed-method research, Quantitative methods, Reflection, Social interaction, Vocational education, Workplace learning

Interest group: SIG 14 - Learning and Professional Development

Chairperson: Maroż Wosnitza, RWTH Aachen University, Germany

Feedback and learning from errors in the insurance industry

Keywords: Informal learning, Quantitative methods, Social interaction, Workplace learning

Presenting Author: Regina Mutler, University of Regensburg, Germany
Co-Author: Veronika Assendel, University of Regensburg, Germany

Feedback on errors often aims on avoiding making similar errors. Less is known about how feedback after errors can influence learning of employees at the workplace. Learning from errors can be defined as a subcategory of non-formal experiential learning. In our study we focus on different types of errors: knowledge and rule based errors (KRE) and slips and lapses (SfL). The aim is to find out if the perceived feedback culture and the individual feedback orientation influences learning activities after errors at work. We conducted a cross-sectional questionnaire survey in the insurance industry (N=154). We used the Critical Incident Technique and asked participants to describe a concrete-error situation and the feedback they expect for. Results show that quality (.40) and importance (.56) of feedback, quality (.35) and importance (.36) of feedback from the supervisor as well as individual feedback orientation (.46) have a positive effect on the development of new strategies. Results for SfL show that quality (.34) and importance of collegial feedback (.44) positively influences general cause analysis. Quality (.52) and importance (.75) of feedback of the supervisor have a significant negative relation with specific cause analysis. Individual feedback orientation (.26) has a significant positive relation to the development of new action strategies. Implications of our results concern the importance of an error friendly climate in organizations. Being able to openly address errors in feedback situations is an important factor to foster engagement in learning after errors. This paper aims at the construction of an efficient scale for measuring innovative work behaviour (IWB), which incorporates all work activities employees carry out in relation to innovation development. Assessing IWB is a precondition for fostering employees’ engagement in innovation processes. Concerning usability, using resources of employees and organisations carefully and, thus, enabling efficient measurement is crucial.

Concerning valid measurement, the IWB of MBW must be taken into account. In order to attain these goals, a study with 369 employees of different companies was carried out. Using exploratory factor analyses, an 8-item scale for measuring IWB based on concrete work activities was adapted from an existing instrument (Messmann & Mulder, 2014). Construct and criterion validity as well as psychometric properties were satisfactory. Implications for future research, including the cross-validation of the scale, and practical implications, including the scale’s value for planning professional development activities, will be discussed.

Effects of perceived feedback culture and work motivation on informal learning after feedback

Keywords: Informal learning, Reflection, Social interaction, Workplace learning

Presenting Author: Gerhard Messmann, University of Regensburg, Germany
Co-Author: Regina H. Mutler, Institute of Educational Science, University of Regensburg, Germany

This paper investigates whether employees are more engaged in informal learning after feedback if they perceive a strong feedback culture at work and have a self-determined work motivation. Informal learning after feedback incorporates all work activities employees carry out in order to process the feedback and to make it utilizable for future situations. Fostering informal learning after feedback therefore is crucial. This issue was addressed in a cross-sectional questionnaire study with 122 employees of different companies. Regression analyses showed significant effects of perceived feedback culture and work motivation. Interestingly, the relative importance of work motivation and perceived feedback culture differed with regard to employees’ engagement in either individual or social activities. Our study implies that informal learning after feedback becomes more likely if supervisors and employees take responsibility in shaping the organisational feedback culture and if attention is paid to employees’ basic needs satisfaction as a precondition for work motivation.

Learning at work: A mixed methods approach on workplaces as learning environments

Keywords: Communities of practice, Mixed-method research, Vocational education, Workplace learning

Presenting Author: Heta Rintala, Tampere University of Technology, Finland
Co-Author: Petri Nokelainen, Tampere University of Technology, Finland
Co-Author: Laura Pyllys, University of Tampere, Finland

The current study explores apprenticeship training focusing on workplace learning. The study uses a mixed-methods design. The quantitative data (n=305 apprentices) was collected using the Workplace as Learning Environment (WLE) survey created by James and Holmes (2012) based on Fuller and Unwin’s (2003) expansive restrictive framework. The qualitative data (n=40) was collected through semi-structured individual interviews in ten workplaces, in which each an apprentice, apprentice’s co-worker, a workplace trainer and an employer were interviewed about vocational competence, apprenticeship training, and learning and guidance in the workplace. The results from the two data sets will be further interpreted together in order to provide a better understanding of the learning in apprenticeship training.
The findings suggest that expansive restrictive framework and the WLE survey are generalizable to the Finnish context. The study shows that there are differences between gender, age, organisation size and vocational sectors in relation to expansive learning environments. The findings demand for an increased attention to finding ways to support varying work-based learning arrangements and workplaces especially when this form of study is offered to youths.

Session G 161
31 August 2017 08:30 - 10:00
Virta - 120
Title: Motivational, Social and Affective Processes, Teaching and Teacher Education

Paper Presentation: Motivation and Emotion - J
Keywords: Assessment methods and tools, Attitudes and beliefs, Educational Psychology, Mixed-method research, Motivation, Motivation and emotion, Primary education, Qualitative methods, Self-efficacy, Teacher Professional Development, Teaching / instruction
Interest group: SIG 08 - Motivation and Emotion
Chairperson: Dagmar Fedner, University of Paderborn, Germany

Motivation for teacher professional development: The role of decision contexts and age
Keywords: Motivation, Primary education, Qualitative methods, Teacher Professional Development
Presenting Author: Folke Glastra, Leiden University, Netherlands
Co-Author: Ümmü Can, University of Brabant, Leiden University, Netherlands

Using semi-structured interviews with 95 primary teachers, this study investigates the impact of three decision contexts—teacher participation is decided by school boards, by teacher teams or by individual teachers – and age group (younger/older) on teacher motivations for continuing professional development (CPD). Its focus is on valences – feelings about CPD and thoughts about the value of its consequences - of CPD and the role of autonomy in these motivations. Research questions pertain to the overall pattern of valences and autonomy, differences and similarities in these patterns according to decision context and teacher age, and the nature of arguments connected to valences and autonomy. Teachers are generally positive about CPD and prefer directly applicable CPD, by implication limiting its uses to short term, non-innovative purposes. Decision contexts matter: Individual decision contexts have positive, board decision contexts negative valences for most teachers. School boards are perceived too distant to school practice to warrant relevance. Team decision contexts shield most against negative valences. Decision contexts impact feelings of autonomy, and these in turn impact CPD valences. Valence and autonomy patterns differ markedly between age groups. Theoretical meaning, and implications of these findings for teacher CPD and for further research are discussed.

Measuring multiple dimensions of early literacy motivation through self-report at school entry
Keywords: Assessment methods and tools, Attitudes and beliefs, Motivation, Motivation and emotion
Presenting Author: Erin McTigue, University of Stavanger, United States
Co-Author: Dinyth Judith Sotheim, The Norwegian Reading Centre, Norway
Co-Author: Bente Walgermo, University of Stavanger, Norway
Co-Author: Jan Fjørsjø, Brock University, Canada

Literacy success in school is co-determined by skill and motivation with early success in literacy predicting long term achievement. Additionally, early literacy interventions for at-risk students are more effective than later interventions. However, despite availability of measures for early reading skills few reliable and valid measures exist to measure reading motivation. In order to assess the viability of measuring students’ reading motivation, at the time of school entry, in a multidimensional and theoretically grounded manner, we developed and validated the Norwegian Early Literacy Motivation Survey (NELiMs). The sample comprised 1,171 first grade Norwegian students, assessed within the first month of school. Through analysis of competing factor models and grounded within a hierarchical model of motivation, the 12 survey items measured two overall dimensions: Self-beliefs and Interest. Self-beliefs comprised of two scales: self-concept and self-efficacy. Interest was a single dimension. The structure was found to be invariant across skill (low and high skill) and gender. Correlations between the three subscales varied considerably, but skill and were supported by theory. Correlations between latent constructs and validation variables provide evidence of convergent and discriminant validity. This work adds to the field particularly by addressing a lack of effective instruments appropriate for use at school entry, in this case by measuring reading motivation prior to formal instruction in reading. Implications for use as a screening tool are discussed.

Teacher’s self-efficacy as predictors of their classroom behaviors
Keywords: Attitudes and beliefs, Motivation, Self-efficacy, Teaching / instruction
Presenting Author: Sindu George, Monash University, Clayton Campus, Australia

Researchers have been interested in teachers’ self-efficacy and its influence on the teaching-learning process since early 1980s (e.g., Ashon, 1984). There is a quantum of literature available highlighting teachers’ self-efficacy as a significant predictor of various teacher and student outcomes. Although the volume of teacher self-efficacy research has increased, researchers are concerned about the direction, quality, and influence resulting from the increased attention given to the construct (Klassen, Tze, Betts, & Gordon, 2011). The current paper addresses one of the main issues in self-efficacy research—overestimation of self-efficacy using global measures—by adopting the multi-faceted model of teachers’ self-efficacy (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). The paper presents a structural model relating the three dimensions of teachers’ self-efficacy and four selected dimensions of their classroom behaviors.

Students’ Beliefs Concerning School Transition to Lower Secondary School in Finland
Keywords: Educational Psychology, Mixed-method research, Primary education, Motivation and emotion
Presenting Author: Siipa Eskelä-Haapanen, University of Jyväskylä, Finland
Co-Author: Kati Vasastampi, University of Jyväskylä, Finland
Co-Author: Marja-Kristina Leinikainen, University of Jyväskylä, Finland
Co-Author: Anna-Maja Pohkeus, University of Jyväskylä, Finland

The present study examines primary school students’ beliefs concerning their school transition to lower secondary school. In this study the concept belief refers to students’ own understanding and ideas. It can be understood as positive expectations to look for or success as well as concerns to be afraid or tensed of. Furthermore, relations between students’ concerns and well-being were examined. Data from 1,037 Finnish students were obtained at the end of students’ primary school. The study was conducted with mixed-method approach. The results of the qualitative part driven contact analysis showed that students’ had positive expectations comprising: 1. Comfort, 2. Friendships, 3. Connected to Learning, 4. School, 5. Increasing Freedom, and 6. Teacher-child relationship. Concerns instead were mainly related to social relations in lower secondary school. Furthermore, results of the independent sample t test indicated that girls, who mentioned concerns about social relations in lower secondary school, were more exhausted and had lower level of self-esteem than the other girls at the end of primary school. In contrast, boys who had concerns about future classroom had higher level of self-esteem and a lower level of cynicism in comparison with other boys at the end of primary school.

Session G 162
31 August 2017 08:30 - 10:00
Main Building A - A3
Single Paper
Assessment and Evaluation

Paper Presentation: Assessment Methods and Tools - C
Keywords: Assessment methods and tools, Competencies, Distributed cognition, Educational policy, Higher education, Instructional design, Language (L1/Standard Language), Meta-analysis, Misconceptions, Qualitative methods, Writing / literacy
Interest group: SIG 01 - Assessment and Evaluation
Chairperson: Hans Gruber, University of Regensburg, Germany

Regulation on line during early-readers’ writing: a situated model of teacher’s assessment activity
Keywords: Assessment methods and tools, Distributed cognition, Qualitative methods, Writing / literacy
Presenting Author: Lionel Dechamboux, Université de Genève, Switzerland

Interested by teacher’s assessment activity during regulation on line (Möttö-Lopez, 2012), we focused on his/her activity during writing tasks he/she gave to their students. This particular context led us to several problems. A conceptual one: from a situated and interpretative perspective, we’ll plead the need of embracing the teacher’s point of view within the situation. But how to define assessment activity in action?! A methodological one: how to catch relevant data of this activity? In front of such questions, we tried to cross over assessment and activity theories through two major concepts of John Dewey’s works: valuation and inquiry (Dewey, 1983 ; 2011).

So we would like to answer these research questions: What is the teacher’s assessment activity in the regulation on the fly process? What matters to him/her? What sorts of sign does he/she take care of? What kind of actions does it lead him/her to? To what extent a previous assessment activity shapes a next one? What sorts of framework are used by teachers to assess? To answer these questions, we’ll focus on three teachers’ work in three primary classrooms during writing sessions with three early-readers pupils with learning difficulties. We filmed teacher-students interactions and we made self-confrontation interview with teacher to model his/her assessment activity.

Our study highlights the validity of our model of valuation and inquiry to describe teacher’s assessment activity showing the building of frameworks during experience, his/her strategy used to support students learning.
Empowering teacher’s assessment literacy: A study on the value of professionalization programs

Keywords: Assessment methods and tools, Competencies, Educational policy, Higher education

Presenting Author: Fer Boel, Wittenberg University of Applied Sciences, Netherlands
Co-Author: Kitty Meijer, Utrecht University of Applied Sciences, Netherlands
Co-Author: Jeroen Van der Linde, Hogeschool van Arnhem en Nijmegen-HAN University, Netherlands
Co-Author: Peter De Boer, Hogeschool van Arnhem en Nijmegen-HAN University, Netherlands
Co-Author: Dominique Sluijters, Zuyt Hogeschool, Netherlands
Co-Author: Tamara Van Schildt-Mol, Hogeschool van Arnhem en Nijmegen-HAN University, Netherlands

The Netherlands Association of Universities of Applied Sciences (NAUAS) agreed upon a set of demands regarding the assessment competence of higher education teachers related to students’ learning in 2011. This study evaluates the value and the alignment of these programs in relation to the intended goals after implementation. The study is characterized as a multiple case design using the model of Van den Akker (2013) as an analytic framework. The NAUAS adopted the set of demands and mainly added value in the implementation. The attained level was experienced in different ways, related with the entry levels of the teachers. Most teachers were positive about the content of the programs.

Best of two worlds in writing assessment: Integrating benchmarking and comparative judgement

Keywords: Assessment methods and tools, Comparative judgement (CJ); Standard Language, Writing / Literacy

Presenting Author: Marjite Lestherius, University of Antwerp, Belgium
Co-Author: Fan De Smidt, Ghent University, Belgium
Co-Author: Resanka Bouver, University of Antwerp, Belgium
Co-Author: Hilde Van Keer, Ghent University, Belgium
Co-Author: Jeroen Van De Maeyer, University of Antwerp, Belgium

As scores on writing performance provide students, teachers and even policy makers insights into students’ writing ability, these scores should be reliable, valid and preferably also obtained in an efficient way. Although rubrics are often used in order to enhance reliability and efficiency, problems are often reported due that raters face difficulties in defining absolute scores for each text separately. Benchmark scoring and Comparative Judgement (CJ) are both based upon the idea that raters are better helped when they can compare between texts instead of compare a text with a rubric. For benchmark scoring, a scale of five benchmark texts is developed by a small number of experts. These five benchmark texts help raters in their scoring decision. Within CJ, raters decide on a high number of comparisons, each time with texts a best. Based on these comparison decisions the texts can be scaled. Both methods have their drawbacks: developing benchmark texts requires time and expertise, while for CJ several raters are needed and this method is especially time-consuming when a high number of texts need to be scaled. The present study reports the discrepancy in the obtained scores and if the texts are scaled in a similar way. Results show that both methods lead to similar reliabilities and scores, Therefore, the authors propose to do more research on how both methods can be combined.

Blind faith and unseen exams: What research has to say about the choice between seen vs unseen exams

Keywords: Assessment methods and tools, Instructional design, Meta-analysis, Misconceptions

Presenting Author: Cathal O’Schooik, Liverpool Hope University, United Kingdom
Co-Author: Melissa Ryan, Liverpool Hope University, United Kingdom

The significance of exams in determining both student satisfaction and success has prompted a widespread interest in the most effective way to employ exams as assessments. This has prompted several investigations and debates on the merits of different exam formats. However, it is interesting to note a relative absence of discussion on what could be argued is a major exam formatting choice, seen vs unseen exams. Many educators have reservations about seen exams based on anecdotal arguments about increased risk of plagiarism, ratemisrepresentation and other poor practices. But what evidence is there to support these assertions? This study presents results from an international exam with experimental sections which we present the findings of our review of the literature exam format and around the seen vs unseen debate. We will consider the perceptions of both staff and students on seen and unseen exams, seeking to understand the preferences on both sides and the origins of those preferences. We will also discuss research which has considered the impacts of the two exam formats, including impact on the approach used by students to prepare for their exams, impact on student self-confidence and impact on assessment outcomes such as student performance. Additionally, we will detail some of the methodological issues we’ve identified in our review of research methods in this area such as a potential lack of ‘student voice’ in the research. We hope to stimulate an informed debate among education researchers and practitioners on this somewhat overlooked issue in exam formatting.

Session G 163

31 August 2017 08:30 – 10:00
Linnia : K1110
Singel Paper

Educational Policy and Systems, Learning and Social Interaction, Teaching and Teacher Education

Paper Presentation: Educational Theory - B

Keywords: Case studies, Citizenship education, Cultural psychology, Educational policy, Interdisciplinary, Knowledge creation, Learning approaches, Literacy, Philosophy, Reflective society, Science education, Social aspects of learning and teaching, Teaching / instruction

Interest group: SIG 25 - Educational Theory

Chairperson: Charles Max, University of Luxembourg, Luxembourg

Teaching Responsible Research and Innovation as a part of the Nature of Science

Keywords: Citizenship education, Educational policy, Reflective society, Science education

Presenting Author: Antti Laherto, University of Helsinki, Finland
Co-Author: Renate Kampshulte, Leibniz Institute for Science and Mathematics Education (IPhI), Germany
Co-Author: Jarmo Anhäcker, University of Giessen, Netherlands
Co-Author: Ron Blonder, Weizmann Institute of Science, Israel
Co-Author: Sevi Akyuyg, Bogazici University, Turkey

The European Union encourages science education to orient towards the concept of Responsible Research and Innovation (RRI), i.e. socially and ethically sensitive and inclusive processes of science and technology. Recent views of Nature of Science (NOS) – one of the most debated and talked topics in science education research – address the same concerns. To examine the socio-institutional nature of science in science education, in the present theoretical study we carried out a concept analysis of educational implications of the RRI policy in relation to a recent reconceptualization of NOS, the Extended Family resemblance Approach (EFA) for Science Education. We discuss how the nature of science in that approach closely connects to the RRI, and thereby conclude that science education for RRI can utilize the approaches and applications developed with the Extended FRA. To illustrate the opportunities and challenges RRI may bring to NOS-focused science education, we discuss the results and experiences stemming from the EU-funded project IRRESISTIBLE. We show examples of the practical classroom approaches developed in the project, as well as some survey results on teachers’ perspectives on RRI. The aim of this work is to better understand the potential implications of RRI to research and practice in science education.

This is not my life: Disrupting dominant cycles of knowing/being in educational research

Keywords: Interdisciplinary, Philosophy, Social aspects of knowing and teaching, Knowledge creation

Presenting Author: Tim Corcoran, Deakin University, Australia

Acknowledging the symbolic inseparability of ontology and epistemology encourages researchers to sense how multiple ways of being and ways of knowing affect the conduct of our work. No wonder then the smallness facing researchers when, for example, seeking financial support, they are confronted with funding being available largely to maintain particular ways of knowing/being. Reggonably this is not uncommon in current practice where positivist informed randomised control trials or causal-explanatory logics are considered gold standard. How is it then possible to maintain a preferred ethics of existence (St. Pierre, Jackson & Mazzei, 2016) when prevailing cycles of knowing/being dominate educational research? This presentation considers opportunities made available in post-positivist or post-qualitative work (Lather, 2007) and new empiricism and new materialism (St. Pierre, 2014) and how these support a revelatory turn in understanding life-enacted learning (Corcoran, 2009). It then engages Shott’s (2010) interest in interpretative responses and how care of these in/into educational scholarship assists with aligning commitments to joint action. This interdisciplinary discussion brings together cutting edge theory from education and psychology to examine researchers orientations to learning and social interaction and how these can support or negate ethical commitments made in/through practice.

Ask What Your Country Can Do For You: Basic Education Policies in the Welfare State

Keywords: Assessment methods, Educational policy, Literacy

Presenting Author: Carell Knauber, German Institute for Adult Education - Leibniz Centre for Lifelong Learning, Germany
Co-Author: Alexandra Ioanidou, German Institute for Adult Education- Leibniz Centre for Lifelong Learning, Germany

Policy for basic education is gaining importance, especially since the results of the OECD Program for International Assessment of Adult Competencies (PIAAC) were published. They revealed that a sizable portion of adults in developed countries have low basic skills. In a contemporary perspective education policy can be considered as part of welfare state policy given that the lack of basic education diminishes chances to participate in society and the economy. The effectiveness of policies on literacy and basic education has both macro- and micro-economic dimensions and thus, it is important to ask which kinds of basic education policies countries implement to address the problems of adults with low literacy skills.

This empirical paper explores the potential of basic education policies in the advancement of basic skills, particularly literacy. In three exemplary country cases (Austria, England and Denmark), representing Europe’s different welfare state regimes: the conservative, the liberal and the social-democratic welfare state. Findings are based upon qualitative data from the project “EU-Alpha” gained through collaborative research in six countries. The paper identifies actors, resources/responsibilities, and implementation of basic education policies and places these findings into broader debates on adult skills and skills inequality.

Independence or interdependence? Dialogue-theoretical problems of ‘independent’ learning

Keywords: Cultural psychology, Learning approaches, Social aspects of learning and teaching, Teaching / instruction

Presenting Author: Tina Kullenberg, Kristianstad University, Sweden
In the light of our empirical study on 12 Swedish students in secondary school, this paper elaborates on the paradoxical issue of how to conceptually, and theoretically, approach an intended self-regulating working model within a dialogical framework. Our findings indicate that the participants' reasoning about the pursued project works is basically built on the ideal notion of being dependent on their teacher in several ways. It is argued that a sociocultural perspective generally problematizes the trilogy of individualistic/individual, interdependence of interpersonal and contextual interdependence. However, drawing on Bakhtin-influenced educational scholars, we also provide a distinction between two types of interdependence in communicative other-orientation: orientation to attunement vs. orientation to agreement-based interactivity. Furthermore, we discuss the educational implications of such a conceptualization in terms of socialization and personalization. Independence from an individualistic point of view is described as an illogical but rather notion of ontological interdependence may instead facilitate students voices, that is, their personalization in terms of creative agency.

Session G 164
31 August 2017 08:30 - 10:00
Pinn 8 - B1039
Single Paper
Instructional Design, Teaching and Teacher Education
Paper Presentation: Writing and Literacy
Keywords: Arts, Cognitive development, Educational attainment, In-service teacher education, Language (L1 Standard Language), Literacy, Metacognition, Mixed-method research, Primary education, Secondary education, Teacher professional Development, Teaching / Instruction, Teaching approaches, Writing / Literacy
Interest group: SIG 12 - Writing
Chairperson: Janina Lehmann, Ulm University, Germany
Learning to mean: The transfer of grammar knowledge to the shaping of rhetorical intentions
Co-Author: Debra Myhill, University of Exeter, United Kingdom
Co-Author: Helen Lines, University of Exeter, United Kingdom

With the re-introduction of formal grammar teaching into the UK curriculum has come a grammar test, largely testing decontextualized grammar knowledge. There is, however, little substantive research evidence demonstrating how grammar knowledge is transferred to the act of writing, nor the extent to which this transfer is explicitly understood by young writers. Within the context of a pedagogy that eschews the decontextualized 'labeling of parts' and rather, supports young writers in making a connection between grammatical choices and rhetorical effect, this paper will consider how young writers 'learn how to mean'. Drawing on case study data from a three year longitudinal study, funded by the Economic and Social Research Council, this paper will explore how four young writers developed an awareness of the role of grammar in shaping meaning, how this is reflected in what they write and how they explain their choices. The data will show that grammar knowledge and the crafting of text exists in a reciprocal relationship; such that an unconscious writing choice can become conscious grammar knowledge that can inform future writing choices.

Teachers' stories about writing: Exploring identities through autobiographical creative writing
Keywords: Arts, In-service teacher education, Teacher professional Development, Writing / Literacy
Presenting Author: Anne Martin, University of Jyväskylä, Finland

Teachers' stories about writing: Exploring identities through autobiographical creative writing

This study examines autobiographical creative writing as a tool for promoting teachers' professional development and identity from a narrative perspective. The purpose of the study is to explore teachers' relationship to writing and their goals regarding developing themselves in the writing group's meetings. Research questions are following:

1) What kinds of stories do teachers tell about themselves as writers?
2) What goals do the teachers set for their personal and professional development in the writing group?

Writing is perceived to be a significant tool for professional development. According to narrative theory, we build our identities through stories we tell about ourselves. Research suggests that arts-based, autobiographical and writing methods can bring new insights to exploring ourselves.

This qualitative study is based on a peer writing group for primary school teachers (N=11). In the group, teachers wrote autobiographical creative assignments to express and to explore themselves. They also discussed their writing experiences. The data were collected during the academic year 2016-2017, comprising of the teachers' writings, interviews and group discussions. Thematic and narrative analysis were used as research methods.

According to preliminary results, the teachers perceived to have a positive relationship to writing. They perceived writing to be effective for personal and professional development, and emphasized therapeutic and pedagogical dimensions of creative writing. The findings of this study further support the idea that integrating arts-based, literary methods can broaden the narrative identity building process of teachers.

Voicing Grammatical Knowledge: Young Writers' Articulation of Grammatical Concepts
Keywords: Cognitive development, Educational attainment, Metacognition, Writing / Literacy
Presenting Author: Helen Lines, University of Exeter, United Kingdom
Co-Author: Debra Myhill, University of Exeter, United Kingdom
Co-Author: Susan Jones, University of Exeter, United Kingdom

Abstract:

Changes to curriculum policy in several Anglophone countries, for example New Zealand, Australia and England, have focused attention on the explicit teaching of grammar as a tool for raising attainment in writing, with the use of linguistic terminology prominent in both teaching and testing. Theoretically, metalinguistic understanding has been framed as the ability to talk explicitly about language, with or without the use of grammatical terminology. However, whilst acknowledging that this is key mechanism through which metalinguistic understanding in writing is made visible, more research attention has been paid to teachers' verbalisations of linguistic subject knowledge than to young writers' articulation of grammatical knowledge. Drawing on data from a three-year longitudinal study, funded by the Economic and Social Research Council, this paper will consider the ways in which children aged 8-14 voice their understanding of grammatical concepts, with particular reference to sentence grammar, given that achieving sentence control is a key marker of progression in writing. The paper will focus on how student talk reveals learning and can be used to assess conceptual development of grammatical knowledge.

The Inspiration Myth: how professional writers manage the planning process
Keywords: Language (L1 Standard Language), Literacy, Teaching / Instruction, Teaching approaches
Presenting Author: Debra Myhill, University of Exeter, United Kingdom

Cognitive models of the writing process draw attention to three process which characterise the process of writing: planning, translating and reviewing, and these models emphasise that these processes are not chronologically or linear but recursive and iterative. At the same time, many classrooms adopt process approaches to teaching of writing, and in the UK, the curriculum advocates the teaching of planning, drafting, and evaluating. Yet there is evidence that teachers tend towards a narrow conceptualisation of planning as the formal outlining of the written text. This paper sets out to explore how professional writers, as expert writers, describe their own planning processes and how these understanding of highly complex management of planning might re-shape instructional practices in the teaching of writing to developing and less mature writers. The paper draws on data from two consecutive studies, which involved interviewing 21 professional writers about their own composing processes, including planning. The findings indicate that professional writers describe planning in ways which are consistent with cognitive models, with the planning being a fluid and varied process including a range of behaviours such as research, generation of ideas, the adoption of personal writing routines as well as more formal outlining of text. The evidence from professional writers indicates that broadening the pedagogical conceptualisation of planning to allow more time for topic familiarisation, creative playfulness, and gestation of ideas, as well as more formal outlining, might better support young writers in their development as writers.

Session G 165
31 August 2017 08:30 - 10:00
Pinn 8 - B4117
Single Paper
Higher Education
Paper Presentation: Doctoral and Researcher Education
Keywords: Doctoral education, Higher education, Knowledge creation, Qualitative methods, Quantitative methods, Reflection, Researcher education
Interest group: SIG 24 - Researcher Education and Careers
Chairperson: Katharina Lobli, University of Education Freiburg, Germany

What are ethics in doctoral supervision, and how do they matter?
Keywords: Doctoral education, Higher education, Quantitative methods, Researcher education
Presenting Author: Erkka Lötjönen, University of Helsinki, Finland
Co-Author: Kjell Pyhälä, University of Oulu; University of Helsinki, Finland

The purpose of this study is to provide a tool for analyzing ethical issues in doctoral supervision, to investigate whether ethical issues in doctoral supervision relate to doctoral experience, and if they do, how. More precisely, the study explored the relationships between ethical issues in doctoral supervision and attrition intentions, research engagement, satisfaction with supervision and with doctoral studies, and burnout. The respondents were 236 doctoral students in behavioral sciences in two research-intensive universities in Finland. The results show that how students are treated, supported, and respected are vital elements in how they experience their doctoral journey. Ethics in supervision as experienced by the students predicted both positive outcome variables (engagement, satisfaction with doctoral studies and supervision) and negative ones (burnout, attrition intentions). This result suggests that high standards of ethics are vital for a functional supervisory relationship.

Becoming a university teacher: doctoral students' conceptualizations of online teaching portfolios

Keywords: Doctoral education, Qualitative methods, Reflection, Researcher education
Presenting Author: Helga Dörner, Central European University, Hungary
Co-Author: Joanna Renc-Poe, Central European University, Hungary

This paper outlines findings from a research project on the reflective processes involved in the creation of online teaching portfolios by doctoral students of an international, graduate university in Europe. The study was conducted with the aim to identify emerging individual and shared conceptions of online teaching portfolios. Fifteen doctoral students who took part in an early-career faculty development program were interviewed. Interviews were transcribed and coded. The coding followed the protocol of qualitative interview analysis. Doctoral students were found to oscillate between performative and authentic repertoires of reflective work in their conceptions of portfolios. These findings provide a useful research insight into the way scholarly, reflective practice is experienced.

Doctoral students' engagement in knowledge creation practices

Keywords: Doctoral education, Qualitative methods, Researcher education, Knowledge creation
Presenting Author: Věví Virtanen, University of Helsinki, Finland
Co-Author: Jenna Vekka, University of Helsinki, Finland
Co-Author: Jani Kukkoila, University of Jyväskylä, Finland
Co-Author: Leelah Frick, Stellenbosch University, South Africa
Co-Author: Kjell Pyhälä, University of Oulu; University of Helsinki, Finland

Knowledge creation is at the core of scientific endeavor. As early career researchers, doctoral students take part in the knowledge creation processes and through their original contribution to knowledge they are considered to become experts of their particular domain (Frick & Brodin, 2014). Yet we currently understand very little about what doctoral knowledge creation entails, and how doctoral students engage with this creative process.

This study aims to gain a better understanding of the kinds of knowledge creation practices that doctoral students in the sciences engage in during their studies. For this purpose, altogether 34 doctoral students from STEM fields were interviewed. The data were collected with semi-structured interviews, and the data were qualitatively content analyzed. The preliminary results showed that the majority (63%) of the described practices were established everyday knowledge creation practices, whereas over a third (37%) of the practices were innovative or transforming the current practices and developing new ones. Moreover, the practices were typically collective (66%) involving the students, their supervisors or other members from their researcher groups. Only about a third (34%) of the practices reported were individual in nature. Further investigation showed that the participants were typically actively engaged in knowledge creation practices (82%) rather than just adapting (24%) the existing ones. Perceiving oneself as bystander (14%) was even less typical.

The significance of this study lies in exploring doctoral students' self-reported knowledge creation practices in STEM fields, and shows that they perceive themselves to be bactively and collaboratively engaged in creating knowledge.

The doctorate as a quest: PhD students purposively navigating their doctoral paths

Keywords: Doctoral education, Higher education, Qualitative methods, Researcher education
Presenting Author: Isabelle Skåki, University of Oxford/Université Laval, Canada

In most Western countries, universities express concern about completion times and graduation rates at the doctoral level, especially in the social and human sciences. While intellectual abilities alone are not sufficient to successfully progress through a PhD program, current knowledge indicates that modalities of training and contexts and conditions in which this training takes place have also major impact on the processes involved. This study examines how the interplay of individual and structural factors influence PhD students' paths. Drawing on Giddens' theory of structuration, this paper aims to address this gap by exploring how PhD students' primary 'reasons', 'motivations' and 'motives'—as defined by Giddens—for engaging in doctoral studies influence both aspects of their training they perceive as facilitating/constraining their progress and the strategies they favoured to face the challenges encountered. Based on semi-structured interviews conducted with 36 Canadian PhD students in the social and human sciences, the findings reveal three distinct journeys regarding how these students navigate their doctoral paths: the quest of the self, the intellectual quest, and the professional quest. Depending on their quest type, the nature and intensity of PhD students' concerns and challenges as well as the support they expected during their training differed.

Session G 166
31 August 2017 08:30 - 10:00
Virta - 114
Single Paper

Paper Presentation: Achievement and Science Education

Keywords: Achievement, Competencies, Educational Psychology, Reasoning, Science education, Student learning, Teaching / instruction
Interest group:
Chairperson: José van der Heeven, CED Group, Netherlands
Co-Author: Clemens Wagner, Physics Department ETH Zurich, Switzerland
Co-Author: Andreas Vaterlaus, Physics department eh, Switzerland

We have developed and applied a model of formative assessment in order to foster concept knowledge in kinematics at Gymnasiums in the German speaking part of Switzerland. Our model consists of four elements: clicker sessions with peer instruction, a monitoring tool, a diagnostic tool and a reflexive lesson.
To investigate the effectiveness of our model we conducted a study with 29 teachers and 607 students (15 to 17 years old) from 24 Swiss Gymnasiums. Our experimental setting consisted of three groups: a control group using a traditional teaching style (TT-group), a frequent testing group (FT-group) where traditional teaching was endowed with concept questions as exercises, and the formative assessment group (FA-group) where teachers used the same set of concept questions in the formative assessment approach. In order to compare the three groups we used a validated kinematics concept test as pre-, post- and follow-up-test and a conventional kinematics textbook with standard numerical textbook problems as post-test.

The results show that the students in the formative assessment courses achieved a significantly better conceptual understanding than the students who attended the traditional and the frequent testing courses. This indicates that the better performance was not a frequent testing effect but presumably resulted from the peer instruction and the reflexive lesson. Moreover, the FA-group achieved the same results as the TT-group in the conventional test. This implies that the students in the formative assessment setting were able to outweigh the shorter exercise time with a better conceptual understanding.

Understanding Coulomb's law by means of inventing with contrasting cases

Keywords: Achievement, Science education, Student learning, Teaching / instruction
Presenting Author: Elisabeth Stern, ETH Zurich - Research on Learning and Instruction, Switzerland
Co-Author: Lennart Schaal, ETH Zurich, Switzerland
Co-Author: Ralph Schumacher, ETH Zurich, Switzerland

Learning a novel principle by inventing with contrasting cases is a promising means to support deeper understanding of abstract scientific concepts. It seems particularly worthwhile if a concept is based on a complex mathematical formula, which at the same time is not too challenging from a mathematical point of view. This is the case for Coulomb's law: the magnitude of the electrostatic force F of interaction between two point charges is directly proportional to the scalar multiplication of the magnitudes of charges (q1 • q2) and inversely proportional to the square of the distance between them (r). In a study with 17 year old students (N = 101) from 5 advanced high-school classes (Gymnasium), we investigated whether students who had to invent the formula by comparing four pairs of contrasting cases would develop a deeper understanding of Coulomb's law than students who were presented with the formula and had to elaborate it by self-exploration. Two self-explanation conditions were set up as control: in both control conditions, Coulomb's law was directly introduced. In the overall condition, students subsequently saw four pairs of contrasting cases of Coulomb's law before they were prompted to generate self-explanations. In the stepwise condition, students were asked for self-explanations after every pair of contrasting cases. Contrary to our expectations, the inventing group did not outperform the other two groups neither on conceptual, nor procedural or transfer tasks.

Reflections from Research: considerations for the implementation of educational simulations

Keywords: Achievement, Science education, Student learning, Teaching / instruction
Presenting Author: Koen Veevaerts, University of Turku, Finland
Co-Author: Tomi Jaakola, University of Turku, Finland

Educational simulations hold great potential for creating engaging and productive learning environments in STEM domains. This does, however, not mean that the implementation and outcomes of learning with educational simulations are straightforward. This paper presents and reflects on research findings in a series of studies with a computer simulation in the domain of electricity. These studies used the same simulation with varying instructional designs and over a range of grades. Interestingly, though the overall impact has been predominantly positive, each design has always had a unique influence on student performance and/or engagement. The paper will look at perceptual consonance of simulation elements, instructional support and combining simulations with real equipment and will try to provide some interpretation for the findings. We hope the results and interpretations presented in the paper provide insights and considerations for educators utilizing simulations in practical settings.

Who speaks Physics? The importance of language competence for physics understanding
Keywords: Competencies, Educational Psychology, Reasoning, Science education
Co-Author: Elisabeth Stern, ETH Zurich - Research on Learning and Instruction, Switzerland
Co-Author: Lennart Schalt, ETH Zurich - Research on Learning and Instruction, Switzerland

In natural sciences in general and in physics in particular, language competence is assumed to play a key role in learning and for conceptual understanding. Nevertheless, a strong empirical basis of this assumption is lacking. In our study, we tested 225 6th graders and assessed their cognitive ability, motivation, and language competence as predictors for physics understanding. Prior to our assessment, the elementary school students were trained on basic physics concepts. A hierarchical regression analysis shows that cognitive ability and language competence predict physics understanding. While a bivariate correlation indicates a significant relation between physics understanding and motivation, this relation diminishes when cognitive ability is simultaneously taken into account in the regression model. Language competence explained 15.5% of unique variance in physics understanding. Thus, language competence does indeed play an important role for physics understanding.

Session G 167
31 August 2017 08:30 - 10:00
Main Building E - E301
Single Paper
Assessment and Evaluation, Cognitive Science, Instructional Design
Paper Presentation: Conceptual Change - B
Keywords: Cognitive development, Conceptual change, Educational Psychology, Mathematics, Misconceptions, Model-based reasoning, Physical Sciences, Primary education, Problem solving, Quantitative methods, Science education, Student learning
Interest group: SIG 03 - Conceptual Change
Chairperson: Luce Claessens, Utrecht University, Netherlands

Errooneously solving multiplicative and additive word problems: A matter of preferences and abilities
Keywords: Educational Psychology, Mathematics, Primary education, Problem solving
Presenting Author: Tine Degrande, KU Leuven, Belgium
Co-Author: Leen Verschaffel, KU Leuven, Belgium
Co-Author: Wim Van Dooren, KU Leuven, Belgium

Previous research has repeatedly shown that young children erroneously reason additively in multiplicative word problems, while older children erroneously reason multiplicatively in additive word problems. Whereas previous studies explained children’s erroneous reasoning exclusively in terms of lacking multiplicative or additive reasoning abilities, the present study aimed to investigate to what extent this erroneous reasoning depends on children’s preference for multiplicative or additive relations — in addition to lacking abilities. For this purpose, four test instruments (a preference test, word problem test, test measuring the procedural component of multiplicative and additive reasoning, and a test measuring the conceptual component of multiplicative and additive reasoning) were administered to 246 third, fourth, fifth and sixth graders. Results revealed that almost all children who erroneously over-used multiplicative or additive reasoning possessed the procedural skills needed to reason multiplicatively and additively, while this was not the case for the conceptual component. However, still a substantial percentage of these multiplicative and additive reasoning abilities had acquired all necessary abilities, and almost all of them had a preference for multiplicative or for additive relations. These results confirm that getting a view on children’s preference is indispensable in order to fully understand the development of multiplicative and additive reasoning.

The Facilitating Role of Analogies in Understanding Scientific Texts
Keywords: Conceptual change, Misconceptions, Science education, Student learning
Presenting Author: Stelia Vosniadou, National and Kapodistrian University of Athens, Greece
Co-Author: Irini Skopeliti, University of Patras, Greece

In two experiments we investigated the influence of instructional analogies in the comprehension of counter-intuitive scientific texts elementary school children. The participants in both studies were randomly assigned to an experimental or a control group. The experimental group read a text presenting the scientific explanation of the day/night cycle (experiment 1) and of the seasons (experiment 2). The control group read the same text without the analogy. All participants gave pretest and posttest explanations of the phenomenon in question and all of them were asked to recall the information given in the text they read. The results showed that most of the explanations given at pretest were inconsistent with the scientific explanation and interfered with the comprehension of texts causing invalid inferences. The children in the analogy condition showed better recall and created fewer invalid inferences compared to the children in the no-analogy condition. The children in the analogy condition also provided posttest explanations closer to the scientific explanation than the children in the no-analogy condition. The results from both studies supported the claim that analogies can facilitate the understanding of counter-intuitive information.

Models as relational categories in science education – insights from cognitive science
Keywords: Conceptual change, Physical Sciences, Science education, Model-based reasoning
Presenting Author: Tommi Kokkonen, University of Helsinki, Finland

Models and modelling have become an influential approach to science education — especially in physics. One reason for this is that models are seen as a way towards authenticity in science education. Another reason is that modelling based learning can lead to better learning outcomes with regard to conceptual knowledge as well as facilitating conceptual change. In this paper I will first look at the roles of models and modelling in science education arising from the literature. Specifically, I will argue that there are three main roles: 1) using models to convey an idea or concept, 2) constructing and revising models and 3) using models in theory development. However, despite ample research there are surprisingly few that look at the cognitive processes underlying model-based learning. However, it has been suggested that viewing models as relational categories could provide insight with regard to the learning processes. I will follow this suggestion and contrast it with the roles 2 and 3 of modelling. Most importantly, I will argue that this comparison highlights the learning of generic relational knowledge, which has been somewhat neglected in science education literature. I will also discuss the specific processes associated with learning of such knowledge. Lastly, I will discuss the implications for research.

A longitudinal study of the development of science knowledge among 4th to 8th grade students
Keywords: Cognitive development, Conceptual change, Quantitative methods, Science education
Presenting Author: Erzsébet Körös, University of Szeged, Hungary
Co-Author: Erzsébet Antal, University of Szeged, Hungary
Co-Author: Zsófia Gabriella Szabó, University of Szeged, Hungary
Co-Author: Györgyvölgy Mohar, University of Szeged, Hungary
Co-Author: Benedek Csapó, University of Szeged, Hungary

In this paper, we examined the development of a set of basic science concepts (e.g., matter, life forms, characteristics, classification and conditions of life, the properties of matter) among 10 to 14-year-old students. The objective of the study is to examine (1) the differences in students’ science knowledge over the years; (2) the predicting power of the starting abilities on later achievement and (3) to compare developmental changes regarding the different subject areas. The sample was drawn from 4th, 6th and 8th grade students. Different versions with different item difficulty of science tests were used, which varied by grade. Versions contained anchor items, so achievement scores could be represented on a single scale. The contents of the tests were adjusted to the school curriculum. Rasch model was used for scaling the data. Plausible values and weighted likelihood estimation were computed to compare the achievements of the age groups and to obtain individual level point estimates. The internal consistency of the instrument was high (a grade=4: 93; a grade=6: 93; a grade=8: 95). Across all grades, development of science knowledge is obvious. The fastest development happened from grade 4 to 6. Initial abilities had a lasting effect: relative abilities did not change significantly over time. The mean probability of correct solution of items belonging to the different subject areas increased with age. The differences at
student level in the same grade were getting larger and varied by subject areas. Findings of the present paper identify factors having predicting power on the developmental level of students’ scientific knowledge.

Session G 168
31 August 2017 08:30 - 10:00
Pinni A - A1081
Single Paper
Learning and Instructional Technology, Lifelong Learning, Motivational, Social and Affective Processes, Teaching and Teacher Education

Paper Presentation: Learning and Professional Development - C

Keywords: Collaborative Learning, Cooperative / collaborative learning, Distributed cognition, Educational Technology, Emotion and affect, Informal learning, Mixed-method research, Reflection, Social aspects of learning and teaching, Social interaction, Teacher Professional Development, Video analysis, Vocational education, Workplace learning

Interest group: SIG 14 - Learning and Professional Development

Chairperson: Astrid Wichmann, Ruhr University Bochum, Germany

A longitudinal perspective to the improvement of teachers’ collaborative knowledge and skills

Keywords: Collaborative Learning, Cooperative / collaborative learning, Social aspects of learning and teaching, Teacher Professional Development

Presenting Author: Nina Impi, University of Oulu, Finland
Co-Author: Sanna Järvelä, University of Oulu, Finland
Co-Author: Pirkko Skiklander, University of Lapland, Finland

This longitudinal study was aimed at increasing our understanding how teachers learn collaborative knowledge and skill. The research was conducted within two-year master’s programme studies with two separately study group during the years 2009-2014. Teachers (N=25) from different fields participated in the study. The data consists of 67 interviews and 124 analytical self-reflections. A qualitative data-driven analysis was aimed to investigate how teachers describe the improvement of their collaborative knowledge and skills during the master’s programme studies and after the graduation in their work. Teachers’ descriptions comprised five main categories, namely attitudes and beliefs towards collaborative learning, awareness of collaborative skills, theoretical and practical understanding about different learning, thinking of students’ learning and teaching practices, and thinking of one’s own possible collaborative practices in school communities. The results indicate that at the beginning of the learning process teachers’ attitudes and beliefs have been significant for their orientation to learn and work collaboratively. During the studies versatile experiences of collaborative learning shape the teachers’ attitudes and beliefs resulting in improvement of collaborative skills. Further, understanding about collaborative learning impacts on teachers thinking of learning and encourages them to use collaborative teaching methods in their daily work. The results contribute for teacher training and teachers’ in-service training by providing new insights for supporting teachers’ collaborative working practices.

Affective components of work team interaction: An empirical study on vocational teacher teams

Keywords: Emotion and affect, Mixed-method research, Social interaction, Vocational education

Presenting Author: Varena Watzl, University of Regensburg, Germany
Co-Author: Regina Mulder, University of Regensburg, Germany

Working and performing as a team is an economically important factor, also in the domain of education. More insight is required in team interaction processes to understand how affective processes contribute to team interaction in vocational teacher teams. The aims of our study are: First, to find out if there are differences in the teams’ learning behaviour; Second, to explore through which affective components the differences can be explained; Third, to get insight in the role of emotions within work team interaction processes. The mixed methods approach consisted of a cross-sectional study with 117 interdisciplinary vocational teacher teams. Teaching professionals of different disciplines worked together on challenging tasks, such as education of refugees. Cluster analysis in SPSS and Mplus were carried out to investigate differences in the teams’ learning behaviour. In addition, for getting in depth understanding of the interaction processes in team meetings, six of these vocational teacher teams were 5 times observed, audio-, and videotaped. This dataset is analyzed to identify emotional communication processes. Three clusters were found, which significantly (p<.01) differ in almost all team learning processes. Based on these results we defined different learning types of teams: ‘Very active all-rounder’, ‘Active all-rounder’, and ‘Active teams focusing on knowledge sharing’. After calculating ANOVA the results of the Scheffé post hoc test revealed significant differences (p<.01) in two affective components that give some explanation of the different learning behaviours of the teams. We will also present preliminary results of the analysis of emotional communication processes.

Effects of video-annotation on tutors’ feedbacks in perioperative nurse training: A case study

Keywords: Educational Technology, Video analysis, Vocational education, Workplace learning

Presenting Author: Alberto Cattaneo, Swiss Federal Institute for Vocational Education and Training, Italy
Co-Author: Elena Boldrini, Swiss Federal Institute for Vocational Education and Training (SFVET), Switzerland
Co-Author: Francesco Lubini, Centro Professionale Società (CPS) di Medicina Tecnica, Switzerland

Video-based analysis of practices is a powerful way to provide effective feedbacks. In particular, video annotation enables evidence-based, focused reflections. Scrub nurses training in Switzerland is based on the alternation between school- and work-based tracks. Within this pilot study, students experience different surgical operations and have a posteriori/debriefing sessions with tutors. However, no use of video has been foreseen so far to support such sessions. Therefore, we conducted a pilot study to explore the affordances of video-based/video-annotated feedbacks on tutors’ quality of feedbacks and tutors’ reflectivity skills.

One perioperative nurse student (tutee) and two couples of tutors have been involved in four debriefing sessions subsequent to four video-recorded surgical operations. The first couple of tutors worked in a video-based condition, the second further included video-annotations. The tutee progressed from not watching the video, watching it without annotation and finally annotating it herself.

Content analysis of the debriefing sessions was conducted to assess the quality of feedbacks. Interviews with the participants investigated their acceptance and perceived usefulness.

Results show that the use of video and moreover of video-annotation changed tutors’ feedback contents and communicative style. Tutors shifted from mostly nonspecific and corrective feedbacks to more evidence-based supportive ones; from assertive tutor centered debriefing session to a student-driven self-evaluation. The tutee’s acceptance of feedbacks augmented, as did the capacity of proactively proposing self-regulated reflections. This contributed to shifting from reflection on action to reflection for future action.

Given the encouraging results, a new study is planned with a larger sample.

Capturing the dynamics of VET teachers’ workplace learning with diaries.

Keywords: Distributed cognition, Informal learning, Mixed-method research, Reflection

Presenting Author: Arnaud Oude Grote Bieverborg, Johannes Gutenberg Universität Mainz, Germany
Co-Author: Maarten Wijnants, Radboud University Nijmegen, Behavioural Science Institute, Netherlands
Co-Author: Jolien Geerlings, Social and Behavioural Sciences, Utrecht University, Netherlands
Co-Author: Tobias Feldhoff, Johannes Gutenberg University Mainz, Germany
Co-Author: Jeroen van Loo, University of Groningen, Netherlands
Co-Author: Peter Sleeegers, BMC, Netherlands

To understand more about the emergence of learning experiences from engagement in professional (reflective) learning in the workplace, the aims of this article are to conceptualize professional learning as an ongoing process during a teacher’s career, which is rooted in a teacher’s choices for action, and to identify an example of how to measure that process situat edly, and how to analyse its temporal pattern. The starting point is the dynamic analysis technique Recurrence Quantification Analysis (RQA). We conducted a diary study, in which 18 VET teachers filled in daily and monthly logs over a period of 5 months. On the basis of these measurements, time-series of occasions of reflection intensity and sumcores of learning experiences were generated, and these data were analysed with categorical RQA and correlations. The results indicate that teachers can further their development if they intend to do so, and that they require a certain amount of sensitization to their respective environments in order to pick up the information they need for their learning processes to progress. A basic requirement to formulate and sustain a certain intention, and also to spot challenging details in one’s environment, would seem to make experiences explicit by being motivated to free some time for reflection. The study shows the utility of measuring density, and it provides an example of how novel techniques can be adopted to tap into professional learning as a dynamic and situated process.
We report the outcomes of an evaluation of a video club intervention to improve the thinking and practice of teachers in giving feedback and engaging in dialogic teaching. The intervention involved 92 teachers from 11 primary schools in England. Participating teachers worked collaboratively in a sequence of six video clubs over a six month period. A range of data were collected through: recording of individual use of the online platform; videos of film club meetings; a before and after survey; shared videos of classroom lessons; two focus groups with school co-ordinators; end of project telephone interviews with participating teachers. We gathered survey responses from non-participating as well as participating teachers. Analysis of change over the period of the intervention found that participating teachers became more likely than non-participating teachers to report that, in their feedback, they posed serious challenges to pupils, helped pupils to review the steps they had taken in solving problems and helped pupils to work out problems with their answers (effect sizes .3 to .5). These results were corroborated by the other data. Our study provides a new instrument for gathering evidence of change in teachers’ thinking and practice in feedback and provides evidence of change in teachers’ thinking and practice through corroboration of comparative survey data with analysis of lesson videos.

Session G 173
31 August 2017 08:30 - 10:00
Linnna · K103
Single Paper
Motivational, Social and Affective Processes

Paper Presentation: Emotion and Affect
Keywords: Achievement, Emotion and affect, Higher education, Mathematics, Mixed-method research, Motivation and emotion, Primary education, Quantitative methods, Quasi-experimental research
Interest group: SIS 08 · Motivation and Emotion
Chairperson: Marianne Schuepbach, University of Bamberg, Germany

How children with different levels of mathematics anxiety perceive and approach mathematical tasks.
Keywords: Emotion and affect, Mathematics, Mixed-method research, Primary education
Presenting Author: Sonia White, Queensland University of Technology, Australia
Co-Author: Kate Williams, Queensland University of Technology (QUT), Australia
Co-Author: Maria Viviani, Queensland University of Technology (QUT), Australia
Co-Author: Lyn English, Queensland University of Technology (QUT), Australia

Mathematics anxiety can have negative effects on children’s mathematics learning and contributing the development of negative attitudes towards tasks involving mathematics. Grade 4 and Grade 5 children (n = 158) completed general, test and mathematics anxiety scales and latent profile analysis determined five distinct anxiety profiles. A subsample of children (n = 13) were interviewed to investigate differences in how children with different anxiety profiles perceive mathematics and how they would approach a specific mathematics problem. The findings will discussed in relation to the ways in which group work with peers, individual work, and support by teachers attenuates or exacerbates children’s sense of anxiety in the face of particular mathematics tasks.

How 1st year study engagement predicts later situational task value and daily emotional experiences?
Keywords: Emotion and affect, Higher education, Quantitative methods, Motivation and emotion
Presenting Author: Elina E. Ketonen, University of Helsinki, Finland
Co-Author: Lars-Erik Malmberg, University of Oxford, United Kingdom
Co-Author: Hanni Muukkonen, University of Oulu, Finland
Co-Author: Katri Niska-Olde, Helsinki College of Advanced Studies, Finland
Co-Author: Kirsti Lonka, University of Helsinki, Finland

The present study examines individual differences in relation between situation-specific task value and academic emotions using intra-individual assessment. Our aim was to investigate how study engagement and study burnout in the beginning of university would mediate situations during the first two years of study.

Study engagement, study burnout and control variables (i.e., life satisfaction and depressive symptoms), were measured with questionnaires in the beginning of the first academic year. Intra-individual state assessments were conducted via mobile phone-based experience sampling (ESM) during participants’ first (N=50) and second (N=36) academic year. Five times during 14 consecutive days, we asked about students’ current activity, how important they perceived this activity and their positive and negative emotions. The ESM-data represented a hierarchical three-level structure, with situations (Level 1) nested within years (Level 2) nested within students (Level 3).

The results of multilevel models indicated that perceived value of the activity either decreases or increases negative emotions, depending on the individual. Furthermore, positive emotional responses to perceived value varied significantly in magnitude between students. The findings suggest that high study engagement in the beginning of university could further increase positive emotions in activities that are perceived personally important in everyday situations, even beyond the first year. Furthermore, while depressive symptoms and life satisfaction strongly predicted negative emotions in everyday situations, the dimensions of study burnout also had an influence. Cynicism in particular predicted negative emotions even beyond the first year, and could therefore indicate a deeper, more enduring problem hindering academic well-being.

The effect of study skills courses on learning-related emotions
Keywords: Achievement, Emotion and affect, Higher education, Quasi-experimental research
Presenting Author: Varvara Schmid, University of Kassel, Germany
Co-Author: Martin Haarz, University of Kassel, Germany

The present study examines the effect of study skills courses on general study competences and learning-related emotions. Further, the study shows whether positive changes in learning-related emotions are mediated by increased general study competences. An online questionnaire measured general study competences on three scales (motivation and organization of the learning process, planning and work postures). The average age of the students was 22.4 years. The achievement motive questionnaire (AMQ) by Peter, Gatz and Perry (2002) was used to measure achievement emotions. The effect was estimated with 185 students from ten different universities in Germany who voluntarily attended a study skills course to improve their general study competences. This group answered the questionnaire before and two months after the study skills course. Students of a control group (n = 147) did not participate in such a course but also answered the questionnaire in a time interval of two months. Analyses show that students who attended a study skills course rate their general study competences and positive learning-related emotions significantly higher (or lower concerning negative emotions) two months after having attended such a course compared to students of the control group. Later change models suggest that positive changes in specifically learning-related emotions are affected by positive changes in general study competences. These findings have significant implications for the understanding of how study skills courses influence the study process and thereby study success. The evidence from this research suggests that study skills courses are one possibility to support especially first-year students when entering university.

Implications of emotional experience and perceived competence on achievement in mathematics
Keywords: Achievement, Emotion and affect, Mathematics, Motivation and emotion
Presenting Author: Natacha Boissacat, Université Grenoble Alpes, France
Co-Author: Michael Fantusul, Université de Nice Sophia Antipolis, France
Co-Author: Jérémy Pouille, Université Grenoble Alpes, France

The main purpose of the study was to examine, among pupils in their fifth grade, the impact of emotion on cognition generated by a domain potentially stressful for them, mathematics. It is acknowledged that when mathematics generate negative thoughts and worries among children (Reschly et al., 2008; Fantusul et al., 2014), it may impact the resources allocation (Ashcraft, 2002), that in turn may impair performance in maths. We hypothesized that emotions generated after the teacher announced a mathematics task would impact pupils’ achievement in that task, especially when they hold a low perceived
The process of adapting to new educational environments is crucial for students. The author discusses the challenges faced by students when transitioning to higher education and highlights the importance of social support and academic preparation. The study findings indicate that students who receive support during this transition period are more likely to succeed. The implications of these findings are discussed, emphasizing the need for better support systems in higher education institutions. The conclusion reiterates the importance of continuous research and support interventions to improve student success.
We report on a study with N = 64 university students, analyzing the relative influence of domain-specific (conceptual and procedural mathematical knowledge, mathematical-strategic knowledge) and domain-general (problem solving skills, conditional reasoning skills, meta-cognitive awareness) resources on students’ proof construction skills.

Results reveal that mathematical knowledge, mathematical-strategic knowledge, and conditional reasoning skills have an impact on students’ proof construction skills. Comparing the regression coefficients shows that the overall impact of domain-specific resources is larger than those of domain-general ones. The implications of these results regarding the role of domain-specific vs. domain-general resources as well as on instruction on (mathematical) argumentation and proof in higher education will be discussed.

Cooperative learning in higher education: Effects of fostering group work on students’ achievement

Keywords: Cooperative / collaborative learning, Higher education, Self-regulation, Student learning

Authors: Arika Bürkle, University of Leipzig, Germany

Co-Author: Henrik Zanichk, University of Leipzig, Germany

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For this purpose, we conducted a quasi-experimental longitudinal study and systematically fostered cooperative learning during self-regulated learning activities in a group of teacher students (EG, n = 237).

First describe results show that students in the EG reported to feel more socially related to their peers in the control group (CG, n = 260) at the end of the course. Further analysis indicates that students’ social relatedness positively predicts their achievement at the end of the semester, in the EG but not in the CG. The crucial role of feeling related to others as well as the impact of cooperative learning contexts for learning development in higher education is discussed.

Session G 177

31 August 2017 08:30 - 10:00

Main Building C - CCL

Single Paper

Higher Education

Paper Presentation: Higher Education - L

Keywords: Economics of education, Educational policy, Educational psychology, Emotional and affect, Higher education, Learning approaches, Mixed-method research, Motivation, Quantitative methods, Teacher Professional Development, Teaching approaches, Technology

Interest group: ISS G4 - Higher Education

Chairperson: Marion Graewe, KU LEUVEN, Belgium

Advancing Teaching and Learning Conceptions in Graduate Teaching Assistant Training

Keywords: Higher education, Learning approaches, Teacher Professional Development, Teaching approaches

Presenting Author: Alex Shum, University of Hong Kong, Hong Kong

Co-Author: Ada Law, The University of Hong Kong, Hong Kong

Co-Author: Suki Ekan Wat, University of Colombo, Sri Lanka

Deep and surface approaches to learning in higher education contexts have been linked to student-focused and teacher-focused approaches to teaching. These connections should be taught and emphasized to improve the effectiveness of graduate teaching assistant (GTA) training courses. The current study investigated a short GTA training course at an Asian research-intensive university on impact of participants’ conceptions of teaching and learning. It further explored predictive effects between latent variables in GTA approaches to learning and approaches to teaching GTAs (N=137) completed the study process questionnaire and the approaches to teaching inventory at the beginning and end of the course. Student-focused teaching and deep learning scores increased with small-moderate effect. Past deep learning scores moderately predicted future student-focused teaching scores. Factor analysis of both questionnaires together revealed two factors, teacher-focused teaching with surface learning and student-focused teaching with deep learning. Implications for theory and practice are discussed.

Variables Explaining Learners’ Emotions in Simulation-Based Learning Environments

Keywords: Emotions, Affect, Higher education, Quantitative methods, Technology

Presenting Author: Tuulikki Keikaku, University of Lapland, Finland

Co-Author: Heiki Ruokamo, University of Lapland, Finland

Medical education can be emotionally charged for many reasons; simulation-based activities in particular are designed to generate emotional reactions. However, few studies have concentrated on learning and emotions despite widespread interest in the topic. The aim of this research is to study the emotional experiences of participants during simulation-based teaching and learning activities. The specific aim is to answer the following research questions: What kinds of emotions do learners experience before and after simulation-based educational activities? Which variables explain learners’ positive and negative emotions after simulations? The data were collected using mixed methods, and pre and post questionnaires of 127 participants were analyzed using descriptive statistics as well as a paired-sample t-test, factor analysis, Cronbach’s alpha, and a linear regression analysis. The results show that simulation-based learning involves mainly positive emotions by creating challenges through goal-oriented studies, whereas negative emotions tend to remain constant during an educational course.

Performance profiling in higher education: A visualisation tool to inform strategy formulation

Keywords: Economics of education, Educational policy, Higher education, Mixed-method research

Presenting Author: Marian Mahat, The University of Melbourne, Australia

An effective visualisation tool for a university’s performance can assist management to make strategic choices to locate themselves in which they can make use of their resources effectively and efficiently. Working within the case study context of medical education, this paper makes a contribution to higher education research by investigating the use of a performance profiling tool to support strategic positioning in Australian higher education. Drawing on data from qualitative semi-structured interviews and quantitative analysis of performance data, the study has provided insights into the ways the planning and monitoring of profiles can inform strategy formulation. Specifically, the empirical findings provide evidence that a performance profiling tool could be used by senior management to identify and understand institutional mission and strategy, target a search or benchmark, and selectively choosing indicators for management and quality enhancement purposes. In doing so, it provides the link between research and the advancement of educational outcomes through providing evidence to support strategic decision making in in areas such as learning and instruction.

Do college students spend more time studying when assignments are interesting? 

Keywords: Educational Psychology, Higher education, Motivation, Quantitative methods

Presenting Author: Martin Meuter, Vrije Universiteit Amsterdam, Netherlands

Over the last decades, many programs in higher education have moved away from a reliance on frontal lecturing, towards a system with small seminars in which assignments are handed out that structure self-study. Assignments are intended to motivate students to master the material programmed for that week, and are therefore constructed to be interesting. However, does an interesting assignment really result in more self-study? This question has up to now been tackled by for example comparing ratings at a course level where has been difficult to establish - for one because such ratings confound true effects of interest in a course with individual differences between students in that course. To get at a more granular level, a study was conducted in which students in a large bachelor’s psychology program rated their interest in assignments, and reported the subsequent self-study in the interval in between two face-to-face meetings. Although there was considerable variance in both the interest in the assignments and in reported self-study, there was virtually no relationship between the two when assessed within students. Instead, self-study only increased nearer to the exams. Across participants, however, there was a correlation between the average interest in the assignments and self-study. This suggests that any relation between interest in assignments and self-study may result more from individual differences between students (e.g., differences in intrinsic motivation or in self-control) than from any strong influence of interest on self-study.

Session G 178

31 August 2017 08:30 - 10:00

Pinn 8 - B3111

Single Paper

Teaching and Teacher Education

Paper Presentation: Educational Effectiveness and Instruction

Keywords: Mathematics, Peer interaction, Quantitative methods, Science education, Survey Research, Teacher Effectiveness, Teacher Professional Development, Teaching / instruction, Video analysis

Interest group: SIG 18 - Educational Effectiveness

Chairperson: Paulina Aalenius, University of Tampere, Finland, Finland

A longitudinal study of reciprocal effects of participation and achievement in science classrooms

Keywords: Science education, Teaching / instruction, Video analysis

Presenting Author: Benjamin Caspar Fauth, Hector Research Institute of Education Sciences and Psychology, Germany

Co-Author: Morakus Kunter, Goethe-Universität Frankfurt, Germany

Co-Author: Eckhard Klieme, German Institute for International Educational Research (DIPF), Germany

Co-Author: Renate Hardy, Goethe-Universität Frankfurt, Institute of Psychology, Germany

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Student participation in classroom discourse is considered to be an essential aspect of student learning. Students who participate in relevant classroom discourse are more likely to be engaged in learning, and teachers may provide better individual support by using on-the-fly assessment strategies to diagnose and address student learning. However, we know little about the mechanisms of connection between participation in classroom discourse, student characteristics, and learning outcomes (e.g., Flénet, Janjigian, & Tazouti, 2016). We used data from a longitudinal study in primary school with a standardized science curriculum at an academic performance level of the 8th grade. Furthermore, we used student participation  assessment in each of the 37 classes. We coded a ten-minute video sequence involving 83 verbal teacher-student interactions during a whole-class discussion on science content and matched the coding with student data. Logit regression analysis reveals that students’ prior conceptual understanding in particular was connected with participation in classroom discourse. Students who showed high level of performance in science assessment were more likely to participate in classroom discourse. Students who showed low level of performance in science assessment were less likely to participate in classroom discourse. Moreover, students with relatively higher prior conceptual understanding when compared to their classmates benefited particularly from participation in classroom discourse. The results underline the benefits of students’ participation in classroom discourse for science learning. Future research is needed to disentangle the underlying mechanisms for science learning. Funky high-achieving students initiate participation and/or do teachers particularly address high achieving students in classroom discourse), and further lesion sequences will have to be coded to examine the generalizability of our results.

Using classroom videos and student perceptions to measure teaching practice

Keywords: Quantitative methods, Survey Research, Teaching / instruction, Video analysis

Presenting Author: Ani Khor, University of Oslo, Norway

Co-Author: Måte Blikstad-Baals, ILS, University of Oslo, Norway

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Research suggests that multiple methods and sources of information are required when analyzing teaching practice, because teaching is too complex for any single measure of performance to capture accurately (BMFSG, 2013; Klieme et al., 2009; Taut & Raczky). In the present study, ‘Linking Instruction and Student Achievement’ (LISA) we use video recordings from mathematics and language-arts classrooms together with student perception surveys and score gains on national tests to understand how instructional practices impact student learning and are able to differentiate between more and less effective instructional practices.

In this paper we will report from the use of video recordings and student perception surveys as measures into teaching quality. Based on video recordings from 48 language arts classrooms and 48 mathematics classrooms (four lessons in each class, in total 396 lessons) and student perception surveys (n=1125 mathematics students and n=1100 language arts students) from the same grade 8 classrooms we discuss the validity and predictive power of the two measures.

Analyses suggest that both student perception surveys and classroom observation can provide meaningful feedback on teaching quality when carefully designed student perception surveys provide valuable and reliable information on classroom teaching. The large and consistent variation between the survey items implies for example that Norwegian grade 8 students were able to discriminate between what they consider effective and less effective teacher actions. Video observations seem less fitted for differentiating between high quality and low quality teachers but seem to have a greater potential for diagnostic and developmental purposes.

Teacher Practices, Student Participation, and Learning: Variation across Classroom Structures

Keywords: Mathematics, Peer interaction, Teaching / instruction, Video analysis

Presenting Author: Nooreen Webb, University of California, Los Angeles, United States

Co-Author: Nicholas Johnson, Orange County Department of Education, United States

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Researchers, policy makers, and practitioners increasingly recognize that engaging students as active participants in classroom conversations (explaining their thinking and engaging with others’ ideas) is important for their mathematics learning. Emerging research also suggests that teachers can support student participation by pressing students to clarify and elaborate on their own ideas and to engage with others’ ideas, but more research is needed in this area. Much of this research, however, is based on observations of teachers and students in only selected participation structures within classroom lessons, such as whole-class discussion, or only small-group collaborative settings. This study examined teacher practices and student participation, and the relationship with student learning outcomes, in a wide range of classroom participation structures, including whole-class discussion, small-group and whole-class conversations during whole-class discussion, and student-led small-group work. The results showed wide variation across participation structures, suggesting that comprehensively observing student participation and teacher support practices in the multiple classroom structures that occur is necessary to draw valid conclusions about the links between teacher practices, student participation, and student learning outcomes. Focusing on only some of the classroom structures would provide an incomplete picture of both student participation and teacher practices.

Developing Stages of Tasks of Teaching Mathematics by Using a Content-Specific Instrument

Keywords: Mathematics, Teacher Effectiveness, Teacher Professional Development, Teaching / instruction

Presenting Author: Charalampos Charalambous, University of Cyprus, Cyprus

Co-Author: Sofia Athanase, University of Cyprus, Cyprus

Co-Author: Maria Papacharalambous, University of Cyprus, Cyprus

While teacher observation instruments were initially conceived as tools for teacher summative evaluation, recently they are considered as key levers for supporting teacher growth. To function in this formative way, different stages of tasks of teaching ought to be developed, so that areas for teacher improvement can be outlined. Based on the Mathematical Quality of Instruction (MQI) instrument, in this study we explore whether stages of tasks teaching mathematics can be developed. Toward this end, we recruited 38 volunteer teachers (Grades 4-6) who had six of their mathematics lessons videotaped. All these lessons were coded independently by trained raters who then met to review the work. Based on these reconciled codes and using a Rasch model, we first developed a scale with good psychometric properties. We then identified the items on their difficulty level. These items were then clustered into five main stages employing a procedure for detecting pattern clustering. Based on this clustering, it appears that at the basic level teachers are featured just ensuring that their teaching focuses on mathematics, is error-free, and engages students in procedural work. Teachers are then featured using more accurate mathematics language and engaging students in somewhat more demanding work. The third stage is characterized by richer and more challenging instruction as well as more productive interactions with students; in the latter two stages teachers associated with the highest levels of the MQI are observed. We discuss how these findings can support teacher training and professional development.

Session G 179

31 August 2017 08:30 - 10:00

Vita - 100

Single Paper

Assessment and Evaluation, Cognitive Science, Teaching and Teacher Education

Paper Presentation: Learning and Development in Early Childhood - E

Keywords: Arts, Case studies, Cognitive development, Communities of learners, Developmental processes, Early childhood education, Learning approaches, Literacy, Mixed-method research, Quasi- experimental research, Student learning, Teacher Professional Development, Teaching / instruction

Interest group: SIG 05 - Learning and Development in Early Childhood

Chair: Aasa, Minna Lakkala, Turku, University of Helsinki, Finland

Enhancing physical active play in Norwegian Kindergartens – a randomised evaluative controlled trial

Keywords: Learning approaches, Mixed method research, Quasi experimental research, Student learning

Presenting Author: Thomas Moser, Faculty of Humanities, Sports and Educational Science, Norway

Co-Author: Steinar Øverdal, University College of Southeast Norway, Norway

Co-Author: Endiv Andersen, University College of Southeast Norway, Norway

Co-Author: Janne Borch-Jensen, Sandefjord municipality, Health services, Norway

Co-Author: Hanna Elingsen, Sandefjord municipality, Health services, Norway

Co-Author: Linda Hjern, Sandefjord municipality, education and upbringing, Norway

Co-Author: Grethe Skalberg, Sandefjord municipality, education and upbringing, Norway

Co-Author: Kar Anne Jorgenson, University College of Southeast Norway, Norway

The purpose of this paper is to present the effects of intervention programs (IPA) on the amount of moderate to vigorous physical activity (MVPA) in children four years of age and 2) to explore whether the IPA had an impact on children’s physical activity. Furthermore, the primary and secondary outcome measures associated with changes for MVPA from T1 to T2 (6 months). The term physical activity play in the present study is used synonymously with MVPA. This longitudinal study includes data from 86 children in 11 public kindergartens (6 intervention; 5 controls). A start-up seminar and 3 courses (3 hours each) were conducted with the entire staff in the intervention kindergartens. The aim was that each institution systematically develop and implement measures tailored to their particular institution in order to increase physical active play. Staff (nun reached activities lasting 30 min during the entire project period (4 months) through visits in their institutions. Children from IG increased their MVPA twice as much as children in the control group (15.3mm ISD=19) and 7.2 mm (ISD=15) respectively, p<0.05 measured by accelerometers during 5 days at T1 and T2). The analysis of data concerning how staff planned and implemented the IPA, based on the qualitative and quantitative data, is still ongoing. Preliminary results indicate that kindergartens with a higher increase of MVPA (1) included other subjects in their IPA and (2) that these institutions had a particular focus on reorganizing indoor activities, compared to institutions with less increase of MVPA.

Narrativity and Narratives in A Musical Playschool Teacher’s Pedagogy

Keywords: Arts, Case studies, Early childhood education, Teaching / instruction

Presenting Author: Kylliikki Rintala, University of Tampere, Finland

The objective of this study is to examine how narrativity manifests itself in music education. The study sets out to find how and what types of narratives are used in musical playschool pedagogics.
This is a case study in which the phenomenon was examined in light of the educational methods used in one musical playschool group. The main data consists of videotaped teaching situations and interviews with the teacher.

The data were evaluated using theory-based analysis. In this case study, narrative first seems to be a conscious and target-oriented activity that uses narratives to direct children’s attention to educational content and, context allowing, to musical learning as well.

Narratives seem to include three groups: tasks related to identity, community, and topics being taught in relation to one’s experiences and life course. This last finding exhibits narratives in more detail. At the heart of the teacher’s narratives lie the problem to be solved, emotionality and safety are the main emotions categorized according to Myerheim (2004). The extent of the narrative varies from a short sentence to a narrative permeating the whole class or a continuum of narrative across classes.

The last finding shows that pedagogics is seen as comprehensive and harmonizing.

Based on my data, narrative pedagogics is very well suited to early music education and many others areas.

A Pre-Literacy Intervention Study in a Multilingual Setting
Keywords: Cognitive development, Developmental processes, Early childhood education, Literacy
Presenting Authors: Mari Nealer, University of Luxembourg, Luxembourg
Co-Author: Silke Frick, University of Sheffield, United Kingdom

Phonological awareness and letter-sound training in a language-rich environment is effective in preparing children for literacy in alphabetic languages (Rose, 2006). However, the effectiveness of such approaches is not established for children who are introduced to literacy in a second language. Preschool in Luxembourg is compulsory for all children and is conducted in Luxembourgish. Literacy instruction does not begin until Year 1 of primary and is conducted in German, the second language for 98% of the children. National statistics show that almost half of Luxembourg’s nine-year-olds are not achieving reading and writing standards at the age of 9 (NSLA, 2012).

This project aims to develop and evaluate the effectiveness of a theoretically motivated preschool literacy programme designed to systematically build up children’s phonological awareness skills and letter-sound knowledge in Luxembourgish. The programme is administered by teachers and specifically designed to promote crisis linguistic transfer effects from Luxembourgish (L1) to German (L2 and language of literacy instruction) and to target the need of language minority children (roughly 50% of the population).

Two hundred children from 8 Luxembourgish preschools were allocated to either the intervention or the control condition (receiving the standard curriculum). The intervention runs for 12 weeks in Year 2 of preschool. Children are followed longitudinally and assessed on various language measures (phonological awareness, RAN, letter-sound knowledge, oral language) before and immediately after the intervention and 6 months after the end of the intervention.

Preliminary data from the pre- and post-tests on the phonological awareness, letter-sound correspondence and reading measures will be presented.

Enhancing Physical Activity in Taiwanese Early Childhood Education and Care
Keywords: Early childhood education, Developmental processes, Early childhood education, Teacher Professional Development
Presenting Author: Yi-Jiun Su, National Taiwan University, Taiwan

We have conducted 16,846 systematic observations in Taiwanese preschools in 2015. One of the observed items was children's physical activity (PA). Only 6.1% of the children’s activities included high PA with at least some running, jumping and physical exertion etc. This means that Taiwanese preschool children do not have enough PA during the school day. We have shared the research results with 15 preschools in Taipei County and Hualien area. The teachers in each preschool have produced plans and models to enhance children's PA in their preschool and also shared the plans and ideas with each other. In this presentation we describe the results of children's PA that need pedagogical attention in the Taiwanese preschools. We also describe examples of the ideas and enhancements produced by the teachers based on the research results.

Session G 180
31 August 2017 08:30 - 10:00
Main Building E - E350
SIMPUL Paper
Assessment and Evaluation, Learning and Special Education

Paper Presentation: Special Educational Needs - C
Keywords: Assessment methods and tools, Computer-assisted learning, E-learning / Online learning, Educational Technology, Learning and developmental difficulties, Motivation and emotion, Peer interaction, Problem solving, Social aspects of learning and teaching, Social interaction
Interest group: SIG 14 - Learning and Professional Development, SIG 15 - Special Educational Needs
Chairperson: Tahir Sitgmaz葛Buğk, Turkey

SEN students, self and teacher perceptions of school performance: Relation with classroom ecology
Keywords: Peer interaction, Social aspects of learning and teaching, Special education, Motivation and emotion
Presenting Author: Joana PIPA, Instituto de Educação da Universidade do Lisboa, Portugal
Co-Author: Sofia Freire, Instituto de Educação da Universidade do Lisboa, Portugal

Preserving one’s positive perception of competence is a central feature in the educational process, being a desirable outcome and a positive mediator of students’ school achievement and motivation. The main goal of this study was to evaluate student self and teacher perception of school performance in accordance to students’ SEN status and classroom social structure. Participants 27 teachers and 359 students (48% SEN students) from Portuguese schools attending to 3rd, 5th and 7th grades. Teachers and students completed a rating scale of perception of school performance in general and in Portuguese and Mathematics subjects and students also completed sociometric tasks to assess classroom social ecology. Results showed that SEN students revealed lower self-perceptions of performance than those of their non-SEN classmates. Teacher-SEN students perceptions of performance shared little consensus. Considering the social acceptance was a positive predictor of perception of performance. Also, classrooms with a more hierarchical structure lead to a low dispersion of classroom perception of school performance. These results reinforce the need to focus on SEN students as a particular vulnerable group and highlight the relevance of classroom’s social ecology in constructing and maintaining students’ self-perception of competence.

Exposure to multimedia features in e-book for promoting literacy among students with ADHD
Keywords: E-learning / Online learning, Learning and developmental difficulties, Special education, Writing / Literacy
Presenting Author: Rachael Grumberg Vardi, Bar-Ilan University, Israel
Co-Author: Adina Shamir, Bar-Ilan University, Israel

The purpose of the present study was to investigate the effect of activity with an educational electronic book (e-book) on literacy acquisition of students with and without symptoms of ADHD, as well as to assess the contribution of multimedia features integrated in e-books to the participants’ literacy acquisition. The study participant population comprised 162 2nd grade children, 60 of whom showed symptoms of ADHD and 102 did not. All participants were administered a screening test followed by literacy tests, namely, dictation, word recognition and vocabulary tests. The sample was randomly assigned to 4 groups in the form of a book with highlighted text and a narrator, e-book with highlighted text, a narrator and a dictionary, e-book with highlighted text, and a static book. Each group was exposed to the e-book 3 times. Upon completion of the exposure process, the participants were tested again, given the literacy test as well as a reading comprehension one. The findings demonstrated significant differences in the word recognition test between the children exposed to the e-book with narrator compared with highlighted text and dictionary and those presented with the static book. The most significant difference between ADHD students and children without ADHD was found in the vocabulary test. In the reading comprehension test, the results of children with ADHD were the same as those of children without ADHD, and those who were exposed to the e-book with narrator and highlighted text had the most significantly higher scores in both populations.

Valid testscores of problem-solving competence and their use for final exams in vocational education
Keywords: Assessment methods and tools, Problem solving, Technology, Vocational education
Presenting Author: Felix Walker, Technical University of Kaiserslautern, Germany
Co-Author: Leo van Waveren, Technical University of Kaiserslautern, Germany

We examine whether it is possible to validly measure domain-specific problem-solving competence as assessed in the final exam using computer based assessment (CBA) (e.g. computer-simulations) for the occupation of electronics technician for automation technology (ETAT). We assume that the CBA is a valid test for the occupation. To test this hypothesis, we drew a sample of 308 ETAT attending the dual apprenticeship track. The apprentices worked on eight real life problems (troubleshooting scenarios). To compare the computer based and real life troubleshooting (on a real automation system similar to the final exam) assessment, we created two groups: one group solved problems one to four in real life, and problems five to eight computer simulated; the second group solved the items vice versa. The data were analyzed applying a multigroup-structural-equation approach and confirmed our hypothesis. As a second step we tested how high the correlations.

Enhancing pro-social ability among HFASD children with computer mediated intervention
Keywords: Computer-assisted learning, Educational Technology, Social interaction, Special education
Presenting Author: Sigal Eden, Bar Ilan University, Israel
Co-Author: Alata Oren, Bar-Ilan University, Israel

ASD (Autism Spectrum Disorder) is a congenital neurodevelopmental disorder, whose symptoms are expressed in two central categories: persistent deficits in social communication and interaction, and repetitive patterns of behavior with limited interests and activities (APA, 2013). The children who participated in this study are high-functioning (HFASD). The research deals with the social aspect of the disorder and focuses on pro-social behavior, defined as the ability to channel positive feelings and behaviors toward others to their benefit (Eisenberg, 1992).

The goal of the study was to determine whether there is a gap between children with HFASD and children with typical development in their ability to exhibit pro-social behavior, and to compare pro-social behavior between children experiencing a computer-mediated intervention and a non-computer-mediated intervention. The study was conducted among 58 preschool children, ages 4-7. The group of children with HFASD was randomly divided into two groups: one group experiencing computer-mediated intervention and the other group experiencing a non-computer-mediated intervention. The two months intervention was based on the Cognitive Behavioral Therapy (CBT) model, combining cognitive learning with active experience.

Before the intervention findings indicate gaps in the pro-social abilities of children with HFASD and children with typical development. However, after the intervention the gap between the two decreased. Comparing the two HFASD interventions groups, the computer-mediated intervention group improved in some pro-social measures compared to children with typical development.

Session G 181
31 August 2017 08:30 - 10:00
Pent S - B3109
Single Paper
Assessment and Evaluation, Educational Policy and Systems, Motivational, Social and Affective Processes

Paper Presentation: Educational Evaluation, Accountability and School Improvement - B

Keywords: Assessment methods and tools, At-risk students, Educational policy, Meta-analysis, Motivation and emotion, Primary education, Quantitative methods, Researcher education, School-effectiveness, Secondary education, Survey Research, Teacher Professional Development

Interest group: SIS 23 - Educational Evaluation, Accountability and School Improvement

Chairperson: Margus Pedaste, University of Tartu, Estonia

Bayesian statistics in educational research – A look at the current state of affairs

Keywords: Educational policy, Meta-analysis, Quantitative methods, Researcher education

Presenting Author: Christoph Koening, Friedrich Schiller University, Jena, Germany

Co-Author: Rens van de Schoot, Utrecht University, Netherlands

The ability of a scientific discipline to build cumulative knowledge depends on its predominant method of data analysis (Schmidt, 1996). A steady accumulation of knowledge requires approaches which allow researchers to take into account results from comparable prior research. Bayesian statistics are especially relevant for establishing a cumulative scientific discipline, because the incorporation of prior knowledge is fundamentally anchored in its basic principles. Despite a considerable increase in attention in other disciplines (e.g., psychology), Bayesian statistics have not been the focus of recent reviews in the educational sciences. The aim of this review is to provide insights into the current state of methodology. An analysis of publication histories of the 224 educational journals currently listed in the Thomson Reuters Journal Citation Report (Thomson Reuters, 2015) indicates that Bayesian statistics are primarily used to solve methodological problems (e.g., the estimation of complex models), rather than used to answer substantial research questions. Motivations for using Bayesian statistics indicate that Bayesian statistics are used to advance the methodological repertories of educational research, as well as to produce knowledge which would not have been available with frequentist approaches. Lastly, the predominant use of noninformative prior distributions indicates that one of the biggest advantages of Bayesian statistics, although generally recognized, remains underutilized in educational research. Practical implications of these findings for educational research are illustrated and discussed.

Explaining halo effects in students’ evaluation of teaching quality

Keywords: Assessment methods and tools, Quantitative methods, Survey Research, Teacher Professional Development

Presenting Author: Sebastian RHT, University of Education Freiburg, Germany, Germany

Co-Author: Wolfram Rollett, University of Education Freiburg, Germany

Academic literature on the quality of teaching often reports a distorting halo effect, which is reflected in high correlations between various dimensions of quality of teaching (for example, Wagner, 2008; Clausen, 2002). This study examines if the halo effect can be explained by the teacher-appreciation perceived by the students as well as by the students’ subject-specific interest. The sample consists of n=860 students in 41 classes from different types of German secondary schools. Analyses are done using structural equation modelling on individual and class level.Indeed, the results indicate a high importance of the perceived teachers-appreciation for the halo effect. The subject-specific interest shows a smaller effect which can only be observed at the student level. These findings seem to imply that considering the perceived teacher-appreciation might be necessary to take this factor into account when measurements of teaching quality are based on student surveys.

Assessments and Accountability in Secondary Education: International Trends in Educational Policies

Keywords: Assessment methods and tools, Educational policy, School-effectiveness, Secondary education

Presenting Author: Janne Telemann, Universitat Hildesheim, Institute for Social Sciences, Germany

Co-Author: Nina Jude, German Institute for International Educational Research (DIPF), Germany

A main focus of recent educational reform projects, which is also promoted by the OECD PISA study, is the targeted use of regular assessment and test-based accountability measures in schools and education systems. It is assumed that countries increased the use of assessments for purposes of teacher and school accountability and that, over time, countries become more similar with regard to their models and types of monitoring and evaluation of education. However, systematic empirical evidence on the prevalence and purposes of assessments is scarce. This paper describes national evaluation and monitoring systems in education and their change in implementation over time. This is achieved by classifying all past and present PISA items focusing on assessment and accountability into the existing theoretical categorizations of evaluation and monitoring systems in education. First analysis for data from PISA 2000 to 2012 show that there is no clear trend of an increased use of assessment and accountability practices. The presentation will include latest results from PISA 2015 to be published in December 2016.

Individual and school-related factors which determine academic performance among at-risk students

Keywords: At-risk students, Primary education, Quantitative methods, Motivation and emotion

Presenting Author: Dóra Fanni Szabó, University of Szeged, Hungary

Research on educational resilience has increased considerably over the last decade and produced various understandings and explanations among success of students who performed well in school, despite the presence of disadvantaged socio-economic background. This study investigated the factors and conditions that could help more students succeed at school despite challenging socio-economic backgrounds.

The main purpose of this study is (1) to identify resilient students based on school performance in different school subject, (2) to explore the applicability of a resilience model, which comprise factors related to the self and attitudes toward school and learning, (3) to contribute to the development of a reliable online instrument, which appropriate to identify the protective factors among primary school students. Based on previous studies it is anticipated that findings will reveal a positive relationship between the investigated factors and performance.

Participants were 96 Hungarian fourth grade students, all of whom were socioeconomically disadvantaged. The students filled out a questionnaire, which contained five scale (general self-efficacy, school motivation, school attachment, academic self-concept, persistence in learning).

Preliminary results showed that the proportion of the resilient student is relatively high. Significant positive correlations between performance and investigated factors were reported. Self-concept and persistence were also a significant predictor of performance.

The results of this study contribute to a more thorough understanding of the role of individual and learning-based factors among at-risk students. The implications of the findings are also discussed, and suggestions for future research are given.

Session G 182
31 August 2017 08:30 - 10:00
Main Building A - A32
Single Paper
Culture, Morality, Religion and Education, Higher Education, Teaching and Teacher Education

Paper Presentation: Learning and Teaching in Culturally Diverse Settings - C

Keywords: Achievement, Case studies, Citizenship education, Collaborative Learning, Cultural diversity in school, Cultural psychology, Culture, Higher education, Language (Foreign and second), Mixed-method research, Secondary education, Self-efficacy, Social aspects of learning and teaching, Teaching / Instruction

Interest group: SIS 23 - Learning and Teaching in Culturally Diverse Settings

Chairperson: Roula Anastasakos, Toronto District School Board, Canada

Encouraging participation in cross-cultural school work: An RCT of local vs internationalised content

Keywords: Collaborative Learning, Cultural diversity in school, Higher education, Mixed-method research

Presenting Author: Jenni Mittelmeier, The Open University, United Kingdom
Doutch teachers on citizenship education in relation to their student composition

Keywords: Citizenship education, Cultural diversity in school, Secondary education, Social aspects of learning and teaching

Presenting Author: Tecl Sincer, Erasmus University Rotterdam, Netherlands

Co-Author: Sabine Severiens, Erasmus University Rotterdam, Netherlands

Co-Author: Monique Volman, University of Amsterdam, Netherlands

Since 2006 Dutch schools are legally required to promote citizenship. As Dutch schools are becoming increasingly culturally and ethnically diverse, it is important to gain insight into the role of the student composition as regards citizenship approaches. Teachers may hold different views on and approaches to citizenship education, according to the student population in their classes. In this study, interviews were carried out with 16 Dutch secondary education teachers to explore what their views are on citizenship and how they approach citizenship goals. Teachers were selected from three schools across the Netherlands, varying by ethnic and socio-economic composition and educational level. The results of the study illuminate teachers’ views towards the student population, diversity and citizenship education and how the student population, explicitly or implicitly, is utilised in relation to the approach of citizenship goals.

The Validation and Exploration of the Chinese Culturally Responsive Teaching Self-efficacy Scale

Keywords: Cultural diversity in school, Language (Foreign and second), Self-efficacy, Teaching / Instruction

Presenting Author: Wei Ming Chang, The University of Hong Kong, Hong Kong

Co-Author: Yanli Huang, The University of Hong Kong, Hong Kong

Co-Author: Wing Yee W. Wong, The University of Hong Kong, China

Co-Author: Hector W. H. Tsang, The Hong Kong Polytechnic University, Hong Kong

Background: The rapid growth of globalization and immigration pose great challenges to many countries and governments. Language learning is one of the greatest barriers faced by both immigrants and teachers. However, Hong Kong teachers have not been adequately trained to teach ethnic minority (EM) children.

Aims: This study aims (a) to develop and validate a Chinese scale of Culturally Responsive Teaching Self-efficacy (CRTSE) and (b) to examine Chinese language teachers’ judgments of their capabilities to bring about desired outcomes of student engagement and learning in Chinese in multietnic schools.

Methodology: The original 40-item CRTSE was translated, revised to accommodate the subject-specific content and the local educational context. A total of 287 teachers from kindergartens, primary and secondary schools were recruited to complete the questionnaire.

Results: Exploratory factor analysis showed that five factors accounted for 69.62% of the variability, which is consistent with the design of the scale. Qualitatively, Hong Kong frontline teachers’ total Chinese CRTSE mean score was 65.5. The highest mean score was attained for factor 2 “Efficacy to create positive and trusting relationship” followed by factor 1 “Efficacy to Accommodate Diversity” and the lowest mean score was factor 5 “Efficacy towards awareness of cultural differences”.

Significance: The results will provide a landscape to the government, researchers and educators on how to support teachers in teaching EM students. The Chinese CRTSE provided deeper insights on teacher’s self-efficacy and on the provision of suitable effective professional development.

Examing tensions between achievement-oriented behaviour and cultural identity.

Keywords: Achievement, Case studies, Cultural psychology, Culture

Presenting Author: Emma Caner, University of Cambridge, United Kingdom

The past decade has witnessed further attention on educational initiatives targeting Indigenous students demonstrating high intellectual potential within Australia. These schemes have provided opportunities for students to leave their remote communities in order to pursue their education in urban centres. This paper presents an in-depth case study of one of these initiatives. ‘The Academic Leader’s Programme’ (ALP), implemented by the Cape York Institute of Higher Education and Leadership. Principally, it examines the tension that arises from Indigenous students’ experience between their achievement-oriented behaviours and cultural identities. Methodologically, this study adopts a novel and innovative case study design, focusing upon 7 Indigenous students. Using a grounded theory analytical approach, findings revealed the centrality of cultural identity for Indigenous Australian’s sense of well-being within a context. Students reported a number of interpersonal and intrapersonal issues related to their identification as both high-achieving students and Indigenous Australians. Socially, students reported peer-group ostracisation upon leaving and returning to the community. According to Barry et al. (2006b) theory of accommodation, students were further found to adopt various profiles profiting from their involvement including Diverse, Ethnocentrism and Integrated. In addition, students reported feelings of isolation, racism, anxiety and underachievement as a consequence of tensions between self-helping and achievement-oriented behaviours and cultural identity. Implications for research include the need for a review of recommended cultural identity models when working with high-achieving Indigenous students. Based upon findings, these should include profile, rather than stage-based, approaches to the construct which explicitly incorporate the variable of achievement.

Session G 183
31 August 2017 08:30 - 10:00
Pinni B - B1096
Single Paper
Learning and Social Interaction, Teaching and Teacher Education

Paper Presentation: Social Interaction in Learning and Instruction - F

Keywords: Action research, Collaborative learning, Educational Psychology, Educational Technology, In-service teacher education, Mathematics, Qualitative methods, Researcher education, Social aspects of learning and teaching, Social interaction, Student learning, Synergies between learning, Teaching and research, Teacher Professional Development, Teaching / Instruction, Video analysis

Interest group: SIG 10 - Social Interaction in Learning and Instruction

Chairperson: Britt Adams, Ghent University, Belgium

Gender differences in math: The role of psychological variables and teacher-student interactions

Keywords: Mathematics, Social aspects of learning and teaching, Students, Teaching / Instruction

Presenting Author: Ana María Espinoza Catalán, Pontificia Universidad Católica de Chile, Chile

Co-Author: Camila Taul, School of Psychology, Universidad Católica de Chile, Chile

The two studies presented here are inter-related and examine gender differences in the mathematics teaching-learning process in secondary mathematics classrooms in Chile. Chile, as other countries around the world, struggles with an important gender gap in favour of boys in mathematics achievement, especially in higher grade levels. The first study examines gender differences in longitudinal mathematics achievement pertaining to 1380 students from 43 7th grade classrooms, and how they relate to relevant psychological variables, and perceptions of their teachers, when learning mathematics. The results show differences in favour of male students in terms of math achievement, motivation, and self-concept. Also, after controlling for initial achievement, math self-concept and students’ perceptions of teacher expectations are significant predictors of end-of-year mathematics achievement. The second study analyses 40 video-taped mathematics lessons, using a coding scheme focusing on gender differences in teacher-student interactions, as well as the gender identity of teacher-student interactions. The results show that teachers, regardless of their gender, pose more questions at a higher cognitive level and give more feedback to male students than to female students, and that male students participate more in class, both spontaneously and in responding to teachers’ questions. The results are important input for educational policies on gender equity in Latin America and beyond.

The gains of teachers’ interaction skills training? An international comparison

Keywords: Educational Psychology, In-service teacher education, Social interaction, Teacher Professional Development

Presenting Author: Markus Talvo, University of Helsinki, Finland

Co-Author: Minna Berg, University of Helsinki, Finland

Co-Author: Lauri Hietanen, University of Helsinki, Finland

Co-Author: Kirsti Lunka, University of Helsinki, Finland

Implementing 21st century skills at school, including social and emotional learning (SEL), has become increasingly important in many countries. This study investigated the development of teachers’ readiness in promoting SEL. Internationally widely-used Lions Quest (LQ) was used as an intervention. The participants were 940 teachers from Finland, Italy, Japan, and Lithuania. Altogether 528 teachers who participated in the Lions Quest answered the questionnaire after the training and the data. The results of the comparison group (n = 412) not participating in the LQ were collected twice as well. The LO inquiry consisted of two components, namely, how teachers perceived the significance of the goals, and their experienced competence in promoting the LQ goals. An exploratory factor analysis was conducted using
data from the pre-test responses of first two countries. This analysis produced three factors. The created factor structure was further confirmed using pre-test data from another two countries. Repeated measures ANOVA (GLM) were used to examine the change between and within groups. After participating in the LG the teachers perceived the importance of the LG goals as more important and they felt more competent in implementing SEL skills in their classrooms. In addition, teachers valued the LG higher after the workshop. In the comparison group no changes were found. The next phase of the study is to extend the study to six new countries. The universality of the LG as a SEL program will be discussed.

The sociomaterial configurations of students’ creative agency in school-based makerspaces

Keywords: Educational Technology, Qualitative methods, Social aspects of learning and teaching, Video analysis

Presenting Author: Kristina Kumpulainen, University of Helsinki, Finland
Co-Author: Artti Rapaja, University of Helsinki, Finland
Co-Author: Anna Mikola, University of Helsinki, Finland
Co-Author: Sinikka Kaartininen, University of Jyväskylä, Finland

This paper discusses a study on the manifestation of students’ creative agency in school-based makerspaces in two Finnish primary schools. By focusing on the temporal unfolding of sociomaterial configurations in students’ maker activities, our study seeks to uncover how students’ creative agency is shaped through the interplay between the creative intentions of students and the digital technologies and other sociomaterial resources of makerspaces. Our study holds that creative agency is a pivotal element of learning as it accounts for students’ critical and generative engagement with novel problems and endeavours. The primary data comprise of 56 hours of video-records of students’ (N=100 students, aged from 10-12 years old) making activities collected intermittently over a period of one semester. Longitudinal, videodata details the micro and macro level dynamics of making activities in situ across time. The findings of the study illuminate how the students’ achievement of creative agency was mediated by complex and nuanced sociomaterial configurations that encompassed not only the process of creating specific artifacts, but also making sense of operational, cultural and critical processes surrounding the maker activity situated in space and time.

Educational researchers and teacher educators: Learning to collaborate across boundaries

Keywords: Action research, Cooperative / collaborative learning, Researcher education, Synergies between learning - teaching and research

Presenting Author: Aleksandr Bucal, University of Belgrade, Serbia
Co-Author: Francesco Arcidiacono, University of Teacher Education (HEP-BEJUNE), Switzerland
Co-Author: Ali Liejen, University of Tartu, Estonia
Co-Author: Nevena Budjilac, University of Belgrade, Serbia

This paper presents the main elements connected to the process of educational researchers and teacher educators within the implementation of the project REP-Synergy: Towards improvement of Research capacities essential for teacher Education and Practices in Serbia and Estonia*. Participants were engaged in order to overcome existing identities and institutional boundaries connected to different scientific communities and to establish a productive collaboration through joint practice led research studies.

Through qualitative analyses, we identified the most important barriers (personal, identity and institutional ones) that prevent educational researchers and teacher educators to collaborate, as well as the ways they employ in order to establish a productive collaboration that will influence both educational research and teacher education. The results concerning these processes in Serbia and Estonia highlight differences in the main interests of participants coming from two professional communities, different perspectives in finding out models of research and teaching activities, and different identities that are supported by the institutional division. On another side, we also have identified key drivers of collaboration from the perspective of the researchers and of the teacher educators.

Session G 1B4

31 August 2017 08:30 - 10:00
Pinni A - Paavo Kall

Teaching and Teacher Education

Early childhood educators’ professional competences fostering Maths and Science

Keywords: Assessment methods and tools, Attitudes and beliefs, Competencies, Conceptual change, Early childhood education, Mathematics, Mixed-method research, Science education, Teacher Professional Development, Video analysis

Interest group: SIG 05 - Learning and Development in Early Childhood

Discussant: Yvonne Anders, Freie Universität Berlin, Germany

Teaching for Conceptual Change in Preschool; Teachers’ Professional Beliefs, Knowledge and practice

Presenting Author: Miriam Leuchter, University of Landau, Germany
Co-Author: Henrik Saulbach, University of Leipzig, Germany
Co-Author: Annette Tettborn, University of Teacher Education Lucerne, Switzerland
Co-Author: Uli Stidholter, ETH Zurich, Switzerland

To support children’s conceptual change in early science instruction kindergarten teachers need to be aware of the constructivist nature of children’s learning. In the present paper, we thus ask 1) what science-specific pedagogical beliefs and Pedagogical Content Knowledge (PCK) can be identified in kindergarten teachers, 2) to what extent is teachers’ practice related to their belief patterns and PCK. In Study 1, we assessed 104 Swiss kindergarten teachers’ beliefs and PCK in science by questionnaires. A cluster analysis on teachers’ belief data revealed a satisfactory three-cluster solution with one cluster showing high agreement and another cluster low agreement to constructivist-oriented items. The third and largest cluster revealed high agreement to items which emphasize the importance of “hands-on activity” in conceptual learning. The three groups of teachers differ significantly with respect to PCK with “constructivist” teachers ranking highest. In Study 2, we examine the relations between kindergarten teachers’ beliefs and their practice. To this aim, 32 kindergarten teachers’ tutoring activities within a structured learning environment on ‘floating and sinking’ were videotaped and their verbal utterances were coded using a scaffolding-coding scheme. We found that teachers’ scaffolding utterances mostly targeted clarification of task and procedure. Utterances targeting conceptual change are rather rare. Furthermore, teachers’ constructivist beliefs correlated positively with their utterances promoting conceptual change; and teachers’ use of content specific language correlated positively with their PCK and negatively with their conceptualization of learning as hands-on activity. The results indicate the importance of targeting teachers’ beliefs and PCK in kindergarten teacher education.

Preschool Teachers’ Leadership in Science Education - Making Professional Competencies Visible

Presenting Author: Orit Spokol-Lovy, Bar-Ilan University, Israel
Co-Author: Anat Abramovich, Technion-Israel Institute of Technology, Israel
Co-Author: Taly Shechter, The School of Education, Bar-Ilan University, Israel

This study follows the development of scientific professional competencies and leadership experiences of preschool teachers who take part in professional development program—PULSE: Professionalism, Understanding and Leadership in Science Education. This two-years 120-hour program offers experiential and reflective learning through the development of a portfolio. The present study was designed to examine the effects of the program on teachers’ professional development. The study was conducted over two years with a control group and an experimental group of preschool teachers. The results showed that teachers in the experimental group demonstrated a greater growth in their professional competencies, as measured by the Teachers’ Leadership in Science Education Questionnaire. The findings suggest that the program is effective in enhancing teachers’ leadership in science education.

Tailored mathematical support during play-based learning – a close look at educators’ competences

Presenting Author: Andrea Wültschlegler, University of Zurich, Switzerland
Co-Author: Rita Stebler, Universität Zürich, Switzerland

Children differ considerably in their mathematical competences when they enter kindergarten. To foster every child of a heterogeneous group, a learning environment that enables personalised mathematical learning is required. Playing mathematical games combined with individualised learning support is suggested as an appropriate approach for young children.

The study aims at investigating the competences of educators to support mathematics learning in kindergarten. Data was obtained from 36 videotaped situations showing four to six years old children playing the game “ moth the bee”. To analyse the data, the child-educator interactions were coded in accordance with the type of interaction content (mathematical, institutional, organisational and social). Subsequently, the quality of individualised learning support was coded and rated using a newly-developed coding and rating instrument. Finally, a qualitative content analysis was conducted to provide detailed insight into the scope of educators’ learning support.

Results show that educators address mathematical topics frequently. Further, they apply a sound diagnosis during children’s play but they do not tailor the learning support as precisely. Additionally, the analysis shows differences in the support actions of educators with high and low support competences. The findings are discussed in respect to children’s competence development and teachers’ training.
Modeling and Measuring Professional Competence of Early Childhood Educators in Mathematics

Presenting Author: Simona Duneckace, IPN Kiel, Germany
Co-Author: Silma Seemann, IPN Kiel, Germany
Co-Author: Alis Hainze, Leibniz Institute for Science and Mathematics Education (IPN), Germany
Co-Author: Miriam Leuchter, University of Landau, Germany
Co-Author: Arne Linneweber, Leibniz Institute of Science and Mathematics Education (IPN), Germany
Co-Author: Elisabeth Moser Opitz, University of Zurich, Switzerland
Co-Author: Franziska Vogt, University of Education St. Gallen, Switzerland

This paper presents a domain-specific model and standardized assessment to measure early childhood educator's professional competence in the domain of mathematics with a focus on their performance. Two dimensions--performance oriented competences -- Reflective Competence and Action-Related Competence -- are distinguished. Reflective Competence includes activities to prepare and reflect mathematical learning situations in early childhood education. Action-Related Competence includes spontaneous actions addressing specific problems occurring during mathematical learning situations. In addition to these performance related competences, a knowledge-based factor is also included in the model: Basic Knowledge covering content knowledge and pedagogical content knowledge. To measure these two competences and the basic knowledge of pre- and in-service early childhood educators, a computer based test with short video vignettes was developed. Structural analysis of data from 119 pre-service educators give evidence that the theoretical assumed three-dimensional model fits best to the data. Accordingly, the model is considered as a suitable tool for further research of early childhood educator's professional competence in mathematics.

Session G 185
31 August 2017 08:30 - 10:10
Main Building D - D168
Symposium
Higher Education

The Intersection between Depth and the Regulation of Strategy Use

Keywords: Cognitive skills, Educational Psychology, Higher education, Learning approaches, Motivation, Science education, Student learning

Interest group: SIG 04 - Higher Education
Organizer: University of North Florida, United States
Organiser: Luke K. Fryer, University of Hong Kong, Hong Kong
Discussant: Patrick A. Alexander, University of Maryland, United States

The Relations between Strategic and Metacognitive Processing During Science Simulations

Presenting Author: Danial Dirsmore, University of North Florida, United States
Co-Author: Brian Zoelner, University of North Florida, United States

This investigation was designed to uncover the relations between students' cognitive and metacognitive strategies used during a complex Earth climate simulation. While cognitive strategy use during science inquiry has been studied, the factors related to this strategy use, such as concurrent metacognition, prior knowledge, and prior interest have not. Data collection is underway and we anticipate having 70 participants with data, with 25 already collected and partially analyzed. Measures for the study included a survey used to gather demographics, prior knowledge and interest, video recordings of participants’ strategic processing through think-aloud protocols, as well as their model of Earth’s climate dynamics using an open-ended survey response. Three main findings have emerged following the preliminary analysis – participants engaged in a controlled variables or a history-ued strategy, as demonstrated in previous literature, trended toward more concurrent metacognitive strategy use with the history-ued strategy than the control of variables strategies. While there was a general trend toward those with more prior knowledge using the history-ued strategies, this finding was somewhat mixed there were notable exceptions as to how prior knowledge and interest emerged during this simulation. Implications, particularly for theoretical contributions are discussed.

Triangulating online and offline measures to explore students’ processing strategies

Presenting Author: Leen Catryse, University of Antwerp, Belgium
Co-Author: David Gjibels, University of Antwerp, Belgium
Co-Author: Vincent Donche, University of Antwerp, Belgium
Co-Author: Manjeet Letharhuis, University of Antwerp, Belgium

This paper starts from the observation that research in which objective process tracking measures are adopted to uncover differences in processing strategies is currently lacking within the Student Approaches to Learning (SAL) field. In this paper, we will therefore use eye tracking in combination with the often-used self-report measures (questionnaires and cued recalls) to operationalize and triangulate processing and strategies. Therefore the Inventory of Learning Styles – Short version (Donche & Van Petegem, 2008) questionnaire was administered to 230 higher education freshman in social sciences. In order to allow for a restricted sample of students, 40 volunteers out of the total group were purposive selected (based on their general preferences). In a next step, students were asked to study three short stories (400 words) on positive psychology while eye tracking was used to register their learning and reading behavior. Afterwards a cued recall was conducted on the last text. Next to that, students’ working memory capacity and topic interest were measured as well as their regulation strategies when learning. Results indicate that in the early phase of processing texts, no clear differences exist between students with a different generic learning profile. In the delayed processing of the texts, students with all high and surface learning profiles processed the text longer in comparison with students with an all low learning profile. Results indicate that self-regulated learners, scoring high on deep-processing strategies, need less time to process the texts and process them more efficiently.

Monitoring and Depth of Strategy Use in Computer-Based Learning Environments for Science and History

Presenting Author: Kai Greene, University of North Carolina, United States
Co-Author: Victor Deeken, University of North Carolina at Chapel Hill, United States

Both the metacognitive processes described by self-regulated learning and cognitive strategy use have been shown to predict student learning. However, less is known about how these metacognitive processes and the kinds of strategies that are employed (e.g., deep vs. surface level) interact to influence learning. We conducted a secondary data analysis of existing think-aloud protocol data from two data sets to investigate relationships among the frequency of monitoring, utilization of both deep and surface level strategies, and academic performance. In both studies, participants engaged in a learning task within a computer-based learning environment. The first data set was gathered from college students learning about a science topic, and the second from high school students learning about a history topic. Using structural equation modeling and path analysis, we found consistent results indicating the frequency of monitoring was positively related to the frequency of deep strategy use. Further, the utilization of deep-level strategies positively predicted performance on outcome measures in both studies, above and beyond the effect of prior knowledge. These findings have implications for how to investigate theories of self-regulated learning, as well as implications for helping students more effectively use computer-based learning environments.

Bridging cross-cultural perspectives on how students study and learn university course materials

Presenting Author: Jan Vermunt, University of Cambridge, United Kingdom
Co-Author: Vincent Donche, Universiteit Antwerpen, Belgium
Co-Author: Yu J., Cambridge University, United Kingdom
Co-Author: Jose Reinaldo Martinez Fernandez, UAB Universitat Autònoma de Barcelona, Spain
Co-Author: Darja Ajsikumo, Alma Jaya Catholic University of Indonesia, Indonesia
Co-Author: Daniel Lay Chung Si Law Chung Sea, Council on Law in Higher Education, Hong Kong
Co-Author: Luke Fryer, The University of Hong Kong, Hong Kong

Both the metacognitive processes described by self-regulated learning and cognitive strategy use have been shown to predict student learning. However, less is known about how these metacognitive processes and the kinds of strategies that are employed (e.g., deep vs. surface level) interact to influence learning. We conducted a secondary data analysis of existing think-aloud protocol data from two data sets to investigate relationships among the frequency of monitoring, utilization of both deep and surface level strategies, and academic performance. In both studies, participants engaged in a learning task within a computer-based learning environment. The first data set was gathered from college students learning about a science topic, and the second from high school students learning about a history topic. Using structural equation modeling and path analysis, we found consistent results indicating the frequency of monitoring was positively related to the frequency of deep strategy use. Further, the utilization of deep-level strategies positively predicted performance on outcome measures in both studies, above and beyond the effect of prior knowledge. These findings have implications for how to investigate theories of self-regulated learning, as well as implications for helping students more effectively use computer-based learning environments.

Studying/learning strategies are an essential part of the university experience and lifelong learning. How an individual studies/manages/organises (i.e., regulates) new materials and then how s/he goes about learning (i.e., processing) that material each, separately and interrelated have lasting effect on students’ learning outcomes. Despite their importance and a general understanding of study/learning strategies respective roles, their interplay is poorly understood. Further to this point, what we do know chiefly arises from research in Western contexts. The current study therefore aims to begin to address both of these gaps by undertaking a person-centred study with six samples from two Western and three Asian-pacific countries. Higher education students from Belgium, Spain, Indonesia, Hong Kong and Mainland China participated. All students completed the inventory of learning styles, from which scales measuring students’ process and regulation were extracted and analysed relating. Relating and processing, memorising, analysing, Concrete processing, Self-regulation, External-regulation, and Lack-of-regulation. Latent Profile Analysis of these strategies with each sample resulted in three sub-groups for five samples and two subgroups for one sample as fitting the data best. Profiles presented theoretically consistent alignment (deep-processing/self-regulation and surface-processing/lack-of-regulation) with each profile. Sub-group profiles generally ranged across a continuum of adaptive (deep-processing/self-regulation) to less adaptive (surface-processing/lack-of-regulation), while exhibiting context/culturally specific patterns of study/learning strategies. Culturally specific patterns exhibited themselves as reliance on a specific type of processing or regulation, or in some cases a pair of strategies. Implications for theory and practice will be discussed.

Session G 186
31 August 2017 08:30 - 10:00
Main Building D - D168
Symposium
Assessment and Evaluation

Uncovering problem-solving processes: Theoretical approaches and the potential of log file analyses

Keywords: Assessment methods and tools, Educational Technology, Learning analytics, Problem solving

Interest group: SIG 27 - Online Measures of Learning Processes

Discourse: Dirk Renthoff, University of Mannheim, Germany

Uncovering Visual Problem-Solving Processes: How Logdata can Inform Theory

Presenting Author: Jeroen Van Merrienboer, Maastricht University, Netherlands
In both research and instructional design there is an increasing interest in real-life problem solving, such as diagnosing patients in medicine, controlling air traffic, engineering software, and so forth. The main problem when we study problem solving is that most problem-solving processes are not easily observable. For this reason, thinking aloud, used retrospective reporting and interviewing experts are the dominant methods for studying problem solving. The main aim of this contribution is exploring whether logdata provide useful information, in addition to traditional think-alouds or other subjective information, for analyzing and understanding problem solving processes. In order to reach this aim, a series of studies will be described that studied problem solving in visual domains (medical diagnosis of paediatric videos and pathology slides, air traffic control) of problem solvers with different levels of expertise. Both traditional subjective data (e.g., thinking alouds) and logdata (e.g., microscope zooming and panning, mouse clicks, eye movement data) were used to get better grip on the problem solving processes. The studies involve paediatricians with different levels of expertise diagnosing authentic paediatric video cases; pathologists with different levels of expertise diagnosing pathology slides, and air traffic controllers with different levels of expertise interpreting radar screens. All three studies showed that logdata add something new to think-alouds, yielding new insights that contribute to further theory development.

Presenting Author: Stephan Abele, University Stuttgart, Germany

In this paper, a theory of the diagnostic problem-solving process in professional contexts is presented and evaluated using computer-generated log-file data. According to this theory, the quality of the mental diagnostic problem-solving process causes the problem-solving process. The success is associated with observable problem-solving behavior (i.e., critical information and test behavior) which is both an indicator and determinant of the process quality. To evaluate the theory, log-file data (i.e., the critical behavior) from a computer-based test, a sample of automotive technician apprentices (N = 338) and authentic diagnostic problems of the car sector were used. Results showed that (1) the problem-solving behavior had substantial effects on the diagnostic problem-solving success, that (2) these effects were moderated by the quality of the behavior and experience and that (3) the effects of the critical information behavior on the problem-solving success were mediated by the critical test behavior. The findings supported the theory and highlighted the benefits of theory-driven log-file research. The theory combines domain-specific variables and various knowledge-based strategies and, when teaching diagnostic problem-solving helps to clarify learning content, to identify areas where students need support and to figure out relevant learning difficulties. Further studies should investigate whether the theory is applicable to other fields and if a combination of log file and eye-tracking data can further enhance our understanding of the (diagnostic) problem-solving process.

What Makes a Good Problem Solver? A Log File Analysis of Activity Workflows in an Office Simulation
Presenting Author: Andreas Rausch, University of Mannheim, Germany
Co-Author: Stefan Brandt, Open Campus.ti Kiron, Germany
Co-Author: Kristina Kögl, University Hohenheim, Business Education, Germany
Co-Author: Clemens Froehlich, University of Bamberg, Germany
Co-Author: Michael Birgrau, University of Bamberg, Germany

Most assessments of problem-solving competence are based on the evaluation of a proposed solution but ignore the problem-solving processes. These processes are usually described in theoretical phase models. However, in authentic problem scenarios these ideal phases can rarely be identified empirically since real-life problems are metaprocesses (i.e., bundles of several types of problems) and various strategies can add to their solution (i.e., weak methods, strong methods, knowledge-based methods). To investigate what makes a good problem solver in the business domain, we analysed log file data from 780 students in commercial vocational education and training (VET) who tackled three authentic problem scenarios for 30 minutes each in a computer-based office simulation. We identified different problem-solving activities and analysed whether test-takers who applied these activities performed better. Due to lack of space only selected results are displayed in heat maps that show the intensity of a particular activity over six equal time intervals and grouped by five levels of problem-solving competence. Our results suggest that good problem solvers adapt their strategies to the nature of a problem. Regarding the different demands of our problem scenarios, it became apparent that it is not enough to identify particular activities but also to consider when these activities are applied in the course of the problem-solving process. Furthermore, high performers show overall higher frequencies of interaction with the problem environment what suggests a very simple weak method of ‘more is better’. Limitations and further steps of analysis are discussed.

Collaborative Problem Solving Behavior: A Deep Dive into Log Files.
Presenting Author: Marita Muratovic, University of Luxembourg, Luxembourg
Co-Author: Samuel Greiff, University of Luxembourg, Luxembourg
Co-Author: Katharina Herdorn, University of Luxembourg, Luxembourg
Co-Author: Nick Schwellter, University of Luxembourg, FLUSHASE, Luxembourg

The Programme for International Student Assessment (PISA) assessed collaborative problem solving (CPS) for the first time on a large scale in the PISA 2015 assessment (OECD, 2013). PISA used a computerized approach to the CPS assessment, which had the benefit of computer generated log files, which contain process data of a student's behavior. As problem solving lies at the base of CPS (OECD, 2013), behavioral similarities can be expected between problem solving and CPS. In complex problem solving, time spent on task presented a non-linear, quadratic relation to performance, and the frequency of interventions showed a negative relation to performance (Greiff, et al., 2016). Therefore, the hypothesis of the present study was that CPS performance would show the same quadratic relation to time on task, and to the frequency of interventions. A sample of 777 students, from 36 grade 9 and 10 classes, was collected to do a selection of the PISA 2015 CPS units. The results showed no quadratic relation between time spent on task and CPS performance. The number of interventions showed a small negative relation to CPS performance. These findings indicate that while some behaviors from complex problem solving remain in CPS, others change, possibly to accommodate for the new collaborative aspect.

Session H 187
31 August 2017 10:15 - 11:45
Linna - K110
Symposium
Lifelong Learning

Informal learning in museums and exhibitions
Keywords: Arts, Comprehension of text and graphics, Educational Technology, Informal learning, Learning Technologies, Lifelong learning, Motivation, Out-of-school learning, Quantitative methods, Science education, Teacher Professional Development
Interest group: SIS 21 - Learning and Teaching in Culturally Diverse Settings
Discussant: Susan Nolen, University of Washington, United States

The impact of visitor profiles on the processing of conflicting information
Presenting Author: Doris Lewalter, Technische Universität München (TUM), Germany
Co-Author: Stephanie Moser, Technical University of Munich, Germany
Co-Author: Steile Phelan, TUM, Germany
Co-Author: Wolfgang Schnitz, University of Koblenz-Landau, Germany

Museums are informal learning settings that present information to a very heterogeneous audience. They are increasingly taking on the challenge to present conflicting information (e.g., risk benefit) in an effective and motivating manner. As we know from a multitude of psychological studies conducted in various educational settings that personality characteristics have an impact on information processing it is the aim of the present study to investigate this relationship in the museum context. While the influence of recipients' personal characteristics has so far mainly been considered separately for each characteristic, we conducted a cluster analysis to identify visitor profiles in terms of combined personality traits that are assumed to be relevant for the processing of conflicting information (epistemological beliefs, tolerance of ambiguity, self-efficacy, interest, prior knowledge). This approach was chosen as for the museum practice, profiles of visitors and the frequency of their occurrence within the audience are more important than the frequencies of isolated personality variables as they better reflect the actual configuration of the audience. On the basis of data of 468 visitors four stable visitor profiles are identified. By calculating linear regression analyses we investigated whether belonging to a specific visitor profile has an impact on the processing of conflicting information. Results indicate significantly different influences of the four visitor profiles on the processing of conflicting information during the museum visit. The results are discussed regarding their implications for theory and research as well as possible consequences for practical educational work in the museum context.

Comparing visit motivation across educational leisure settings with a new short-scale
Presenting Author: Doris Lewalter, Technische Universität München (TUM), Germany
Co-Author: Steile Phelan, TUM, Germany
Co-Author: Johannes Bauer, University of Erfurt, Germany

In order to better understand motivational aspects of choice learning, a profound knowledge of people’s visit motivation within and across educational leisure settings (ELS) is needed. We developed a short scale to enable quick and valid comparisons of visit motivation across educational leisure settings and investigated its dimensionality, reliability and measurement invariance across three sites (science museum, art museum, zoo; N = 605). Our 17-item short scale captures six theoretically important visit motivation categories with sufficient reliability (p. 05 < .05). Analysis indicates an approximate scalar invariance of factor loadings and item intercepts, allowing for a comparison of latent factor means across sites. Subsequently, we found plausible mean differences in visit motivation dimensions across science museum, art museum and zoo. The implications for future research and theory as well as possible consequences for practical educational work (HELS) are discussed.
Using multimedia guides to foster comprehension of pictorial artworks in museums

Presenting Author: Stephan Schwan, Leibniz-Institut für Wissensmedien, Germany
Co-Author: Silke Dutz, Leibniz Institut für Wissensmedien, Germany

Guiding viewers' attention in a picture is a prerequisite for successfully integrating additional verbal information into the picture's content, as research on multimedia learning has indicated. Therefore, the present study investigates the use of multimedia guides with audio narration and visual cues in an art exhibition and its effects on memory of pictorial elements and the perception of the artwork's principles of composition. We compared three different types of digital exhibition guides (audio guide plus visual cues with a black background, audio guide plus visual cues with a beige background). 105 participants took part in the study. After the visit in the laboratory art exhibition and listening to 30 audio files on the multimedia guide in the three different conditions, participants were tested in a memory test about pictorial elements and the paintings' underlying composition principles. Results show that adding images with visual cues to an audio guide narration helps visitors to remember pictorial elements to which the audio narration refers, and to better comprehend the compositional principles. But this advantage comes at the cost of a decreased memory for further pictorial elements not mentioned in the audio guide. Whether visual cues are superimposed on high resolution or blurred images did not have a substantial impact on the results.

Teachers' Perspectives on the Role of Digital Media for School Class Visits to Science Museums

Presenting Author: Carmen Zahn, Institute for Cooperation Research and Development, Switzerland
Co-Author: Beat Vollmeyer, Fachhochschule Nordschweiz, Switzerland

Research has shown that it is a highly demanding task for teachers to plan and carry out successful school class visits to science museums. Aside from dealing with logistical and organizational hurdles, teachers are also responsible for the trilogy of pre-visit preparation, the visit itself and post-visit follow-up activities for their students' learning. Science museums increasingly provide digital media and tools in order to assist teachers in their planning and realization of school class visits, for instance, digital contents and mobile apps or virtual tours are offered for download from specific museum websites. The present visitor survey investigates teachers' perspectives on such support related to their own practices of pre-visit preparation, museum visit and post-visit follow-up activities. We obtained inquiry data from 195 teachers and calculated Fleiss' k in order to assess agreement among teachers. Results reveal that with fair agreement teachers considered museum-provided digital contents (e.g., from the website) important for pre-visit preparation and post-visit activities, while during the visit they would prefer mobile tools for both spatial orientation and "on-the-spot" pedagogical/didactic support. Generally, a positive attitude towards digital media and tools in the context of school class museum visits was clearly evident, underlining the potential for such applications.

Session H 188
31 August 2017 15:15 - 11:45
Main Building C - C8
Symposium

Temporal and adaptive process of regulated learning – what can multimodal data tell?

Keywords: Computer-assisted learning, Computer-supported collaborative learning, E-learning / Online learning, Educational Technology, Emotion and affect, Learning analytics, Metacognition, Multimedia learning, Problem-based learning, Self-regulation

Interest group: SIG 16 - Metacognition

Discussant: Alysson Hadwin, University of Victoria, Canada

Analyzing Temporal Data for Understanding and Fostering Learning induced by Self-Created Prompts

Presenting Author: Maria Barnert, Technical University of Munich, Germany
Co-Author: Katharina Engelmann, Technical University of Munich, Germany

Research in self-regulated learning (SRL) demonstrates that learners often do not perform regulatory activities spontaneously, which results in lower learning outcomes. Therefore, our research aims to provide instructional support for the activation of strategic processes during technology-enhanced learning utilising students' self-created metacognitive prompts. In a pre-post experimental design, students in the experimental group (n = 28) were instructed to create their own metacognitive prompts before learning whereas students in the control group (n = 29) learned without prompts. Log file analysis of navigation behavior indicates that students who learned with their self-created prompts spent a longer time on relevant websites compared with students in the control group. Moreover, participants in the experimental group attained better comprehension performance. In the presentation we will focus on process mining techniques which we used to analyze temporal data in order to better understand student’s learning induced by self-created prompts.

Examining the interplay of affect and self regulation in the context of clinical reasoning

Presenting Author: Susanne Lapie, McGill University, Canada
Co-Author: Marian Gubu, McGill University, Canada
Co-Author: Amanda Jarrell, McGill University, Canada
Co-Author: Shan Li, McGill University, Canada
Co-Author: Juan Zheng, McGill University, Canada

This study examines the relationship between self-regulatory activities and affect in the context of clinical reasoning in a computer based learning environment, BioWorld (Authors, 2013). We present a case study of high and low performing medical students to demonstrate the interplay between cognition, affect, motivation and self-regulation in a clinical problem solving context. The temporal nature of clinical reasoning was examined with a specific focus on how high and low performers handled uncertainty. In particular, we examined differences in the types of self-regulatory processes students enacted throughout the reasoning activity, and the emotions they experienced while diagnosing a patient case. Think-aloud and log file analyses were used to code SRL using Meijer et al.'s framework (2006) that was adapted by Authors (2012) to classify both macro and micro levels of self-regulatory activities that pertain specifically to clinical reasoning. Affect was analyzed while students solved cases using behavioural data (through facial expressions). Achievement goal orientations (Elliot & Murayama, 2008) and habitual emotion regulation strategy use (Gross & John, 2003) were also assessed. We discuss the implications of these preliminary findings in terms of the validity and reliability of inferences made in relation to self-regulatory activities and affect.

Measuring, Analyzing, Inferring Temporally Unfolding Self-Regulatory Processes from Multimodal Data

Presenting Author: Roger Azevedo, North Carolina State University, United States
Co-Author: Michelle Taub, North Carolina State University, United States
Co-Author: Nicholas V. Mudric, North Carolina State University, United States
Co-Author: Garrett C. Miller, North Carolina State University, United States
Co-Author: Amanda E. Bradbury, North Carolina State University, United States
Co-Author: Megan J. Prices, North Carolina State University, United States

Understanding the complex nature of cognitive, affective, metacognitive, and motivational (CAMM) processes during learning with advanced learning technologies (ALT's) is key to understanding how these processes impact learning about conceptually challenging topics (Azevedo et al., in press). Current methodological and analytical approaches to studying SRL processes (e.g., self reports) have several weaknesses compared to capturing real-time deployment of SRL processes (see Molenar & Jarvela, 2014). Our approach has been to use MetaTutor (an intelligent, hypermedia multi-agent ALT) to collect rich multimodal multichannel trace data of CAMM processes during learning (e.g., eye tracking, audio recording, physiological data). In this paper, we present our infras step by step in unfolding CAMM self-regulatory processes during human-pedagogical agent (PA) interactions with MetaTutor. In our presentation we will present and discuss the methodological and analytical challenges associated with understanding and inferring the roles of CAMM processes by using examples from multimodal, multichannel data (e.g., log files, eye tracking, facial expressions of emotion, physiological data, and screen capture of learner-system interactions) collected from college students as they learned with MetaTutor.

How regulation evolves during collaborative learning? – triangulation of multimodal dataset

Presenting Author: Sanna Jarvela, University of Oulu, Finland
Co-Author: Jonna Malmberg, University of Oulu, Finland
Co-Author: Maria Sobociński, University of Oulu, Finland
Co-Author: Eetu Haataja, University of Oulu, Finland, Finland
Co-Author: Paul A. Kirschner, Open Universiteit, Netherlands

Collaboration is not a snapshot of a task performance, but a process in collaboration matters. In order to understand how regulation evolves during collaborative learning, research should inform students' strategic adaptation to the situated challenges and strategic regulation of cognition, motivation. The aim of this paper is to explore what multimodal data can tell us about SRL processes in authentic collaborative learning tasks. The study included high school students aged 15 to 16 (N = 36). The students worked in collaborative groups of three students in a total of 12 groups on the task of designing a "healthy breakfast" by using the WellSpot learning environment and following the principles of scientific inquiry. Data collection involved information from four data channels: observation data, two types of physiological data (electrodermal activity and heart rate), and facial recognition data processed from the video data. We will demonstrate what multimodal data can tell us about SRL processes in authentic collaborative learning tasks in terms of a) the adaptation and student's reaction to challenge situation, and b) how adaptation in collaborative learning evolves.
Session H 189
31 August 2017 10:15 - 11:45
Main Building A · A06
Symposium
Knowledge, Lifelong Learning

Researching professional learning in changing epistemic environments

Keywords: Engineering, Higher education, Knowledge creation, Lifelong learning, Professions and applied sciences, Qualitative methods, Social interaction, Teacher Professional Development, Workplace learning

Interest group: SIG 14 - Learning and Professional Development

Discussant: Madeleine Dahlgren, Linköping University, Sweden

Insights into the dynamics between changes in professional fields and teaching in higher education

Presenting Author: Lina Markauskaitë, The University of Sydney, Australia
Co-Author: Peter Goodyear, The University of Sydney, Australia

What counts as expert knowledge, and what is expected from knowledgeable practitioners are subject to continual change in professional fields. Consequently, professional education programmes are often challenged to ascertain their capacities to prepare "job-ready" graduates for such changing professional knowledge work. However, what is the nature of these changes and how they get incorporated into teaching and learning practices in university courses are rarely examined; so teachers running courses for professional education get little guidance about how it can be more clearly conceptualised, and done better. Our study focussed on "epistemic shifts" – observable changes in professional fields that bear on how professionals are expected to work with knowledge. We aimed to understand how recent epistemic shifts in specific professional fields were intimated in assessment tasks in professional courses. We focused on assessment tasks as these tasks give insights not only into what and how students learn, but also into what counts as "job-ready" graduates. Our detailed case studies came from five courses – in pharmacy, nursing, social work, school counselling and education. Our results show that the epistemic shift results in their transformative scale and in the ways they became incorporated in assessment tasks; from implicit incorporation of an ongoing flow of small shifts into established professional tasks, to introduction of new professional epistemic practices. The analytical framework we have constructed helps depict what is actually changing in students' epistemic practices when assessment tasks are redesigned and what kinds of new epistemic capabilities students will consequently develop.

Students’ and beginning professionals’ learning with web-based resources in software engineering

Presenting Author: Monika Harland, University of Oslo, Norway
Co-Author: Crina Damsa, University of Oslo, Norway

This paper examines how distributed knowledge resources in the field of software engineering provide opportunities for students and professional practitioners to set up learning opportunities for themselves. By using perspectives on artifact mediated practices and knowledge construction as analytical lenses, we examine how learners in this field access versatile web-based knowledge resources, become involved in exploring and constructing knowledge objects, and pursue learning opportunities in deliberate and strategic ways as part of their local problem solving activities. We draw on two empirical cases, one study of students’ project based learning in computer engineering education and one study of novice engineers’ continuous learning in the context of engineering projects at work. Data comprises videotaped observations, learning logs, interviews, and documentation of tools and resources utilized in practice. Findings show how accessing distributed knowledge resources in both cases led to the participants’ involvement in object-related learning dynamics, which oscillated between opening new avenues for exploration and arriving at temporary closures. Moreover, the participants approached knowledge resources in deliberate ways and created learning opportunities for themselves through the ways resources were identified, attended to and examined. The resources served to link their practices with other sites and actors in the domain, which also stimulated further learning. However it varied how thoroughly the participants engaged with the knowledge resources. We discuss opportunities and challenges for learning provided in this environment, and suggest that models for professional education and learning should be reconsidered to support exploration along wider epistemic infrastructures and recognize self initiated construction of learning activities.

Knowledge translation, professional communication and learning in the context of chronic illness

Presenting Author: Asa Makita, University of Gothenburg, Sweden
Co-Author: Mona Lundin, University of Gothenburg, Sweden

The epistemic work among professionals in the health sector is under transformation. Chronic diseases constitute a primary challenge for the sector and treatment of these call for technologies that can support a new relation with patients based on self-treatment and patient-generated data. In this study the aim was to analyse the implications of such self-treatment for professional epistemic work (information care professionalisation). The data consists of 10 video-recorded consultations with professionals and patients after 8 weeks of self-treatment and reports through a mobile phone based system. Based on sociocultural and dialogical traditions the analysis focused on the in situ interaction with a focus on what epistemic orientations that emerged in the consultations as the data was visually displayed through graphs on the screen. Three orientations are reported: The system as a knowledge object, the system as a coordination device and the system as support in mediating professional and patient perspectives.

Epistemic shifts in teachers’ work and learning analyzed through three research projects

Presenting Author: Karen Jensen, University of Oslo, Norway
Co-Author: Eli Tronsme, University of Oslo, Norway

This paper explores how the epistemic environments for teachers’ work and learning are being reformed to meet new knowledge demands. The paper synthesizes and reviews findings from three empirical studies that examined Norwegian teachers’ work-related learning, spanning a time period of twelve years. The studies were designed to build on each other, by following the same practitioners over time and by adding targeted case studies to investigate in depth questions emerging from the first study. Data was collected through questionnaires, interviews and learning logs (study 1 and 2) as well as through observations of knowledge practices and learning (study 2 and 3). A shared conceptual framework building on theorizations of professional knowledge cultures and artefact mediated learning (Knorr Cetina 2001, Säljö 2010) was employed to analyze how professionals in different environments work, as well as how their situated enactments are linked with wider knowledge spheres. When synthesizing and reviewing the findings across the studies, we identify significant shifts taking place within the teaching profession. From a state in which teachers’ learning were dominated by the sharing of personal experiences within the local workplace, the later projects documented an increased variety of knowledge resources which linked practitioners to larger knowledge networks. Moreover, teachers increasingly take on responsibilities for the epistemic basis for professional actions, by relating to and adapting knowledge-based standards and templates in everyday work. In doing so, they also become local knowledge producers. We discuss what these changes imply for continuous learning and development.

Session H 190
31 August 2017 10:15 - 11:45
Lirva · K103
Symposium
Teaching and Teacher Education

Professional Development in Dialogic Teaching: Commonalities and Constraints

Keywords: Argumentation, Communities of practice, Comparative studies, Qualitative methods, Quantitative methods, Quasi-experimental research, Self-efficacy, Social Interaction, Teacher Professional Development, Video analysis
Interest group: SIG 11 · Teaching and Teacher Education
Organiser: Alina Reznitskaya, Montclair State University, United States
Discussant: Jonathan Osborne, Stanford University, United States

Using Talk to Promote Argument Literacy: Effects of Professional Development in the Language Arts

Presenting Author: Ian A.G. Wilkinson, The Ohio State University, United States
Co-Author: Alina Reznitskaya, Montclair State University, United States
Co-Author: Ariel Sykes, Montclair State University, United States
Co-Author: Min-Young Kim, The Ohio State University, United States

In this paper, we report findings from the third year-long iteration of a professional development program in dialogic teaching to promote students’ argument literacy. We define argument literacy as the ability to comprehend and formulate arguments through speaking, listening, reading, and writing. The professional development program focused on helping teachers use a specific type of talk called ‘inquiry dialogue’ in classroom discussions about text to promote students’ argument literacy. The program was delivered using a combination of workshops, study groups, and coaching sessions. Using a prototyped experimental design, we examined evidence of growth in teachers’ epistemological beliefs and enactment of discussions, and collected data on students’ argument literacy and reading comprehension. Twenty-six fifth-grade language arts teachers, 14 in the experimental condition (professional development) and 12 in the control condition, and their students at two U.S. sites participated. Teachers made substantial shifts in their discourse practices and in the quality of argumentation in the discussions, though there was little apparent change in their epistemic beliefs. Some evidence of transfer to individual learning outcomes was observed.

Professional Development For Dialogic Teaching

Presenting Author: Robin Alexander, University of Cambridge, UK, United Kingdom

This paper presents an account of progress to date on the joint Cambridge Primary Review Trust / Institute for Effective Education projectClassroom talk, social disadvantage and educational attainment: Raising standards, closing the gap, funded by the UK’s Education Endowment Foundation. The project’s professional development programme aims to intensify the quality of classroom talk, teachers’ as well as students’, in order to increase engagement and improve attainment among students judged disadvantaged by government criteria. The approach builds on the notion of dialogic teaching, which emphasises a broad pedagogical/dialogic repertoire, and principles of procedure rather than specific talk formulae.
The strategy comprises a two-term iterative programme of planning, target-setting and review using mentoring and video/audio analysis and structured into 11 fortnightly cycles. Trialled in 2014-15 in 10 London primary schools, it was subjected during 2015-16 to randomised control trial (RCT) in 72 schools in Birmingham, Bradford and Leeds. Alongside the RCT, the project team have undertaken their own process analysis using observation, interview and both quantitative and qualitative analysis of the teachers’ lesson videos. The presentation will focus on outlining and reflecting on the project’s rationale, methodology and strategy. It will also include a critique of the increasing colonisation of UK policy and research funding by the RCT as the supposed methodological ‘gold standard’, showing how in a field as complex as classroom talk the viability of RCT is strictly limited.

Effects of Professional Development in Dialogic Teaching on Teacher and Student Self-efficacy

Presenting Author: Alexander Grösschner, Friedrich Schiller University of Jena, Germany
Co-Author: Ann-Kathrin Schindler, Technische Universität München (TUM), Germany
Co-Author: Doris Holzberger, Technical University of Munich, TUM School of Education, Germany
Co-Author: Tina Siedel, Technische Universität München (TUM), Germany

Professional development (PD) programs in dialogic teaching often address dialogic moves and formats to change teachers’ classroom practice and to scaffold student engagement. Scaffolding is a form of high quality support that may help to increase teacher self-efficacy. Similarly, students’ self-efficacy may be promoted by high quality support of their teachers and may be relevant to the way students participate in classroom dialogue. To date, there is a lack of research investigating teacher learning in relation to both changes in classroom dialogue practice and the effects on teacher and student self-efficacy. This study contributes to this research by applying a quasi-experimental approach. Specifically, we investigated whether teachers and students in an intervention group (IG), who participated in a video-based PD program on classroom dialogue, improved their self-efficacy compared to a control group (CG) of teachers and students, who participated in a non-video-based PD approach. Quantitative instruments were administered to measure teachers’ and students’ self-efficacy. Qualitatively, a coding scheme was developed to capture changes in videotaped teaching practice and teacher verbal exchanges during PD workshops (IG only). The findings show a significant change in teachers’ and students’ self-efficacy in the IG. We suggest that the changes could be related to the IG teachers’ practice of scaffolding, as scaffolding was directly addressed in a lesson planning workshop during PD intervention.

Developing Dialogic Pedagogy, Supporting Teacher Agency

Presenting Author: Alexander Grösschner, Friedrich Schiller University of Jena, Germany
Co-Author: Adam Lettsen, Ben-Gurion University of the Negev, Israel
Co-Author: Benzi Stakman, Ben Gurion University of the Negev, Israel

A key principle of dialogic pedagogy is respect for students’ voice and agency, yet often attempts to promote dialogue through teacher professional development afford limited space for participating teachers’ voice and agency. This paper reports on the design and initial progress of an initiative designed to facilitate teacher agency in experimenting with and appropriating dialogic practices.Key features of this programme include: learning on the job, as part of routine participation in work-groups; working with existing leadership and practices; quick feedback from research to practice; and deep partnership with the Ministry of Education and other partners. Drawing on interviews, surveys and audio-recordings of teacher team meetings and professional development workshops, the study explores (a) how the participating teachers are thinking about dialogic pedagogy, (b) what local practices they have developed, (c) central challenges encountered, and (d) design adaptations to address them. Emerging issues include gaps between the research team, Ministry of Education officials and teachers in our thinking about dialogue, and indeed in our goals for the intervention; different ways of appropriating and adapting dialogic pedagogy in the different cultural settings of Jewish and Bedouin schools; and the advantages and drawbacks of classroom video-recordings as a means of representing dialogic practice. The paper will contribute to comparative analyses of dialogic pedagogy across cultural contexts, to an appreciation of teacher agency and voice in appropriating dialogic pedagogies, and to a deeper understanding of the processes of informal teacher learning aimed at enacting dialogic practice.

Session H 191
31 August 2017 10:15 - 11:45
Main Building A - A07
Symposium
Context Effects In Learning and Instruction

Keywords: Attitudes and beliefs, Conceptual change, Educational Psychology, Higher education, Interdisciplinary studies, Language (Foreign and second), Mathematics, Motivation, Pre-service teacher education, Primary education, Qualitative methods, Science education, Secondary education, Teacher Effectiveness, Teaching / instruction

Interest group: Organiser: Matthias Nickles, University of Freiburg, Germany
Discussant: Fritz C. Staub, University of Zurich, Switzerland

Changing language mindsets influences beliefs towards and feedback given to language learners

Presenting Author: Nigel Marrou Lou, University of Alberta, Canada
Co-Author: Kimberly Noals, University of Alberta, Canada

Language mindsets refer to people’s beliefs about whether language aptitude is malleable (i.e., incremental mindsets) or fixed (i.e., entity mindsets). Previous research suggests that a context that promotes incremental mindsets leads people to become more motivated and persistent in the face of challenges. This research examines whether language mindsets influence the type of feedback that people provide to language learners who fail a test in a language class. Two studies (N = 258) showed that holting or priming entity beliefs led Anglo-Canadians to attribute English learners’ failure to a lack of language intelligence and thus, to provide consoling feedback to comfort for low competence (e.g., “don’t worry, not everyone is good at language”), while holding or priming incremental beliefs led Anglo-Canadians to believe in English learners’ potential to learn, and in turn to provide constructive feedback to improve competence. We conclude that promoting incremental mindsets may help people to become more effectively support language learners’ developing competence.

How context influences pre-service teachers attending and responding to student ideas

Presenting Author: Leenah Berland, University of Wisconsin Madison, United States

Movements in science education increasingly emphasize responsive teaching practices in which teachers attend and substantively respond to their students’ ideas. Existing literature examining these pedagogical practices seems to have conflicting findings; some work suggests it is extremely challenging for teachers while others demonstrate novices doing it from early on in their student teaching. We interpret these differences in findings as contextual, and our study explores the contexts in which pre-service teachers are more and less likely to reason with and about their student ideas while teaching. Preliminary analyses suggest that pre-service teachers are more likely to attend to the substance of students’ ideas when interpreting them than when considering possible responses. Further, we find teacher attention becomes increasingly difficult as their context becomes increasingly similar to “real world” classrooms. We explore the implications in the full paper.

When learning becomes traveling. How metaphors of learning change when entering university

Presenting Author: Elisabeth Wegner, University of Freiburg, Germany

For successful learning, students need to adapt their conceptions of learning to the learning culture, especially when entering a new context of learning such as university. However, conceptions are usually implicit and thus difficult to assess. Metaphors have been proposed as a possibility to examine conceptions. Therefore, we examined how students’ metaphors of learning (N=30) changed over the course of the first year of studies. Also, we analysed how the metaphors related to motivational aspects of learning.

Metaphors were more congruent with university learning culture in the second year of studies than in the first year, and congruence of metaphors to university learning culture was related to perceived competence, indicating that students adapt their conceptions of learning when entering a new context of learning.

Context affects teachers’ principle-orientation of explanations

Presenting Author: Mona Weinhuber, University of Freiburg, Germany
Co-Author: Matthias Nickles, University of Freiburg, Germany
Co-Author: Andreas Lachner, Eberhard Karls Universität Tübingen, Germany
Co-Author: Timo Leuders, University of Education Freiburg, Germany

Principle-based explanations have shown to be an effective scaffold to support students’ understanding. However, prior research suggests that mathematics teachers often neglect principles and rather describe the algorithmic rules without explaining, why these mathematical steps are performed. One reason for this finding may be that classroom context activated a rather procedure-oriented mindset of the nature of mathematics (i.e., math as a “toolbox”), which triggered the teachers to generate more procedure-oriented explanations. We examined how different contexts affected teachers’ provision of principle-oriented or rather procedure-oriented explanations. Using mindset priming, we had mathematics teachers either read a comic portraying mathematics as argumentation (students vividly discussed a mathematical problem), or a comic portraying mathematics as a toolbox (students rehearsing algorithms). Afterwards, the teachers wrote an explanation about an extremum problem for novice students. Results revealed that teachers primed with an argumentative context generated more principle-oriented explanations than teachers primed with a toolbox context. The findings suggest that the concepts in fact activated different mindsets which led the teachers to either include more principle-oriented or more procedural information in their explanations. These results could stimulate math teachers to critically reflect on the mathematical culture in schools, given that principle-oriented explanations are more effective than procedure-oriented information in helping students gain transferable knowledge.
Implementing SDT in practice: Improving need-supportive teaching through school-based interventions

**Keywords:** Assessment methods and tools, At-risk students, Experimental studies, Motivation, Quasi-experimental research, Teacher Professional Development, Teaching approaches

**Integrative group:** SIG IB - Motivation and Emotion

**Discussant:** Idit Katz, Ben-Gurion University of the Negev, Israel

**Motivating primary school students with diverse backgrounds: Effects of a teacher training**

**Presenting Author:** Desirée Weijers, Kohnstamm Institute, University of Amsterdam, Netherlands

**Co-Author:** Lisette Horstena, Utrecht University, Netherlands

**Co-Author:** Thea Peetsma, University of Amsterdam, Netherlands

With growing diversity in classrooms, teachers face an increasingly complex task of meeting the different motivational needs of every student in the classroom. Autonomy-support, instead of control, is found to be an effective teaching strategy to foster students’ motivation. However, teachers tend to be more controlling toward students from disadvantaged backgrounds, because they perceive these students to have less autonomy or need for structure. However, structure can also be offered in autonomy-supportive ways. Therefore, this study investigated whether a teacher training focused on providing autonomy-support in combination with the provision of structure (resulted in need-supportive teaching) enhanced need-supportive teaching by teachers and resulted in higher motivational motivation, self-efficacy, and effort of students.

**Differentialized effects for ethnicity and SES were examined.**

484 primary school participants. Teachers participated in either the intervention (n = 8) or control group (n = 13). Teachers and students filled out questionnaires at three moments throughout the academic year and observations of teachers’ provision of autonomy and structure were carried out. Results of multilevel regression analyses showed that teachers in the intervention group reported more need-supportive teaching compared to the control group. However, students in the intervention group did not experience higher levels of need-supportive teaching or motivation compared to the control group. Also, results were similar for students with different socio-economic and ethnic backgrounds. This suggests that a more intensive training is needed in order to help teachers become more autonomy-supportive in order to enhance the motivation of students.

**How to train teachers to deliver a multi-level SDT-based intervention to promote youth activity**

**Presenting Author:** Katarina Klykka, University of Helsinki, Finland

**Co-Author:** Nelli Hankonen, University of Tampere, Finland

**Co-Author:** Katarina Koyka, University of Helsinki, Finland

**Co-Author:** Martin Haggin, Curtin University, Australia

**Co-Author:** Taut Lintunen, University of Jyväskylä, Finland

**Co-Author:** Elisa Kaaja, University of Helsinki, Finland

**Background:** No school-based interventions among older adolescents have shown long-term effectiveness (Hynynen et al. 2016). The “Let’s Move It” (LMI) project is a school-based program to promote PA and decrease excessive SB among vocational school students and is based on behavioural science, e.g. self-determination theory. A central element is autonomy supportive interaction designed to foster high-quality motivation in students and teachers.

**Aims:** To investigate process evaluation data from the original LMI trial to co-develop a teacher training for the LMI. We examine, what are 1) teachers’ views on the “Let’s Move It” program, 2) needs for training optimization, and 3) the final optimized intervention?

**Methods:** We draw from the process evaluation quantitative survey of the LMI trial (n=120, teachers, n=1100 students), qualitative research materials (n=18 teachers, n=34 students), and field observations.

**Findings:**

1. 87% of teachers would recommend LMI program to their colleagues, and majority (76-82%) agreed on statements regarding beneficially and effectiveness.

2. Teachers valued the expertise but missed more strategies to motivate students.

3. The optimized training includes pre-course material, 2x2.5 hour contact course, self-support materials and maintenance sessions, and a web-platform. Motivational interaction principles (i.e. reflective learning, non-coercive language) are emphasized. Teachers are prompted to plan and self-monitor the use of these principles.

**Theoretical and educational significance of the research** Next, we will examine training’s acceptability, and its impact on teacher behaviours. This is one of the first studies to transparently report the phased development of co-creating teacher training to intervene on adolescent PA and SB.

**Training teachers to assess in a more motivating way – the effects on teacher and student outcomes**

**Presenting Author:** Christa Krijgsman, Ghent University, Belgium

**Co-Author:** Jolien Maes, Ghent University, Belgium

**Co-Author:** Nathalie Aerteman, Ghent University, Belgium

**Co-Author:** An de Meester, Ghent University, Belgium

**Co-Author:** Isabel Tatir, Ghent University, Belgium

**Co-Author:** Jan van Tartwijk, Utrecht University, Netherlands

**Co-Author:** Greet Cardon, Ghent University, Belgium

**Co-Author:** Maarten Vansteenkiste, Ghent University, Belgium

**Co-Author:** Leen Haerens, Ghent University, Belgium

**Previous research argues that grading is negatively related to students’ motivational experiences whilst Assessment for Learning (AFL) to build progress and detect personal progress) is positively related to students’ motivational experiences. However, it is under investigated whether teachers could learn to implement AFL teaching strategies more and if such strategies could positively influence students’ motivational experiences. To investigate this, we developed a one-day professional development (PD) programme for teachers on how to assess in a more motivating way.

In a quasi-experimental design, a sample of 14 physical education (PE) secondary school teachers (n=6 intervention group, n=8 control group) and 222 students participated in this study. Questionnaires measuring the extent of applied AFL strategies (completed by teachers and students) and students’ motivational experiences (completed by students) were completed pre and post intervention. MANOVA’s were conducted on teacher data and multilevel regression analyses were deployed on student data.

**Favourable intervention effects were found in the student reports.** The intervention prevented students from a decrease in motivational experiences. However, these effects were not evident in the teacher reports.

**Results** suggest that a first step in the right direction has been made. It is recommended to replicate the present study with a larger sample size and to extend the duration of the PD programme so that more collaborative and reflective practices can take place. Only then, teachers will be provided with an opportunity to internalize and implement the AFL teaching strategies in a more efficient way and larger effects might be obtained in students’ motivational experiences.

**Supporting students’ need for autonomy and structure: An intervention study in secondary school**

**Presenting Author:** Lisette Horstena, Utrecht University, Netherlands

**Co-Author:** Brice van der Veen, Kohnstamm Institute, University of Amsterdam, Netherlands

**Co-Author:** Thea Peetsma, University of Amsterdam, Netherlands

**Co-Author:** Desirée Weijers, Kohnstamm Institute, University of Amsterdam, Netherlands

Self-determination theory states that fulfillment of students’ basic psychological needs for autonomy, competence, and relatedness can promote students’ motivation for school. However, in practice many teachers find it difficult to support students’ need for autonomy and to provide structure in autonomy-supportive ways, especially when it concerns lower achieving students or students from low-SES or ethnic minority backgrounds. In this study, we developed a training for teachers in the lowest track of secondary school on combining autonomy and structure. We examined whether the training increased need-supportive teaching and positively affected developments in students’ domain-specific motivation.

Fourteen teachers with 21 classes and 280 students in year one of secondary school filled out questionnaires on need-support and motivation during a pre-test, post-test, and follow-up. Questionnaire data were analysed with multilevel regression analyses comparing the intervention and control group (N=9 and N=12 classes, respectively). Also lessons of teachers in the intervention group were observed.

The results showed declines in experienced autonomy-support, relatedness, autonomy motivation, and effort (both in the control group, whereas these aspects did not decline for students of teachers who engaged in the training. The observed effect sizes indicated a small increase in autonomy-support (especially choice). Overall, the effects were mostly similar for students with varying background characteristics. Even though this was a small-scaled study, the results show that a teacher training on autonomy-support and structure has the potential to prevent student motivation from declining and can benefit students from varying backgrounds.
Bridging Discourse in Educational Research Through Examining the Notions of Stability and Change

Keywords: Assessment methods and tools, Communities of practice, Comparative studies, Conversation / Discourse analysis, Culture, Educational attainment, Interdisciplinary, Philosophy, Psychometrics, Qualitative methods, Quantitative methods, Social aspects of learning and teaching, Social interaction, Student learning, Video analysis

International Conference SIG 10 - Assessment and Evaluation, SIG 9 - Social Interaction in Learning and Instruction, SIG 5 - Educational Theory

Organiser: Man Ching Esther Chan, The University of Melbourne, Australia

Discussant: Richard Lehrer, Vanderbilt University, United States

Examining Different Research Perspectives through Interviews with Researchers: A Dialectic Approach

Presenting Author: Man Ching Esther Chan, The University of Melbourne, Australia

This study aimed to connect the diverse perspectives and research traditions in education through interviews with ten senior researchers in multiple countries. It applied the dialectic approach (Overtorn, 2003; Stace, 1995) in philosophical investigation using the relational concepts of stability and change to stimulate and understand different views of learning and teaching and to explore the potential application of these different understandings of stability and change in classroom practices. Each interview was around 30 to 60 minutes and semi-structured, generally beginning with some background questions about the interviewees' background and their research interests and studied in their work, and how the interviewees might interpret the issue of stability and change in his or her work. The study found that all of the researchers interviewed could relate their work to stability and change in some ways. The interpretations offered by the researchers can be viewed in terms of two levels: the application of stability and change, and the relationship between the notions of stability and change. Through examining the researchers' interpretations of stability and change, what the researchers view as central to their work and how that relates to their method of investigation can be compared and contrasted. The findings of the study could help to address the incoherence and fragmentation in education discourse and explore ways in which different educational theories and methodologies could complement each other in classroom practice.

Measuring Change in ICT Literacy Over Time

Presenting Author: John Anley, Australian Council for Educational Research, Australia

Co-Author: Hottam Harald Schultz Teuteberg, Australian Council for Educational Research, Australia

Co-Author: Julian M. S. Frallon, ACER, Australia

Co-Author: Evelyn Gehardt, Australian Council for Educational Research, Australia

This paper illustrates the notions of stability and change in terms of the challenges associated with the measurement of Information and Communication Technology (ICT) literacy using a performance assessment. Large-scale assessment studies are used to examine changes over time. Measuring change over time presumes an underlying construct that may be manifest in performance on particular tasks that may be different at different times. This paper focuses on challenges involved in studying change in ICT literacy where the contexts have changed over time. The Australian National Assessment in ICT literacy was a performance assessment in late primary (Year 6) and mid-secondary (Year 10). This paper discusses the assessment design that was applied in assessment cycles from 2005, through 2008 and 2011 to 2014. It also reports on the trends in ICT Literacy for Year 6 and Year 10, and the relationships of ICT Literacy with other variables, that were observed over this period of time. The notions of stability and change will be explained from the latent trait perspective in terms of how trends and changes are conceptualised and measured in the large-scale assessment study.

Epistemic Topicalizations as Resources for Cohesion and Change in Classroom Learning Trajectories

Presenting Author: Fridolf Sahlin, Abo Akademi, Finland

Co-Author: Marie Tanner, Karlstad University, Sweden

Despite a seemingly fragmented interactional context, teachers and students in classrooms routinely manage to co-construct coherent, inter-related and individually adapted learning trajectories distributed over days and weeks. The aim of this paper is to explore how interactional resources productivity is accomplished in learning trajectories, by focusing on how participants establish relations of cohesion and change in the present and previous occasions. Analysis of empirical data shows how participants frequently topicalize aspects of epistemic stance towards a co-constructed learning content. This practice is conceptualized as epistemic topicalizations, shown to play an important role for maintaining cohesion in a learning trajectory, while making it possible for the teacher and the student to progressively change and differentiate their epistemic stance. Epistemic topicalizations are suggested as a useful analytic concept, grounded in Conversation Analysis (CA), to describe how cohesion and change are imagined in interaction to accomplish progressivity in learning trajectories. The analysis shows how epistemic topicalization is a primary resource in establishing a shared understanding of the evolving epistemic status of the students, and consequently, as a primary resource for adapting and changing teaching and instruction. Epistemic topicalizations seem to be resources both for the contingent organization of learning as social action within and beyond situated interactions, and for the situationed construction of differentiation and mutual adaptation of teaching and learning in relation to displayed needs and requests of various students.

Only the Ephemeral is of Lasting Value – Interrogating the Tension between Stability and Variation

Presenting Author: David Clarke, University of Melbourne, Australia

This presentation illustrates the tension between stability and variation in international classroom research studies in the identification of patterns in classroom practices in culturally and geographically diverse education systems. In our pursuit of structure in the social interactions we find in the classroom, we are trying to construct enduring portraits of phenomena that are fundamentally transient. When the classrooms that we are studying are culturally and geographically diverse, identifying stability becomes both a challenge and a source of major insight. The interrogation of stability and variation in this presentation is organised around particular constructs, deliberately chosen because they all relate to classroom practice but are all of different levels of granularity. In this paper, consideration of all such constructs draws on a foundation of extensive cross-cultural classroom research. The purpose of this presentation is to illustrate the difference between those things that can be reported as stable concerning classroom practice internationally and those things that vary, either as a consequence of the vagaries of student learning progress or strategically as a result of teacher decision-making. In fact, it is the dynamics of the generation and the essential accompanying qualifications that creates the conceptual space for educational specification. The examples employed in this presentation are intended to highlight precisely such tensions between stability and variation and by interrogation of the revealed tensions, identify those elements most critical to our theorizing about the canonical nature of teaching/learning.

Session 194

31 August 2017 10:15 - 11:45
Main Building A - A4 Seminar Room

Students’, Peers’, and Teachers’ Monitoring and Regulation: Effects of Cognition and Motivation

Keywords: Cognitive skills, Comprehension of text and graphics, Computer-assisted learning, Developmental processes, Emotion and affect, Metacognition, Motivation, Motivation and emotion, Self-regulation, Social aspects of learning and teaching, Teacher Effectiveness

Interest group: SIG 16 - Metacognition

Discussant: Daniel Dinsmore, University of North Florida, United States

The Efficacy of Cue Availability on Teachers’ and Students’ Judgment Accuracy.

Presenting Author: Pol Lui, University of the Netherlands

Co-Author: Arnaud de Bruin, Maastricht University, Netherlands

Co-Author: Manielle van Loon, University of Bern, Switzerland

Co-Author: Tamara Van Gop, Utrecht University, Netherlands

For effective regulation of student learning, it is imperative that both teachers’ and students’ judgments about student’s current level of knowledge are accurate. Yet, judgments tend to be relatively inaccurate and existing interventions are not highly effective. This study aimed to investigate whether varying the degree to which teachers and students had access to diagnostic cues about students’ understanding of texts (i.e., representations of their students’ own knowledge in the form of a diagram) improved teachers’ and students’ judgment accuracy.

Students (N=229, Age M=14.6) from 17 teachers were randomly assigned to a control condition, a diagram-completion condition, or a diagram-drawing condition. Each teacher judged understanding of 15 of his/her own students based on their name only (control condition, 5 students), name+completed diagram (completion condition, 5 students) and name+drawn diagram (drawing condition, 5 students).

We found that students’ judgment accuracy increased by completing diagrams compared to not completing a diagram (i.e., control condition) whereas teachers’ judgment accuracy increased by viewing students’ drawn diagrams, not by viewing students’ names only. Teachers’ and students’ judgment accuracy did not significantly differ and their judgments were most similar in the diagram-completion condition, compared to the control condition.

Thus, judgment accuracy can improve by having access to cues about students’ knowledge representations, although overall, judgment accuracy was still relatively low, even in the experimental conditions. Nevertheless, we can conclude the key to further improve judgment accuracy – which is pivotal for effective regulation of student learning – may lie in helping teachers and students to focus on diagnostic cues.

Elementary School Children’s Self- and Peer Scoring of Test Responses Using Feedback

Presenting Author: Marielle van Loon, University of Bern, Switzerland

Co-Author: Claudius Rovera, University of Bern, Switzerland

Children’s calibration is often not accurate when making self-score judgments (SSJs) about performance, and as a result, their self-regulation is not effective. Feedback may support young learners to improve calibration of SSJs. Further, monitoring others’ seems easier than monitoring oneself, and therefore, calibration may be more accurate when children make peer-score judgments (PSJs) than SSJs. Further, older children may be more accurate when making SSJs and PSJs than younger children. We investigated whether well elementary children (4th and 6th graders) can score their own and their peers’ test responses with a feedback standard. Children they did not score to test achievement; calibration of SSJs and PSJs was less accurate than calibration of PSJs, and calibration of SSJs and PSJs was more accurate for 6th than for 4th graders. Children who were more overconfident in their own scores were also more overconfident when making PSJs, indicating that overconfidence was confounded. untermine calibration accuracy for self and peers was related to task achievement; calibration of SSJs and PSJs was less accurate and more overconfident for children who had lower performance. Findings show that peer scoring is more accurate than self-scoring, and imply that making peer calibration should especially focus on children with low test performance.

The Influence of Affect and Motivation on SRL When Learning to Solve Problems in Secondary Education

Presenting Author: Martine Baars, Erasmus University Rotterdam, Netherlands

Co-Author: Lisette Wijnia, Erasmus University Rotterdam & University College Roosevelt, Netherlands

Co-Author: Fred Paas, Erasmus University Rotterdam & Utrecht University, Netherlands

We studied the effect of affect and motivation on self-regulated learning (SRL) when learning to solve problems in secondary education. The research was conducted within a classroom setting where students were learning to solve mathematical problems. Two conditions were manipulated: affective and motivational manipulations. Affective manipulations were introduced through affective cues and motivational manipulations were introduced through motivational cues. We hypothesized that affective and motivational manipulations would have a different effect on SRL in different situations. The results showed that affective and motivational manipulations had a different effect on SRL in different situations. The results showed that affective and motivational manipulations had a different effect on SRL in different situations.
Self-regulated learning skills are essential for learning during school years and in working life. Secondary school students often encounter problem-solving tasks when learning about different subjects in their curriculum (e.g., biology or math). Furthermore, opportunities for learner control, such as monitoring and selecting study tasks, are becoming increasingly important to help students prepare for future learning. Research to cognitive resources, learning to solve problems, is a self-regulated learning way demands emotional resources and motivation. Therefore, the current study investigated the relation between affect (i.e., Positive Affect and Negative Affect Scale), motivation (i.e., autonomous and controlled motivation), and self-assessment accuracy and regulation choices when learning to solve biology problems in an online learning environment. Students first studied video-modeling examples demonstrating how to solve biology problems, self-assess performance, and choose a next task. Then they practiced this self-regulated learning cycle and took a posttest with the same procedure. Results showed that both affect and motivation were predictors of problem-solving performance, in such a way that negative affect had a negative effect on performance, and negative affect and positive motivation was positively related to performance. Furthermore, better self-assessment accuracy was related to higher performance. The results from the current study showed that students' affect and autonomous motivation for learning play a crucial role in self-regulated learning in secondary education. Future research could further disentangle the relation between affect, motivation, monitoring accuracy and regulation choices.

Measuring Middle School Students’ Metacognitive Monitoring during Science Learning with SimBelt

Presenting Author: Michelle Taub, North Carolina State University, United States
Co-Author: Nicholas Mudrick, North Carolina State University, United States
Co-Author: Roger Azvedo, North Carolina State University, United States

Advanced learning technologies (ALTs) can be used to measure and foster middle-school students’ metacognitive monitoring and regulation during learning. This study investigated how 63 8th grade students monitored and regulated their self-regulated learning (SRL) processes during three days (from an 8th-grade classroom) during learning with SimBelt, an ALT designed to foster SRL during science learning. Results revealed that on day 2, students spent significantly more time using the Skill Diary than on days 4 and 6. Overall, middle school students rarely monitored their emerging understanding and other critical SRL processes (e.g., motivation, emotion) and rarely use embedded metacognitive tools (e.g., skill diary) to facilitate monitoring and regulation of key cognitive, affective, and motivational processes during learning. Our results have implications for training the effective use of metacognitive monitoring during learning.

Session H 195

31 August 2017 10:15 - 11:45
Linna - K195
Symposium
Motivational, Social and Affective Processes
The development of motivation during school years

Keywords: Achievement, Attitudes and beliefs, Goal orientation, Literacy, Mathematics, Motivation, Teacher Effectiveness
Interest group: SIG 08 - Motivation and Emotion
Organiser: Jaana Villjaranta, University of Eastern Finland, Finland
Organiser: Anna-Maija Poikkeus, University of Jyväskylä, Finland
Discussant: Jaana Villjaranta, University of Eastern Finland, Finland
Discussant: Anna-Maija Poikkeus, University of Jyväskylä, Finland

The present study aimed to examine with a cohort design whether lower secondary school students’ school motivation (self-concept in literacy and in math, task values, achievement strategies and educational aspirations) and school well-being (school enjoyment and burnout) have changed from 2007 to 2014 in Finland. The sample was merged from two follow-up studies. A sample concerning years 2007–2010 (n = 1702) is part of the Jyväskylä Longitudinal Study of Dyslexia (JLSD) and a sample concerning year 2014 is part of the First Step Study (n = 1167). Results showed that students’ educational aspirations and particularly girls’ motivation at Grade 7 have risen from 2007 to 2014. At the same time, students’ literacy motivation has decreased. In addition, school motivation and school enjoyment differed between girls and boys: girls were more motivated to study literacy than boys, whereas boys valued math more than girls. Interestingly, although girls reported higher school enjoyment than boys, particularly boys’ enjoyment had recently increased. School burnout, instead, had not changed across years.

Patterns of Word Reading Skill, Interest, and Self-Concept of Ability

Presenting Author: Jaana Villjaranta, University of Eastern Finland, Finland
Co-Author: Anja Koskivaara, University of Jyväskylä, Finland
Co-Author: Marja-Kristiina Leikkanen, University of Jyväskylä, Finland
Co-Author: Jari-Erik Nurm, University of Jyväskylä, Finland
Co-Author: Anna-Maija Poikkeus, University of Jyväskylä, Finland
Co-Author: Jani-Erik Nurm, University of Jyväskylä, Finland

Students who are interested in and who have positive self-concept of their ability in specific academic tasks typically perform better in those tasks than students with negative self-perceptions and a low level of interest (e.g., snack, 2004). However, there has been research suggesting that the associations between academic skills, self-concept of ability, and interest are not necessarily similar for all individuals (e.g., Aunola, Leskinen, Onatsu-Arividsson & Nurmi, 2002; Nurmi & Aunola, 2005). This study aimed to broaden the previous literature, which has mainly deployed variable-oriented approach, using by person-oriented methods to examine the patterns and dynamics of pattern change in Finnish children’s: (N=696) word reading skill, self-concept of ability, and interest from kindergarten to Grade 2. Six groups of children were identified by using the I-states as objects analysis (ISDA) procedure: (a) low skills, negative self-concept but high interest; (b) high skills but low interest; (c) average; (d) high skills, positive self-concept, and high interest; (e) low skills, negative self-concept, and low interest; and (f) positive self-concept but low interest. Thetically occurring transitions between groups were characterized by changes in either reading-related interest or simultaneously in self-concept and skills. Gender, risk for reading difficulties (RD), being an early reader, mother’s level of education and home literacy environment predicted group membership in kindergarten, and gender, RD risk, being an early reader, and mother’s level of education also predicted transitions between groups.

Motivation and well-being at Grade 9 and underlying development of self-concept and interest in math

Presenting Author: Anna-Lisa Jõgi, Tallinn University, Estonia
Co-Author: Eve Kikas, Tallinn University, Estonia

Our study aimed to first differentiate graduating middle school students based on their math-specific motivation and general learning-related well-being, and next back-track the development of math self-concept and interest of students from different motivational and well-being profiles. We followed 253 students (54.5% of boys) from Grade 2 to Grade 9, measuring their self-reported self-concept and interest in math in Grades 2, 3, 6, and 9, and additionally their performance-avoidance goals, task-avoidant behavior, school burnout and well-being in Grade 9. We used latent profile analysis to determine four groups of students with distinct motivational and well-being patterns. Next we showed that although students’ self-concept and interest had been very high in Grade 2, in almost all cases it had declined by Grade 9, most rapidly between Grades 3 and 6. There was a deeper decline for students with moderate motivation profile, in contrast to the group of students with high motivation and well-being in Grade 9 and no decrease in their self-concept. Math interest and self-concept of students reporting less motivation and highest burnout, had started declining already during primary school, between Grades 2 and 3. Practical implications of these findings are discussed.

Student-perceived teacher behaviors and motivational profiles in mathematics:

Presenting Author: Charlot Rubach, Universität Potsdam, Germany
Co-Author: Rebecca Lazanides, University of Potsdam, Germany
Co-Author: Julia Dierich, Friedrich Schiller University of Jena, Germany
Co-Author: Päivi H. Taskinen, Friedrich Schiller University Jena, Finland

This longitudinal study investigated the stability and change of students’ motivational profiles in mathematics and their relations to student characteristics (gender, mathematics anxiety and effort) and student-perceived teacher beliefs and behaviors in mathematics classrooms. Survey data stemmed from 6020 ninth Graders who participated in two measurement occasions of the PISA-I Plus Study 2004 (55.2% girls) of 152 schools and 275 classrooms in 118 classes. Latent class analysis revealed four motivational profiles: a moderate motivation profile, a low motivation profile, a high motivation profile and a high motivated and well-adjusted profile. Stability of students’ motivational profile from Grade 9 to 10 was typical, but also more students than expected by chance moved from the high motivation profile to the high self-concept, low interest profile. Multinomial logistic regression analyses showed that when students perceived low levels of clearness of instruction at Time 1 they were more likely to be in the high self-concept, low interest profile than in the high motivation profile at Time 2. In turn, students in the low motivation profile at Time 1 were significantly more likely to perceive lower mathematics teacher enthusiasm, clearness of instruction and teaching for meaning at Time 2 compared to students in the high motivation profile. The findings are relevant for research on learning and instruction as they address the question of the heterogeneity of students in mathematics classrooms.
The neuroscience of learning: implications for education

**Keywords:** Cognitive development, Educational Psychology, Game-based learning, Interdisciplinary, Learning analytics, Learning and developmental difficulties, Mathematics, Neuroscience, Reasoning, Student learning

**Interest group:** SIG 22 - Neuroscience and Education

**Discussant:** Roland H. Grabner, University of Graz, Austria

Effort versus trait praise differentially influences negative feedback processing in adolescents

**Presenting Author:** Stijn Konst, VU University Amsterdam, Netherlands

**Co-Author:** Niels Aal, VU University Amsterdam, Netherlands

Adaptively responding to teacher’s feedback is important for learning. Previous research has demonstrated that praising intelligence as a fixed trait can lead to less adaptive motivational and learning patterns, compared to praising someone’s effort. Here, we investigated adolescent’s neural processing of negative feedback during a math task, while manipulating task difficulty and praise context. After a correct response, half of the participants received trait praise (you are smart!), the other half effort praise (“again, great effort!”). Negative feedback after an incorrect response was always identical. Preliminary fMRI analyses indicate that activation of the insula and ACC during negative feedback was stronger in the effort-praise context. Ongoing analyses are testing how these differences relate to task-performance (with varying difficulty levels) and to theory of intelligence. Our findings of the impact of what is praised on how negative feedback is processed underlines the importance of how feedback is provided.

A neural dissociation between deductive and probabilistic reasoning in children

**Presenting Author:** Jérôme Prado, Centre National de la Recherche Scientifique (CNRS), France

Learning to deduce conclusions from prior information is central to the growth of scientific thought in children. Yet, the neural mechanisms underlying the development of deductive reasoning remain poorly understood. Here we investigated whether the brain regions that support deductive reasoning differ from those that underlie everyday probabilistic reasoning in 8- to 13-year-olds. In a functional magnetic resonance imaging (fMRI) scanner, children were presented with conditional premises and were asked to evaluate a conclusion either based on deductive or probabilistic instructions. We found that performance under deductive instructions was associated with activity in the left inferior frontal gyrus and posterior medial prefrontal cortex, whereas performance under probabilistic instructions was associated with activity in the right inferior frontal gyrus, anterior medial prefrontal cortex, and bilateral parietal cortex. Thus, making deductive inferences from conditional premises relies on brain mechanisms that qualitatively differ from those involved in making probabilistic inferences from similar premises in children. Implications for theories of deductive reasoning and education will be discussed.

Strategy over operation: Neural activation in fact retrieval and procedural strategy use in children

**Presenting Author:** Brecht Polspoel, KU LEUVEN, Belgium

**Co-Author:** Leen Peters, KU Leuven - University of Leuven, Belgium

**Co-Author:** Bert De Smidt, KU Leuven - University of Leuven, Belgium

Adult fMRI studies have indicated that activation in the arithmetic brain network is modulated by strategy use. However, little is known to which extent the use of different strategies affects the arithmetic network in children. Therefore, we used trial-by-trial verbal strategy reports, investigated the neural underpinnings of different types of strategy use during arithmetic in children. Participants were 23 typically developing 4th graders (9- to 10-year-olds). In a behavioral session, all children were asked to solve 100 subtraction and multiplication items, and to verbally report on a trial-by-trial basis how they had solved them. Next, in the fMRI scanning session, the children were presented with 80 of those items. With an event-related design, we were able to analyze the brain responses during retrieval or procedural strategy use, based on the children’s verbal reports in the behavioral session. During retrieval, we observed increased activity in the bilateral medial temporal gyrus, hippocampus, medial frontal gyrus and inferior parietal lobe. For procedural strategies, activation increases were observed in the bilateral superior parietal lobe, middle and inferior frontal gyr, insula and inferior occipital gyr. No differences were found between multiplication and subtraction, indicating that differences across items were driven by strategy use and not by the operation at hand. These data add to a better understanding of the development of mathematical skills at the biological level, which in turn can refine current psychological theories and improve interventions.

The neuroscience of learning: issues in modeling cognition and learning contexts

**Presenting Author:** Julien Mercier, University of Quebec in Montreal, Canada

**Co-Author:** Pierre Chabot, User Research Lab – UQAM Montreal, Canada

**Co-Author:** Kamran Sheikhi, University of Quebec in Montreal, Canada

**Co-Author:** Babak Khosrovifar, University of Quebec in Montreal, Canada

The optimization of learning contexts requires pertinent information corresponding to the rate of change of characteristics of interest pertaining to the learner and to the learning context. Such characteristics can change from state to state very rapidly. Indeed, context is seen as a cascade of top-down and bottom-up processes across behavioral and psychophysiological layers in a cognitive architecture (Anderson, 2002). Moreover, a learning task and accompanying context can be conceived of as a hierarchical decomposition of operations which, cumulatively and sequentially, are necessary to complete the task successfully. Such a multi-layered view of cognition, learning tasks and contexts provides a property that can serve as a cornerstone for the neuroscience of learning: as complexity increases, speed decreases, and as complexity decreases, speed increases. Capturing change at these various timescales and complexity levels requires both psychophysiological and behavioral data recorded concomitantly and presents significant challenges (Mercier, & Chairland, 2013a; 2013b).

The goal of this presentation is to illustrate an innovative cross-disciplinary methodology to define and track dynamic aspects of cognition and of a learning context as they unfold in time at various timescales during an initial episode of play with a video game, which aims specifically at developing a minimal level of mastery of the game’s core mechanics (combat, crafting, economy, etc.). This approach could help bridge the gap between cognitive neuroscience and cognitive psychology in the study of learning and could contribute insights in the design of learning environments.

**Session H 197**

31 August 2017 10:15 - 11:45

Main Building A - A3

Symposium

Teaching and Teacher Education

The evolution of PCK of history teachers.

**Keywords:** Competencies, History, In-service teacher education, Inquiry learning, Meta-analysis, Pre-service teacher education, Qualitative methods, Quantitative methods, Teacher Professional Development, Teaching / instruction, Teaching approaches

**Interest group:** SIG 11 - Teaching and Teacher Education

**Discussant:** Janett van Drie, University of Amsterdam, Netherlands

**What makes a history teacher? An empirical review of PCK in History.**

**Presenting Author:** Hanneke Tuitel, Utrecht University, Netherlands

**Co-Author:** Albert Logtenberg, Leiden University, Netherlands

Pedagogical Content Knowledge is teachers’ knowledge about the transformation of subject matter knowledge to achieve enhanced student learning. To explore emerging research on history teachers’ PCK in secondary education, 34 empirical studies that investigated beginning and experienced teachers were reviewed. We examined the conceptualization and operationalization of PCK and PCK development in empirical educational research. These mainly American articles examine PCK on the basis of a small number of teachers and qualitative instruments. Moreover, they also refrain from giving a systematic definition of PCK, which makes it difficult to link the outcomes to other domains. However, we do point to specific avenues for further PCK research.

**Test-Development for a standardized instrument to measure PCK of future history teachers**

**Presenting Author:** Nicola Brauch, University of Bochum, Germany

**Co-Author:** Joanna Seifert, Ruhr-University Bochum, Germany

**Co-Author:** Andreas Seifert, University of Paderborn, Germany

**Co-Author:** Martin Rothland, Siegen University, Germany

**Co-Author:** Joergen Wolf, Ruhr-University Bochum, Germany

Before moving in their practical teacher training, German students of History education (Master of Education in History) attend several courses to learn about the theoretical principles and hands-on planning activities to prepare History lessons in school. Although there has scarcely been empirical research about professional competence development in the domain of History education for the German context yet...
one can identify a conventional set of concepts students learn in university courses. In order to gain a standardized test instrument to measure students' concepts in cognitive knowledge and related activities to plan a lesson 165 items have been constructed. A framework covering four dimensions representing PCK’s facet of knowledge of instructional strategies and representations has been modelled. In a study (N= 365) these four dimensions could be confirmed as distinct parts of PCK’s facet of knowledge of instructional strategies and representations in the sense of planning skills. The four constructs are knowledge about (1) concepts and aims, (2) structuring principles, (3) learning material and (4) tasks.

Developing student history teachers’ PCK: an introductory training on inquiry-based learning
Presenting Author: Michel Voel, Ghent University, Belgium
Co-Author: Bram De Wever, Ghent University, Belgium
This study focusses on the development of student history teachers PCK, and, in particular, their implementation of inquiry-based learning (IBL) activities in the classroom. A workshop was developed to impart student teachers (n=36) with the knowledge necessary to organize IBL. After attending this workshop, student teachers were required to teach an IBL activity during their teaching internship. Their work in practice was examined through: a questionnaire administered at three different times, the lesson plan of the IBL-activity, two reflection papers, and an interview. Three lesson templates emerged from student teachers’ work: a fit in the blanks, synthesis and inquiry lesson. These templates differed with regard to (1) the structuring they provided, and (2) the required student mental activity. Next to providing concrete illustrations of these three lesson templates, the presentation will also explore the relation between student teachers’ choice for a particular template and (1) their beliefs related to IBL, as well as (2) influences of the context of the internship context.

The homogeneity of Dutch experienced history teachers’ PCK in a curriculum innovation
Presenting Author: Hanneke Tuit, Utrecht University, Netherlands
Co-Author: Larrie Bronkhorst, Utrecht University, Netherlands
Co-Author: Jan van Tartwijk, Utrecht University, Netherlands
In this study we examine the content and context dependency of PCK of experienced history teachers in the specific context of a radical curriculum innovation. Until now researchers have rarely described or compared the concrete PCK of two or more concepts. We capture the PCK of sixteen Dutch experienced history teachers on two substantive concepts that are part of a new history curriculum, namely (1) the clash between Greco-Roman culture and the Germanic cultures of North-West Europe and (2) waging World Wars I and II. Our research question is a dual one: firstly, to what extent is history teachers’ PCK homogenous on two different concepts in this history curriculum? And, secondly, how can we explain the degree of the homogeneity in history teachers’ PCK? On balance, there seems to be a continuum in the homogeneity history teachers’ PCK: at one end of this continuum the PCK seems less homogenous and more related to one of the substantive concepts mentioned above. At the other end of the continuum, history teachers’ PCK seems more homogenous, where we relate to the fact that these teachers have the same subject-related goals for both substantive concepts. The continuum as a whole reaffirms the content and context dependency of PCK. We also discuss the significance of our outcomes for the debate regarding the role of the PCK element teaching orientation.

Session H 198
31 August 2017 15:15 - 11:45
Pers B - Bat 16 Symposium
Instructional Design
How am I doing? Improving students’ self-assessments
Keywords: Achievement, Educational Psychology, Experimental studies, Instructional design, Metacognition, Motivation, Qualitative methods, Self-regulation
Interest group: SIG 16 - Metacognition
Discussant: Anique de Bruin, Maastricht University, Netherlands
Providing Feedback on Self-Assessments: Effects on Subsequent Self-Assessment and Task Selection
Presenting Author: Steven Raaijmakers, Utrecht University, Netherlands
Co-Author: Marine Baars, Erasmus University Rotterdam, Netherlands
Co-Author: Fred Paas, Erasmus University Rotterdam, University of Wollongong, Netherlands
Co-Author: Jeroen Van Merrienboer, Maastricht University, Netherlands
Co-Author: Tamara Van Gog, Utrecht University, Netherlands
Monitoring and control are key components of self-regulated learning (SRL). Students’ monitoring accuracy is often low, which negatively affects subsequent regulation (control) of study behaviour (e.g., prematurely terminating study, or studying unnecessarily long; selecting a too easy or too difficult subsequent task). Consequently, SRL often leads to suboptimal learning outcomes. It is thus imperative for educational researchers to investigate ways to improve students’ monitoring accuracy. One effective instructional intervention consists of training students’ self-assessment (monitoring) and task selection (control) skills with video modeling examples, in which students observe another person (the model) engaging in self-assessment and task selection. However, even after this training, there remains room for improvement in students’ self-assessments. Therefore, the present study investigated whether scaffolding self-assessments with accuracy feedback after the training, would improve the accuracy of concurrent task selection, as well as their future self-assessment and task-selection decisions in the absence of the feedback. Students either received no feedback, general feedback (i.e., information regarding the accuracy/inaccuracy of their self-assessment and information regarding the number of correct steps) or specific feedback (i.e., information regarding the accuracy/inaccuracy of their self-assessment and information regarding which steps were correct/incorrect). Contrary to our hypothesis, however, self-assessment accuracy feedback did not affect concurrent task-selection accuracy and even led to less accurate future self-assessments and task selection. Possible explanations are discussed.
Providing Standards both with and without Idea-Units to improve Calibration Accuracy
Presenting Author: Marloes Nederhand, Erasmus University Rotterdam, Netherlands
Co-Author: Hub Tabbers, Erasmus University Rotterdam, Netherlands
Co-Author: Remgius (Remy) Rikkers, UCR / Utrecht University, Netherlands
Previous research showed that providing standards can improve calibration accuracy of students. However, low performers are less accurately calibrated than high performers, even when both groups receive standards. This experimental study investigated whether providing students with extra guidance how to use standards would remedy the significant difference in calibration accuracy between high and low performers. We hypothesized that by providing extra guidance, all students become equally able to compare their own answer to standards (i.e., significant differences in calibration accuracy will disappear). Students with participants with tasks that contained key terms. Students had to recall the correct definition of each key term and had to estimate the quality of their recall. One half of the participants received full definition standards while the other half of the participants received idea-unit standards while estimating their performance. Data is being gathered at the moment and results will be discussed during the symposium.

Effects of Informing Fifth Graders About the Dangers of Making Overconfident Judgments of Learning
Presenting Author: Julian Roelfe, Bielefeld University, Germany
Co-Author: Kirsten Berthold, University of Bielefeld, Germany
Learners often insufficiently monitor their level of comprehension, which results in overconfident judgments of learning and underachievement. One reason for insufficient monitoring is that learners do not know the high frequency of the and the detrimental consequences that result from overconfident judgments of learning (i.e., providing information about the dangers of making overconfident judgments of learning has recently been introduced as an approach to foster comprehension monitoring. However, although this information is provided during the course, it is reasonable to assume that its benefits depend on learners’ monitoring skills; if learners’ lack monitoring skills, informing them as to why investing effort in monitoring is important could be of little use. To address this potential moderator, we tested the effects of the approach of informing learners about the dangers of making overconfident judgments of learning in a study with fifth grade high school students (N = 47). Based on previous research, it was reasonable to assume that learners without monitoring skills to a large extent. As main results, we found that informing the learners about the dangers of making overconfident judgments of learning neither fostered monitoring nor reduced overconfidence in a subsequent learning phase. We conclude that, at least, this is not combined with components that focus on fostering monitoring skills, informing learners about the dangers of making overconfident judgments of learning is not necessarily a promising approach to foster monitoring in all situations.

The Calibration Process Among Proficient and Low Calibrators: A Qualitative Approach
Presenting Author: Antonio Gutierrez de Blume, Georgia Southern University, United States
Co-Author: Pamela Wells, Georgia Southern University, United States
Co-Author: Jason Parker, Georgia Southern University, United States
Traditional research on the metacognitive practice of calibration has been primarily investigated within the realm of quantitative experimental methodologies. This article expands the research scope of metacognitive calibration by offering a qualitative approach to the growing body of literature. More specifically, the current study investigates the learners’ perspective on the calibration process. Ten undergraduate students were selected to participate in an interview-based study on their previous performances (five students in calibration processing and five proficient in calibration processing). Ultimately nine students (N=9) participated in individual interviews. Participant interviews were qualitatively assessed through the mediums of (1) Sierra and Matafoli’s original work on the “feelings of knowing” and (2) self-regulated learning theory (SRL). Results indicate a difference in feelings of knowing between low proficient calibrators across a battery of themes: effort, strategies, planning, and evaluation. Implications of the results and direction for future research are explored.

Session H 199
31 August 2017 15:15 - 11:45
Main Building C - C7 Symposium
Developmental Aspects of Instruction, Educational Policy and Systems
Curriculum, pedagogy, and classroom quality: Promoting effectiveness of early childhood education
Keywords: Assessment methods and tools, Case studies, Comparative studies, Early childhood education, Educational policy, Educational Psychology, Qualitative methods, Social interaction, Teaching / instruction, Teaching approaches
Interest group: SIG 05 - Learning and Development in Early Childhood
Discussant: Antje von Sochudelitt, New York University Abu Dhabi, United Arab Emirates
Towards a new ECE curriculum for Europe: findings from the CARES research project
Presenting Author: Kathy Sylva, University of Oxford, United Kingdom

The paper summarises findings on the broad curricular goals of ECEC with regards to children’s development, learning and wellbeing. It is based on two studies carried out in a broadly representative sample of European countries: a survey on curriculum completed by ‘research experts’ in 11 countries, and a face-to-face interview or on-line survey of parents’ (N = 2,500 parents) goals regarding ECEC carried out in nine countries. This paper concerns the expert and the parent surveys to chart the conceptual and empirical landscape in which the symposium’s papers are located. It shows that despite an enormous range in the approaches of combining evidenced-based content, there is a lack of clarity on the way that learning is a particular learning related to intellectual goals – is conceptualised. Although experts and parents agree that the curriculum for children at age 3-6 should be more ‘cognitive’, there is no consensus on the pedagogy that will best support the development of content knowledge or of ‘executive skill’ such as problem solving or teamwork.

Complex relations between structural characteristics and process quality in ECEC across Europe

Presenting Author: Pauline Slot, Utrecht University, Netherlands

Co-Author: Marja-Kristiina Leikkanen, University of Jyväskylä, Finland

Co-Author: Paulus Leseman, Utrecht University, Netherlands

Relations between structural process and quality in early childhood education and care (ECEC) provisions have been extensively studied with mixed and inconsistent findings. Although these inconsistent findings might in part be due to strong and country specific regulation, which results in restricted variance, it may also point to more complex relations of different structural aspects interacting with each other and jointly affecting process quality. The aim of this paper is to unravel these associations by looking at possible combined and interaction effects of structural features at the teacher, classroom and centre level on observed process quality in several European countries. The results can inform policy and practice in view of enhancing process quality in ECEC settings.

How does process quality vary according to the classroom activities? A multiple case study

Presenting Author: Joana Cadima, University of Porto, Portugal

Co-Author: Janni Salminen, University of Jyväskylä, Finland

Co-Author: Pauline Slot, Utrecht University, Netherlands

Co-Author: Marja-Kristiina Leikkanen, University of Jyväskylä, Finland

The current study investigates the extent to which the quality of interactive processes varies across different types of activities in ECEC centers from seven European countries. Using common methodological framework, 4 ECEC centers per country, in a total of 28, were selected. Videos were made out of four common types of activities in ECEC centers (play, care routines, educational, creative), resulting in a total of 154 videos. Videos were scored by certified researchers from three countries using a standard observational tool (CLASS-Kindergarten and CLASS Pre-K). The results showed that observed classrooms scored high in emotional support and behavior support/classroom organization. However, there was considerable variation across types of activities and age of the children in the level of instructional support and consideration for child perspectives. In 3-6-year-old classrooms, educational activities seemed to represent moments in which educators facilitated children’s broader conceptual understanding of concepts and ideas. Opportunities for learning varied based on type of activities in 0-3 classrooms. Across 0-3 and 3-6 classrooms, play activities provided the best opportunities to follow child lead, consider children’s opinions and follow their initiations. Results will be discussed in view of how different types of activities can be intentionally used by educators to potentiate different types of interactions.

Educational dialogues in toddler classrooms

Presenting Author: Helena Rasku-Puttonen, University of Jyväskylä, Finland

Co-Author: Janni Salminen, University of Jyväskylä, Finland

Co-Author: Heli Muhonen, University of Jyväskylä, Finland

Educational dialogue (ED) refers to extended verbal exchange between teacher and children, striving to joint understanding. Daily situations in toddler classrooms enable discussions, but variation in the quality of teacher-child interactions and teacher’s pedagogical support creates differing opportunities for EDs to emerge from classroom to classroom. Within this study we ask: What kind of patterns of ED can be identified from toddler classrooms? How do teachers’ pedagogical practices support and enhance ED? And how do teachers’ quality reflect the similar characteristics with ED? Data were gathered in seven European countries as part of the CARE project. Within this study, video recordings from emerging academic activities and free play situations in 2–3-year-olds classrooms (n = 28 videos; 20 min each) were analyzed. The episodes of EDs were identified along the set of criteria (Maag et al., 2006; Muhonen et al., 2016) and analyzed with respect to teacher’s pedagogical practices, functions of talk and the quality of teacher-child interaction (CLASS-Kindergarten: La Paro et al., 2012). Modest amount of EDs were identified within toddler classrooms along with emerging EDs. Maintaining ED required the teacher to sensitively listen to children’s developing verbal expressions and pose straightforward and simple questions (relating to concrete hands on materials or to children’s daily experiences). The results indicated a relation between the CLASS dimensions and the depth of EDs. The results will benefit teacher training by increasing teacher awareness of the potential of shared talk in the toddler classrooms.

Session H 200

31 August 2017 10:15 - 11:45

Main Building D - D168

Symposium

Motivational, Social and Affective Processes

New research perspectives on interest development in science education

Keywords: Biology, Case studies, Emotion and affect, Mixed-method research, Motivation, Motivation and emotion, Primary education, Science education, Secondary education

Interest group: SIG 08 - Motivation and Emotion

Discussant: K. Ann Ravivinger, Swarthmore College, United States

A teacher’s growing interest in science: Developing alongside Kindergarten students

Presenting Author: Kimberly Pressack-Kiborn, University of Technology, Sydney, Australia

A number of researchers recently have investigated the facilitative role that teachers can have in supporting their students’ interest development. Conversely, however, there is little research that has examined the process of the growth in teachers’ interest that is promoted through working with interested students. This paper reports on a case study of a Kindergarten teacher whose own interest both in teaching science and in the discipline of science, has been nurtured and maintained over time in the context of her classroom teaching experiences. Valiser’s theoretical notions of canatisation and self-canisation are drawn on, to analyse and interpret qualitative data gathered over three years through a series of in-depth interviews with the teacher, classroom observations and annotated class programs. The findings focus on the development of (1) the nature of the teacher’s interest, and (2) interactions with students and characteristics of the classroom teaching and learning context that constrained and promoted her own pedagogical and discipline-based interest. This case study highlights the bi-directional relationship between students’ interests and the teacher’s interest, as the teacher moves towards developing a professional identity more strongly inclusive of that of ‘science teacher’. Furthermore, evidence is provided for the importance of responsive, playful, inquiry-based approaches in the early years of schooling in promoting the teacher’s interest and sense of wonder, not only in the students’.

Development of Secondary school students’ interest and academic emotions over science lessons

Presenting Author: Kalle Juuti, University of Helsinki, Finland

Co-Author: Susi Marjanen, University of Helsinki, Finland

Co-Author: Jari Lavenon, University of Helsinki, Finland

Co-Author: Katarina Sahne-Aro, Helsinki Collegium for Advanced Studies, Finland

Co-Author: Jennifer L. Ruby, Michigan State University, United States

Co-Author: Joseph Krakip, Michigan State University, United States

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In developed countries, there is lack of students’ engagement in school science learning. Too few students select a science track in secondary school and then gravitate in a science-related field. It is known that in a classroom, it is possible to influence students’ academic emotions through the interaction style and teaching and learning methods selected. In order to help teachers to tackle this problem of the lack of engagement in science learning, it is important to understand the development of the students’ academic emotions in classroom situations. This paper presents the development of students’ interest and academic emotions over 12 science (chemistry or physics) lessons in nine classrooms. We applied the experience sampling method (ESM) in order to investigate students’ interest and academic emotions, namely feelings of success, confidence, effectiveness, happiness and enjoyment, anxiety, stress, confusion, and boredom in specific science learning situations. During a science lesson, students were asked to respond three times in the mobile phone delivered questionnaire that measured their interest and academic emotions in the specific situations. The ESM questionnaires were synchronized, thus the students in one class responded at the same time. The time Academic emotion-graphs show that (1) academic emotions fluctuate over the lessons, (2) there are evident gender differences, and (3) academic emotion mean values of all classes appear to be rather stable over the time. The Time Academic emotion –graphs emphasize that situational interest and emotions may be rather easy to trigger, but difficult to maintain.

Students’ perceptions of time in learning tasks supporting or lacking interest development

Presenting Author: Morten Risk Petersen, University of Southern Denmark, Denmark

Co-Author: Nicolai Frydersbjerg Elf, University of Southern Denmark, Denmark

Interest and learning are interdependent. In this study, the process of learning is seen as an enhancer of interest. This means that interest develops as students learn about the topic they are working with. It is through discovering the accessible learning in a task that students become interested, and willing to place effort in that task. In the present research, 19 interested and non-interested upper secondary biology students were studied in regard to their perceptions of time usage in a 4 hour simulation of natural selection. While non-interested students did not find it worthwhile, the interested students did but did not see any potential in prolonging the time frame for the exercise. This could be due to the available time for the task being set in advance without scope for negotiation or flexibility, but further research is needed to support such claims.

Psychological perspectives on ‘negative’ interest development in science education

Presenting Author: Niels Dohn, Aarhus University, Denmark

Co-Author: Nikolaj Frydersbjerg Elf, University of Southern Denmark, Denmark

There is a distinct lack of theoretical constructs that describe and explain ‘negative’ interest development, i.e. the transition from a well-developed individual interest in a school science domain toward lack of interest. In this study, we have followed one Danish student through six years. In grade 9, she had a strong interest in school science domains – especially physics. However, through gymnasium (grade 10-12) her interest declined because she felt that physics became more and more challenging. In order to explain this ‘negative’ interest development, we suggest that interest in physics instruction is closely related to the students’ physics-related self-concept, i.e. the picture students have of their own ability and competence in physics. Our data suggest that this student’s feelings of being ‘insideously challenged’ a revision in her values and motives through her transition from grade 9 to grade 10,12, which had a negative impact on her self-concept, resulting in loss of interest. The physics-related self-concept
This study focused on Finnish vocational teachers’ professional agency and its connection with positive adaptation in the stream of an educational reform. Professional agency refers to the notion that teachers affect matters, make decisions, and negotiate regarding their work and their professional identities (including their professional goals and interests). To investigate teachers’ positive adaptation to changes from the perspective of professional agency, we conducted a qualitative meta-analysis based on five interview studies. We found that the teachers experienced a lack of influence on the contents and conditions of their teaching and that they therefore expressed resistance and criticism. Despite lacking these kinds of opportunities to enact professional agency, the teachers did not refuse to implement the reform. However, their pathways within the reform varied according to their opportunities to act in respect of their professional identity. The most positive adaptation pathways (involving increased commitment and enthusiasm) emerged when the teachers were truly able to realize their professional identities, or to renegotiate their professional identities to correspond with the changing work, on the basis of pleasant emotions gained during the change. The study provides an agentic perspective on teachers’ adaptation in the context of vocational education reforms. To decrease the teachers’ resistance to the reforms, and to foster positive adaptations, there is a need to support their professional agency in relation to both reform practices and professional identity.

Vocational school novice teachers’ perceptions of school climate and self-efficacy
Presenting Author(s): Eve Eisen Schmidt, Tallinn University, Estonia
Co-Author(s): Mariliis Meristo, Tallinn University, Estonia

Vocational school novice teachers’ perceptions of school climate and self-efficacy play an important role in their decision to stay in profession. Many countries are facing problems related to teacher shortage and teachers leaving the profession. Therefore it is essential to study how novice teachers adapt to professional challenges. The present study explored how novice teachers (N=125) perceive the school climate and self-efficacy and how these phenomena are interrelated. However, this paper sets a focus on vocational teachers who were part of the sample. Analysis of variance, correlations and multiple regression were performed. Most school climate aspects correlate positively with self-efficacy aspects. Cohesiveness appeared to play the most predictive role in self-efficacy beliefs. The findings show that vocational school novice teachers have lower self-efficacy beliefs, and positive adaptations to school climate and self-efficacy are lower among novice teachers and they also showed lower level of self-efficacy in school climate aspects.

What support vocational teachers’ work engagement? Explorative study among Swedish VET teachers
Presenting Author(s): Viviana Sappa, Swiss Federal Institute for Vocational Education and Training (SVI/VET), Switzerland
Co-Author(s): Elina Bokkrist, Swiss Federal Institute for Vocational Education and Training, Switzerland

In the field of teacher education there is an increasing interest in understanding how to effectively develop teachers’ active engagement and well-committed professional identity. With this respect, several scholars have investigated those individual and contextual resources that foster teachers’ work engagement, the latter being defined as a positive, fulfilling, work-related state of mind. However, further studies are needed to examine how individual and contextual resources contribute to support teachers’ work engagement particularly in the vocational education and training (VET) context. Based on a preliminary determination of non-trivial intervention aims at exploring how individual and contextual resources impact on VET teachers’ work engagement. A total of 64 Swiss teachers were involved in the data collection by means of an online self-reported questionnaire. Work engagement was assessed by using the Utrecht Work Engagement Scale (Schaufeli, Bakker, & Salanova, 2006). In addition, three sets of the Utrecht Work Engagement Scale were related to investigate perceived resources (i.e. school-related resources, teaching-related competences and resiliency resources). Data analysis combined simple and multiple regressions and Structural Equation modeling procedures. Findings show the following effects: a) resiliency resources have the strongest direct and positive impact on work engagement; b) teaching-related competences influence work engagement directly as well as indirectly by fostering resiliency resources; c) school-related resources impact positively on teaching-related competences and resiliency resources; on the contrary they do not have any significant effect on work engagement. Implications for research and teaching education have been outlined.
In perspective of literacy skills for the 21st century, children in primary school read hypertext for comprehension. However, children typically are taught reading strategies for linear text, while these strategies are not automatically transferable one-to-one to hypertext. In the present study, a training group of 55 sixth-graders were taught four hypertext reading strategies (planning, monitoring, evaluation and elaboration) via mind mapping and the use of a prompting paper card. A control group of 29 children received no strategy training. We examined to what extent strategy training influenced children’s strategy use and learning outcomes: (1) number of pages read and reading time per text, (2) explicit / implicit reading comprehension scores and (3) knowledge representations (relatedness judgment task and mind maps). At posttest, the training group showed higher scores on a self-reported strategy usage questionnaire, higher comprehension scores, and more advanced mind maps as compared to the control group. It can be concluded that hypertext strategy training in combination with mind mapping supports children’s hypertext comprehension.

**Learning to construct navigable concept maps with eye-movement modelling examples**

**Presenting Author:** Ludmila Salmon, University of Valencia, Spain  
**Co-Author:** Dacia Victoria, University of Valencia, Spain  
**Co-Author:** Franck Amadieu, University of Toulouse, CELLE, France

Navigable concept maps are a hybrid document that combines hypertext and concept maps (Amadieu et al., 2015), in which readers not only navigate between hypertext nodes, but also create links between such nodes to create a concept map. Preliminary studies revealed that teenagers confront comprehension difficulties with hypertext, as compared to a hypertext with navigable maps (Garcia, Salmon, Amadieu, & Cegarra, 2013). In this study we tested an instructional program to teach teenagers how to navigate and create maps. Specifically, our program included the phases for the construction of concept maps: planning, organizing and reviewing developed by Hilbert and Reitl (2009), with which we incorporated a navigation phase. Two groups of sixth graders were randomly assigned to the two conditions. The control group discussed in pairs a series of videos depicting students’ actions and verbalizations while navigating and constructing maps. The experimental group followed a similar procedure, but added to the videos the students’ eye-movements (EMMEs). In the pre and post test sessions students created a navigable concept map using the CMaps tool. No difference between groups was observed for an immediate comprehension test. Students from the EMME group identified better the phases illustrated in the videos during the intervention, and wrote better one-day delayed summaries of the hypertexts in the post-test. Those results indicate that EMMEs are a powerful instructional tool to instruct reading and navigation in complex digital formats.

**Session H 203**  
31 August 2017 15:15 - 11:45  
Pinill B - B3107  
Symposium  
Educational Policy and Systems

**Learning to learn in Italy and in Latin America**

**Keywords:** Competencies, Learning approaches, Metacognition, Self-regulation  
**Interest group:** SIG 16 - Metacognition  
**Organiser:** Cristina Stringher, Istituto Nazionale per la Valutazione del Sistema Educativo di Istruzione e di Formazione (INVALSI), Italy  
**Discussant:** Amparo Moreno, Universidad Autónoma de Madrid, Spain

**Learning to learn in Italy and in Latin America: a systematic literature review**

**Presenting Author:** Cristina Stringher, Istituto Nazionale per la Valutazione del Sistema Educativo di Istruzione e di Formazione (INVALSI), Italy

This presentation sets the stage for subsequent symposium contributions. Italy is providing the research background against which the literature review has been conducted. Each presenter in the symposium is developing the central theme according to a specific viewpoint.

In 2014, Deakin Crick, Stringher and Ren edited the book Learning to Learn. International perspectives from theory and practice. The book collected significant experiences from twenty authors in eleven countries and four continents. In spite of this massive effort, learning to learn lacked a shared understanding among book authors.

In 2015, the need to deepen knowledge on Learning to learn emerged from schools in Italy. From this need, INVALSI drafted an international project. Its focus is to understand the development of this key competence in different cultures, in order to sustain its acquisition.

The symposium will refer to the first project phase: the systematic literature review carried out in 2016 in order to inform the theoretical framework of the entire project. This paper in particular reports on the international review methodology and initial outcomes.

Italian and Latin American references mainly deal with theoretical issues and very few are the empirical studies. The main difference lies in the depth of theoretical arguments, with a few Latin American studies tackling the challenge to define the concept in a wide conception according to Housell (1979).

The presentation addresses the other results of the review by research question and concludes with relevant policy and practice contributions to the learning to learn research agenda.

**Learning to learn in Mexico**

**Presenting Author:** Hugo Armando Brito Rivera, Metropolitan Autonomous University, Mexico

This study has been conducted with the same methodology already presented in the first contribution within the overall project. Results are based upon forty references selected based on the shared research objectives and research questions according to research questions.

Learning to learn in Mexico seems a quite developed field of study which deserves the attention of the international community for its breadth and depth. The paper addresses historical roots of the concept in the reviewed Mexican literature and presents current research, experiences and research tools developed locally.

Learning to learn in the 70s was conceived around to two problematic areas: a) the obstacles and personal limitations (disorganization, inconsistency, etc.); b) the development of critical thinking. Currently, the need for this competence stems from the complexity of contemporary societies.

Nationally, very few studies have been developed around strategies, resources and exercises linked to learning to learn at all levels of education. Such a set of works, theoretical and practical, is divided into two types: a) contributions focused on activities for students; b) texts aimed at teachers.

Another group of studies focuses on the reflection and analysis of the institutional change needed in order to make learning to learn a central element in schools and universities, in a collaborative effort typical of organization studies, whose actors are organized in communities of practice, for the development of shared competence and organizational learning.

Critique on Mexican conceptions of this competence yield to the need to further examine it theoretically and empirically.

**Learn how to learn in Brazilian intellectual production**

**Presenting Author:** Claudia L. F. Davis, Fundação Carlos Chagas // PUC-SP, Brazil

This paper aims to analyze how the studies about ‘learning to learn’ are displayed in Brazilian intellectual productions, reviewing articles and books published from 2000 to 2016. Two perspectives were found: cognitive psychology sees ‘learning to learn’ as the acquisition, mastery and use of cognitive and metacognitive strategies, encouraging continuous learning throughout life in order to promote student’s autonomy and independence; (b) the historical materialist and dialectical view, emphasizing the social nature of education, criticizes the prevailing notion of learning by focusing in individual processes, disregarding the contents of public schooling and the reasons why they must be learned. The former perspective, in this view, is seen only as an ideological subtext of capitalism to improve the ruling class education, making the one offered to the dominated class innocuous. The two perspectives go in parallel, without profiting from a dialogue between them. In such circumstances, knowledge about ‘learning how to learn’ difficulty will progress and those who work at school will hardly benefit from its findings.

**Components of learning to learn in Italy and in Latin American countries**

**Presenting Author:** Paolo Di Renzo, University Roma Tre, Italy  
**Co-Author:** Estefania Garcia Gonzalez, University of Valladolid, University of Roma Tre, Spain

Learning to learn is not univocally conceived in scientific literature. However, this concept is playing an important role in most education policies, and constitutes one of the main bridging knowledge societies.

Our study is focused on the current understanding of the Learning to learn concept in Latin America. To this aim, the research group performed a systematic literature review of scientific articles addressing this topic in Latin American countries.

In this paper we report on a specific aspect of the literature review: the analysis of Latin American definitions. For our purpose, we used the resources published by Latin American authors that have been collected and selected by the research group according to the overall project methodology as detailed in Stringher’s presentation within this symposium. From this database, we further selected articles with definitions of Learning to learn (whenever present) and constructed an analysis table. Finally, we performed a qualitative analysis on the identified definitions with respect to the Learning to learn components according to Stringher (2014).
The results of our research show important differences between Latin American countries concerning the understanding and definition of Learning to learn. From a general perspective, the state-of-the-art Learning to learn components are not explicitly mentioned in most of the analyzed contributions. However, we could observe some aspects closely related to the topic, such as the cognitive, metacognitive, affective and social dimensions.

We conclude by suggesting further work on the conceptualization of Learning to learn for its assessment in Italy and in Latin American countries.

Session H 204
31 August 2017 10:15 - 11:45
Main Building A - A2B
Symposium
Assessment and Evaluation, Higher Education, Learning and Instructional Technology, Learning and Social Interaction
Advances in the Assessment of Scientific Reasoning and Argumentation Across Disciplines
Keywords: Argumentation, Assessment methods and tools, Collaborative Learning, Conceptual change, Conversation / Discourse analysis, Higher education, Learning Technologies, Mathematics, Problem solving, Qualitative methods, Quantitative methods, Reasoning, Secondary education, Student learning, Teaching / instruction
Interest group: SIG 01 - Assessment and Evaluation, SIG 07 - Learning and Instruction with Computers, SIG 26 - Argumentation, Dialogue and Reasoning
Discussant: Andrés Tricot, University of Toulouse, GfLE, France
Productive argumentation for conceptual change learning
Presenting Author: Christa Astedter, Hebrew University of Jerusalem, Israel

In this contribution, I focus on argumentation for subject-matter learning that requires the transformation of misconceived knowledge about natural phenomena towards the scientifically accepted, canonical account (conceptual change). In this line of research, “high quality argumentation” is defined empirically and ad hoc. Those dialogue features that are associated with learning gains are defined as productive. Through a line of empirical studies we have identified three features of productive argumentation for conceptual change: Critical reasoning, supportive collaborative interpersonal regulation, and a content-specific focus on key conceptual issues. We present coding schemes to assess these features and discuss the implications for the educational design and theory.

Conceptualizing context-related and formal quality aspects of mathematical argumentation and proof
Presenting Author: Sarah Ottinger, LMU München, Germany
Co-Author: Stefan Ullner, Ludwig-Maximilians-Universität (LMU), Germany
Co-Author: Ingo Kolter, University of Augsburg, Germany
Co-Author: Friede Vogel, Technische Universität München, TUM School of Education, Germany
Co-Author: Klas Schwaghofer, Ludwig Maximilians-Universität (LMU), Germany
Co-Author: Ika Trewedor, Ludwig Maximilians-Universität (LMU), Germany
Co-Author: Anselm Strohmaier, Technische Universität München, TUM School of Education, Germany
Co-Author: Kristina Reiss, Technische Universität München (TUM), Germany
Co-Author: Frank Fischer, Ludwig Maximilians-Universität (LMU), Germany

Mathematical argumentations are characterized not only by their deductive nature, but also by their formal presentation using variables and logical symbols. Students at all educational levels struggle with mathematical argumentation and proving. Constructing elaborate mathematical argumentations and proofs requires both the ability to find deductive lines of single arguments as well as skills to communicate these argumentations in a formally correct way according to mathematical standards. Even though these two sub-processes are intensively discussed in the literature, it is yet unclear to what extent they can be seen as independent from each other. In a study with N=159 students at the transition phase from secondary to tertiary education, students were asked to generate argumentations in elementary mathematics. We examined the quality of the content of mathematical argumentations and the quality regarding several formal aspects of their presentation as well as relations between the different quality indicators. The study replicates students’ problems in constructing mathematical argumentations. Moreover, the results indicate that not all, but some aspects of formal quality are related to the quality of the content of the argumentation which is presented. We discuss ways to conceptualize and operationalize different quality aspects of mathematical argumentation as well as implications of the results for further research.

Differential item functioning and bifactor model analyses in evaluating scientific reasoning tests
Presenting Author: Anisgar Otzi, Ludwig Maximilians-Universität Munich, Germany
Co-Author: Moritz Heene, Ludwig Maximilians-Universität (LMU), Germany
Co-Author: Janosch Weiden, Utrecht University, Netherlands
Co-Author: Jeroen Janssen, Utrecht University, Netherlands
Co-Author: Gвидет Еркенс, Utrecht University, Netherlands
Co-Author: Mieke Brokelmans, Utrecht University, Netherlands

Despite the importance of assessing higher education competencies in general and scientific reasoning in particular, past analyses in these areas have not used complex analytical designs. In this study, differential item functioning (DIF) and bifactor model analyses are used to evaluate the domain generally assumption of a scientific reasoning test and the overlap between scientific and general reasoning, respectively. A scientific reasoning test and three general reasoning scales were administered to 507 university students. The DIF analyses revealed up to five biased items most of them favoring biology students. A traditional comparison of means, phyics students had significantly higher scores, though. In the bifactor and correlation, scientific reasoning factor kept almost no unique variance after general reasoning had been controlled for. The overlap was less strong in traditional regression analyses. Thus, the newly deployed statistical methods provided insights that reached beyond statistical methods that were used in the past to analyze scientific reasoning tests. According to the results from these new methods, it is not possible to measure scientific reasoning in a completely domain-general way and the overlap between scientific reasoning and general reasoning is larger than previously thought.

Teacher reasoning about collaborative learning: the role of learning analytics
Presenting Author: Ingo Kolter, University of Augsburg, Germany
Co-Author: Ulf Weißen, Utrecht University, Netherlands
Co-Author: Jeroen Janssen, Utrecht University, Netherlands
Co-Author: Gвидет Еркенс, Utrecht University, Netherlands
Co-Author: Mieke Brokelmans, Utrecht University, Netherlands

Teachers support is essential for collaborative learning to be successful. In turn, teachers need to be able to reason about how to support students based on scientific theories and evidence. Teachers may be stimulated to do so when students’ collaborative interactions are judged in an objective and reliable way. Learning analytics, the automated analyses and visualization of student data, could be a means to do so by analyzing and aggregating data about students in specific ways. By means of a simulation study, we investigated the effects of providing teachers with learning analytics. It was found that the mean frequency of interventions was significantly higher when teachers had access to LA, and that their interventions were relatively more often directed at problematic groups than at non-problematic groups. The study represents a step towards even simulating analytics of student activities informing teacher collaboration and an important direction for future research is to consider in which ways learning analytics could play a role for teacher professionalization in terms of more advanced visualization and analyses of student data.

Session H 205
31 August 2017 11:15 - 12:45
Pent A - Paavo Kari
Symposium
Cognitive development from late childhood to adolescence: Challenges for education
Keywords: Achievement, Cognitive development, Cognitive skills, Developmental processes
Interest group: Multumi Imai, Keio University, Japan
Who makes use of prior knowledge in a curriculum on proportional reasoning?
Presenting Author: Daniela Nussbaumer, HH Zurich, Switzerland
Co-Author: Ralph Schumacher, ETH Zurich, Switzerland
Co-Author: Elisabeth Stenn, ETH Zurich - Research on Learning and Instruction, Switzerland
Understanding proportions is a time intensive process that does not come cheap during late childhood and early adolescence. It is fostered by learning experiences in which students have opportunities to explore, discuss and experiment with situations involving proportions (van Hoë et al., 2015). Children have to undergo many informal learning opportunities before they can gain from direct instruction on proportional reasoning. In this study, we want to find out whether physics curricula dealing with the concept of density will prepare for learning from a curriculum on proportional reasoning. A 2x2 design with the factors “Physics curricula” (with, without) and “Concept used to introduce proportional reasoning” (speed, density) was applied to altogether 253 children coming from 12 classrooms at the beginning of grade 5. We expected the group “density, with physics curriculum” to outperform the other three groups. It turned out, however, that only the students who scored on the highest quartile of an intelligence measure gained from the prior knowledge acquired in the physics curricula. The results show that curricula on proportional reasoning are worthwhile for all students in early adolescence. However, more capable students can boost their proportional reasoning if they had gotten the chance to acquire prior knowledge in a physics curriculum.

Mapping and changing general intelligence: A theory and an intervention program
Presenting Author: Andreas Demetriou, University of Nicosia, Cyprus

A model of human intelligence and its development and its implications for learning and education are first outlined. Two relevant empirical studies are then summarized. The first investigated if learning relational reasoning in mathematics and related awareness generalizes to other domains and general intelligence, including attention control, and working memory. A total of 118 10-year olds were involved, allocated to an experimental and a control group. We found significant but not fully sustainable learning gains in mathematics. However, learning transferred to similar processes in other domains of reasoning and also to attention control and working memory. The second study trained 180 8- and 11-year old children to master conditional reasoning. Experimental groups learned principles of conditional reasoning at various levels. Reasoning improved proportionally to training. Changes in reasoning and awareness changes were related to attention control and fluid intelligence. Awareness mediated the
influence of training on reasoning but not vice-versa, suggesting that awareness is necessary for mastering conditional reasoning. Implications for psychometric and developmental theories of intelligence and for education are discussed. We suggest that learning programs must be tailored to the needs of developmental phase and the individual and must recycle appropriately, following the composition and needs of each developmental phase.

Growth and changes in mathematical and formal thinking in Finland: A nine-year follow-up.
Presenting Author: Jarkko Hautamäki, Helsinki University, Finland
Co-Author: Mari-Paulina Vainikainen, University of Helsinki, Finland
Co-Author: Satu Kivovuori, University of Helsinki, Finland
The Finnish framework defines learning to learn as cognitive competences and learning- and self-related beliefs that are both related to school achievement. To monitor the development and the structuration of these competences, a nine-year longitudinal study was launched in 2007 in a major Finnish city. This paper focuses on the growth and changes in mathematical and formal thinking of about 600 pupils as measured in several assessment cycles during the nine-year follow-up. The results show that whereas Piagetian formal thinking skills gradually improve, in the arithmetical operations task measuring mathematical thinking the development is even negative. The results indicate that the way to abstract generalisation is hard and it needs to be supported by educational means. More research is also needed on the impact of learning-related beliefs and school/class composition effects on this development.

Assessment and training of experimentation skills in primary school children
Presenting Author: Sonja Peltonen, The TH - Helsinki University of Technology, Finland
Co-Author: Anne Diegmiay, Swiss Federal Institute of Technology, Zurich, Switzerland
Scientific reasoning is defined as the competence of understanding, coordinating and evaluating scientific evidence and claims. A core component of scientific reasoning is the ability to design conclusive, un-confounded experiments, and to interpret and evaluate the obtained data, summarized as experimentation skills. This research focuses on the assessment and training of experimentation skills in primary school students. Our focus is on the "control of variables" strategy (CVS), a core skill in planning, conducting, and evaluating scientific experiments for testing causal hypotheses. An experimentation skills training for primary school children was developed with the aim to foster children's understanding and application of CVS. In addition, a paper-based test for assessing the experimentation skills of children in primary school has been developed, focusing on several subskills of CVS, and addressing prevalent misconceptions. Both, the test and the training were evaluated in ten 6th-grade classes. In this paper, first results will be reported.

Session H 205
31 August 2017 10:15 - 11:45
Pitto B - 844113
Symposium
Motivational, Social and Affective Processes
Measuring and supporting collaborative learners' engagement in shared regulation processes
Keywords: Collaborative Learning, Metacognition, Peer interaction, Self-regulation, Social interaction, Technology, Video analysis
Interest group: SIG 16 - Metacognition
Discussant: Deborah Pino-Pasternak, Murdoch University, Australia
Metacognitive regulation during collaborative learning: does sharing always imply quality?
Presenting Author: Jeppe De Backer, Ghent University, Belgium
Co-Author: Hilde Van Keer, Ghent University, Belgium
Co-Author: Martin Vatok, Ghent University, Belgium
The present study investigates higher education collaborative learners' adoption of socially shared metacognitive regulation (SSMR) during reciprocal peer tutoring (RPT). Sixty-four Educational Sciences students participated in a semester-long RPT intervention and tutored one another in small groups of six. All sessions of five randomly selected RPT-groups were videotaped (70h of video recordings). The focus of the present study is to investigate at both identifying time-bound evolutions in RPT-groups' adoption of socially shared metacognitive regulation (SSMR) and at unraveling possible quality differences in identified utterances of SSMR. Multilevel logistic regression models allowing change points are adopted to study evolutions over time. Cascading cubing is developed to investigate qualitative differences in engagement and coordination of participants with shared regulation activities. The results indicate that RPT-participants significantly enhance their adoption of SSMR as the RPT-intervention progresses. They especially engage in shared regulative acts during orientation and monitoring activities. The results further reveal differences in the quality of identified SSMR-acts, based on the number of RPT-participants engaged in a shared regulation activity and the level of elaboration of RPT-participants' regulative contributions to SSMR-acts.
Supporting intra-group social metacognitive activities with technology: a grammar learning game
Presenting Author: Iege Molenaar, Radboud University Nijmegen, Netherlands
Co-Author: Peter Desain, Radboud University, Netherlands
Co-Author: Anne Honors, Radboud University Nijmegen, Netherlands
This study investigates the effects of a technology enhanced collaborative grammar learning activity on student sentence parsing and formulation. These types of collaborative learning activities for grammar education are expected to support more effective learning. Yet, effective intra-group social metacognitive activities are essential for effective group learning. Groups engaged in these activities often fail to engage in effective control and management of their learning. In this study, we examine how a technology enhanced game can support intra-group social metacognitive activities during a collaborative learning activity to practice sentence generation and parsing. Results indicated that students indeed improved on aspects of sentence parsing, namely the naming of the direct subject in sentence parsing over time. Also, an improvement was seen in naming the direct verb in parsing and in the use of the subject, direct verb and indirect object in the formation of sentences.Clearly examples were found where the technology design supported high quality intra-group interaction on cognitive and metacognitive levels.
Metacognitive regulation in collaborative science learning across different contexts
Presenting Author: Tuule Iskala, University of Turku, Finland
Co-Author: Simone Vølet, Murdoch University, Australia
Co-Author: Milo Koretsky, Oregon State University, United States
Co-Author: Cheryl Jones, Murdoch University, Australia
Co-Author: Marja Vauras, University of Turku, Finland
Research on metacognitive regulation, such as socially shared metacognitive regulation (SSMR), in collaborative learning has been studied with a broad array of analytic methods, but to date empirical work has been limited to the study of single contexts. Comparing findings across different contexts is needed to advance our understanding of, and further validate the construct of metacognitive regulation, including the development of new measures. The aim of this paper is to explore and test the hypothetical predictions of the SSMR model in collaborative learning across several contexts, using the same analytical approach. The participants were groups of high-school students from Finland (general science), and university students from Australia (second year veterinary science) and the USA (final year veterinary science). One high-outcome group from each research site were selected. Recordings of the groups' verbal interactions were coded for evidence of metacognitive regulation, including SSMR. Reliable inter-coding agreement between researchers was achieved. Statistical significance was determined using non-parametric tests, and differences in coding distributions were evaluated using logistic regression. Findings from the high school and the second year university veterinary site were similar in that both sites the high-outcome group displayed a higher proportion of metacognitive regulation and SSMR than the low-outcome group, but this was not the case for the engineering data. A developmental pattern in SSMR also emerged across levels of education with lowest engagement in SSMR among high school students and highest among final year university students. In depth comparisons and tentative explanations for the context-related differences are discussed.
Socio-cognitive and socio-emotional monitoring in collaborative learning
Presenting Author: Pia Najyki, University of Oulu, Finland
Co-Author: Jana Ichtšátil, University of Oulu, Finland
Co-Author: Sanna Järvelä, University of Oulu, Finland
The aim of this study is to examine social regulation in collaborative learning, particularly how socio-cognitive and socio-emotional monitoring processes emerge and function during student teachers' collaborative inquiry learning. The participants of this study were first-year teacher education students whose collaborative learning was supported with a designed macro-script during a six weeks environmental science course. The script divided the group work into three phases; namely: orientation-phase, intermediate-phase and reflection-phase. The script was put in use by prompting questions that were elaborated after the group's first brainstorm. The group's face-to-face work were video-taped with spherical 360 degree cameras. The results show that the students used the provided macro-script more thoroughly in the orientation-phase than later phases. More active script discussion was followed by more active socio-emotional monitoring. It can be concluded that more profound regulation processes can be enhanced with a theory-based script that supports students' interaction about cognitive, metacognitive, motivational and emotional group processes.

Session H 207
31 August 2017 12:15 - 11:45
Main Building D - D13
Symposium
Learning Social Interaction, Teaching and Teacher Education
Explaining Differences in Teacher Expectations and their Effects on Student Outcomes
Keywords: At-risk students, Attitudes and beliefs, Educational Psychology, Primary education, Quantitative methods, School effectiveness, Social aspects of learning and teaching, Social interaction, Student learning, Teacher Effectiveness, Teaching, Teacher Education
Interest group: SIG 10 - Social Interaction in Learning and Instruction, SIG 11 - Teaching and Teacher Education
Organiser: Camilla Rysk, Humboldt-Universität zu Berlin, Germany
There is a paucity of research that has examined the stability of teachers’ expectations across a single year and there are no longitudinal studies. The current study examined the stability of 88 teachers’ expectations within three separate years at two time points each year and across three years (six time points) in mathematics and reading. In both subject areas, teachers’ expectations remained stable from the beginning to the end of the year for each separate year of the study. However, teachers who had under- or overestimated their students by more than half a standard deviation over one year, became less extreme in their views over three years. Nonetheless, the under-estimators continued to underestimate their students albeit to a lesser degree at every time point in both reading and mathematics. Similarly, the over-estimators remained positive in their predictions of student achievement. The educational and theoretical implications of the findings are discussed.

The Interpersonal Character of Teacher Expectations

Effects of Teacher Expectations on Teacher Behaviour and Students’ Achievement Development

Merton Scores Twice: Teacher Expectations as Self-fulfilling Prophecy and Matthew Effect

Context, support and agency in new teachers’ induction and learning

Is initiative an indicator of neglect? Social context, support, and new teachers’ learning patterns.

How does the guidance offered to newly qualified teachers determine their collegiate network?

Lack of support is one of the reasons why newly qualified teachers (NQTs) tend to leave the job during their first years. Previous research made a distinction between support structure and support culture. Support structure can be defined as the induction programs that are aimed at guiding NQTs, e.g. mentoring. Support culture is related to the informal support NQTs get, e.g. the exchange of advice. Studies show that a wider network of support is related to a greater level of commitment. A support culture that focusses on equality amongst novice and experienced teachers and on reciprocal cooperation and thus support by the social network may be sufficient to cope with high drop-out rates among NQTs. However, few is known on the relation between support structure and culture. It is unclear how support structures contribute to the support culture of NQTs. The aim of this study is to investigate this relation and to unravel how support structures contribute to the network of NQTs.
Tensions of beginning teachers: Professional identity and Agency at work  
Presenting Author: Mireil van der Wal, Radboud University, Netherlands  
Co-Author: Harmen Schaap, Radboud University Nijmegen, Netherlands  
Co-Author: Heima Oobekink-Marchand, Radboud University, Netherlands  

This study reveals how tensions of beginning teachers experience are at work between their professional agency and to whom they want to be as teacher. To study teacher agency 54 teachers from secondary education filled out a log three times during one school year about their professional agency, about the image they have of themselves as a teacher and their tensions. The results show that most teachers experience agency in the school to develop professionally but they also experience tensions due to the many tasks they have to fulfil and the high demands they place on themselves as teachers. Consequently, beginning teachers perceive that they have to teach in a way which does not align with who they want to be as a teacher.

Sliders: parallel universes of novice teachers’ entrance and learning of the profession  
Presenting Author: Tal Patalov, University of Haifa, Israel  

In their first years of teaching, novices are required to learn how to handle various new challenges. The present research aims to expand research on novices’ “on-job” learning in the context of their habitat and from a social-cultural perspective. Thus, this research addresses the need to investigate novices’ professional identity construction in relation to their learning and the social-cultural context, as they become teachers and negotiate their place in their school. From this perspective, we also examine the connections between learning and performance, which have not been sufficiently researched.

The suggested paper for this conference presents contrasting school habitats, which influence novice teachers’ learning and identity construction, demonstrating parallel universes of novices’ entrance to the educational system. It also reveals a vicious circle, connecting between novices functioning and learning, indicating that a teacher who is in a survival state and barely functions, isn’t available for learning and thus remains in survival, eventually “dropping-out” of the profession.

This research is part of a large research program on novice teachers’ learning in Israel. The present research relies on a qualitative approach, consists of teachers in Jewish Israeli schools and combines research tools (questionnaires, observations and interviews).

The research addresses a call to expand research on the relations of context, learning and professional identity. Through examining contrasting stories, it indicates new ways for improving novice teachers’ learning and identity construction, and how their schools and the educational system as a whole can better support them at the entrance to the profession.

Session H 209  
31 August 2017 10:15 - 11:45  
Main Building E - E222  
Symposium  
Learning and Social Interaction  
Using video-data to capture motivational, regulatory and cognitive processes during collaboration  
Keywords: Collaborative Learning, Goal orientation, Motivation and emotion, Peer interaction, Primary education, Self-regulation, Video analysis, Workplace learning  
Organiser: Maaike Endoek, University of Twente, Netherlands  
Discussant: Simone Volet, Murdoch University, Australia  

Social regulation at the Workplace: Understanding Social Regulation of Learning in ICT Teams  
Presenting Author: Marijn Wijga, University of Twente, Netherlands  

Group work and collaboration are key elements of organizational life, which makes learning at the workplace particularly depending on interaction and dialogue. Social regulation, dealing with how individuals reciprocally regulate each other’s metacognitive processes, is a powerful concept in explaining the interactive character of teamwork. However, the field of social regulation research is still emerging, and these processes are fairly left unexplored in a workplace setting. The present study explored the different types of social regulatory processes that take place during team meetings. Video-observations of team meetings were used to analyze the types and quality of socially regulated learning of team members in the context of agile ICT organizations. Results are an adequate and valid analysis tool with which the performance of teams can be explained based on the occurrence of different types and combinations of regulation processes during team meetings. Notable results were that in the far majority of the regulation interactions, team members reciprocally regulated each other’s metacognitive processes. In addition, all regulation utterances, planning occurred the most, followed by monitoring, whereas evaluation hardly took place. As evaluation is essential to complete the full cycle of regulation and to learn from previous activities, further research could focus on interventions to increase evaluation in team learning.

Exploring the fluctuation of motivation, emotion and cognitive regulation in collaborative groups  
Presenting Author: Hanna Jarveno, University of Oulu, Finland  
Co-Author: Jonna Malmberg, University of Oulu, Finland  
Co-Author: Sanna Jarvstå, University of Oulu, Finland  

Up until now, the majority of the studies concerning regulation processes within collaborative groups have focused on a particular aspect of regulation processes, such as co- and socially shared regulation of cognition or, alternatively, motivational and affective processes. However, in actual collaboration, these aspects together compose collaborative groups’ regulated learning process. Hence, the aim of this study is to explore the sequential associations between co- and socially shared regulation of both cognitive as well as and motivation and emotion in collaborative group learning.

The participants of the study were 16 teacher education students taking part in a mathematics course. During the course, the students completed an extensive collaborative assignment during several video-recorded group sessions. The video data analysis was performed to locate and categorise the visible regulation episodes from groups’ interaction according to two different qualities; the type of regulation and the target of regulation. The type of regulation included co- and socially shared regulation and the target of regulation referred to differentiation between cognitive and motivation regulation. The results show that the collaborative groups activate particularly cognitive co-regulation. Motivation and emotion regulation was scarcer, but when the groups engage motivation and emotion regulation, possibility to engage in socially shared regulation was higher than with cognitive regulation. To conclude, the results indicate that while cognitive regulation is needed to ensure collaborative learning activity within the group, the need for the regulation of motivation and emotion during the collaborative learning process is more situation-specific.

Negotiation of shared achievement goals during collaborative group interactions  
Presenting Author: Tonni Rogat, Purdue University, United States  
Co-Author: Karyl Adams-Wiggins, University of Texas – Tyler, United States  
Co-Author: Tamsipt Atayaya, Purdue University, United States  
Co-Author: Zhigang Zhang, Purdue University, United States  

Understanding groups’ productive collaboration requires cognitive, sociocultural, and motivational processes. However, research has relied primarily on cognitive frameworks. In this research, we explore the role of motivational processes using an achievement goal theory framework to enrich our understanding of collaborative processes. Motivational challenges can be raised by status differences and/or disagreement, which can provoke a competence threat and focus on social comparison. We draw on situative views to treat motivation as jointly negotiated motivational norms, shaped within social contexts. We present a case study that examines the joint negotiation of achievement goals during inquiry-based science curricular tasks focused on promoting reasoning and argumentation. Findings elucidate three means by which shared performance goals were negotiated as predominant in group interaction: (1) the exclusion of low status group members from shared activity, (2) the self-presentation of one’s own ideas as most competent, and (3) errors as indicators of low competence and reason for shame.

How primary school students use rules for effective collaboration  
Presenting Author: Hamse Gijens, Universiteit Twente, Netherlands  
Co-Author: Tracy Olde Riekert, Expertis Onderwijsadviseurs, Netherlands
Students in primary education do not always have a clear understanding of effective collaborative learning. They need to recognize that in order to successfully complete a joint project they need to listen to their peers, share important information and consider knowledge and ideas shared by their peers. Literature shows that knowledge sharing activities can be supported by providing pupils with instruction in ground rules for effective communication and collaboration. This study aims to investigate how primary school students implemented these rules during a group project. Stepwise analysis of video and audio recordings was used to see how students' use of the rules developed during the course of six lessons. Results revealed that students used the rules in their group interactions. Over the course of the lesson series students started selecting specific rules that were relevant in specific situations. Students' reflection on the visualized results of our analysis indicated that they recognized that specific rules like checking agreement and understanding maintained important in all occasions but that other rules were particularly important during a certain phase of the learning process.

Session H 210

31 August 2017 10:15 - 11:45
Main Building D - D11
Symposium
Teaching and Teacher Education

Teacher Self-Efficacy: Difference, impact, and correlates

Keywords: Comparative studies, Educational Psychology, Mathematics, Mixed-method research, Motivation, Pre-service teacher education; Quantitative methods, Self-efficacy, Teacher Effectiveness, Teaching approaches

Interest group: SIG 11 - Teaching and Teacher Education

Discussant: Jeffrey Smith, University of Otago, New Zealand

The impact of mathematics teaching efficacy on teachers' pedagogical practices

Presenting Author: Naomi Ingram, University of Otago, New Zealand

Co-Author: Mustafa Ail, University of Otago, New Zealand

Co-Author: David Berg, University of Otago, New Zealand

This study explores the pedagogical practices of 167 Year 4 and 168 Year 8 New Zealand mathematics teachers who have different levels of mathematics teaching efficacy. Missing data from the National Monitoring Study of Student Achievement 2013, the teacher questionnaire items believed to be the indicators of mathematics teaching efficacy were selected, represented by six items such as "I feel confident about teaching maths". Then, low, mid, and high efficacious teachers were identified and compared to see how they differed with respect to their teaching profile and the frequency they used effective pedagogies when teaching mathematics ( italicised below ) (Anthony & Walsh, 2007). Twenty eight percent of Year 4 and 41% of Year 8 teachers had high mathematics teaching efficacy. Compared with the other teachers, teachers with high mathematics teaching efficacy were better able to provide an ethic of care in their classroom, they more frequently arranged their classrooms for learning to enable students to collaborate, and more frequently expected their students to communicate their thinking and debate ideas with others. They more frequently provided students with worthwhile mathematical tasks, they more frequently provided opportunities for their students to build on their own thinking and to explore how new learning linked to or changed what they already knew. They more frequently expected their students to make mathematical connections by reflecting on their learning, to use multiple representations, and use ideas and skills from different curriculum areas.

Job demands and job resources in the teaching profession: Relations with teacher self-efficacy

Presenting Author: Einar Skalaæv, Norwegian Univ. of Science and Technology, Norway

Co-Author: Sidsel Skalaæv, Norwegian Univ. of Science and Technology, Norway

The purpose of this study was to explore how teacher self-efficacy was related to (a) job demands and job resources in the school environment, (b) emotional exhaustion and (c) teachers' engagement in teaching. The study was based on Social cognitive theory and the Job Demands – Resources model (JD-R model). The job demands measured in this study were (a) time pressure or work overload and (b) low student motivation. We included two measures of job resources in the study: one organizational resource (teacher autonomy) and one social resource (supportive social climate at school). Participants were 523 teachers in three counties in central Norway. We analyzed data by means of confirmatory factor analyses and SEM analysis for latent traits. The results showed that teacher self-efficacy was positively predicted by both job resources in the study whereas it was negatively related to lack of student motivation. However, in the SEM model self-efficacy was not significantly predicted by either time pressure/work overload or by emotional exhaustion. Self-efficacy positively predicted engagement whereas emotional exhaustion predicted engagement negatively. The study clearly indicates that self-efficacy is influenced by both job demands and job resources in the school environment. However, it also indicates that it is not affected by all job demands. Possible interpretations will be discussed.

Enhancing Preservice Teachers’ Efficacy Beliefs Through a School-Area University Partnership Programme

Presenting Author: Claire Lloyd, Liverpool Hope University, United Kingdom

Co-Author: Sue Cronin, Liverpool Hope University Liverpool England, United Kingdom

Co-Author: Michelle Pearson, Liverpool Hope University Liverpool England, United Kingdom

For over 30 years, teacher efficacy has been identified as a teacher characteristics relating to student achievement and motivation. Moreover, some of the most powerful influences on the development of teacher efficacy are mastery experiences during student teaching and the induction year, alongside vicarious experiences and social persuasion (Charalambous & Philippou, 2010).

This paper reports the results of an investigation into student teachers’ efficacy through participation in an intensive school-area university partnership programme in the first year of their three-year BEd programme provides students with mastery experiences through a cycle of Ambitious Teaching (Smith, Lee & Newman, 2001; Lampert et al., 2013) and builds upon a collaborative cycle of modelling and feedback.

Data were collected from 30 students who participated in the partnership programme. Using TheTeacher Sense of Efficacy Scale (Woolfolk-Hoy, nd), pre- and post-programme levels of self-efficacy were analysed quantitatively. Qualitative arts-based methods were also used to explore students’ perceptions of schools in challenging circumstances. This complementary form of data collection allowed for further exploration of changes in beliefs (Lampert & Rumbold, 2008; Pink, 2008).

Preliminary analysis of questionnaire data revealed pre-post shifts in students’ self-efficacy. Qualitative data lent further support to the power of the programme in changing beliefs. Indeed, the qualitative analysis revealed a consistent pattern of improvement and nuances in students’ perceptions of schools in challenging circumstances.

The results suggest that carefully designed partnership programmes, which provide student teachers with guided mastery experiences in challenging school contexts, can lead to positive changes in self-efficacy.

Preservice teachers’ self-efficacy and choice of teacher education in Norway and New Zealand

Presenting Author: David Berg, University of Otago, New Zealand

Co-Author: Einar Skalaæv, Norwegian Univ. of Science and Technology, Norway

In this presentation, we present preliminary findings from year one of a five-year longitudinal study exploring the teacher self-efficacy beliefs and motivation to teach of preservice and beginning teachers in Norway and New Zealand (NZ). Here, the reported reasons for enlisting on an initial teacher education degree and the self-efficacy beliefs of Norwegian and NZ preservice teachers are compared. The primary purpose of the study is to compare the reasons for enlisting in a teaching preparation degree programme and the teacher self-efficacy beliefs of preservice teachers in two nations. A second purpose was to contrast the self-efficacy beliefs of these preservice teachers with findings from previous studies examining in-service teachers.

Preservice teachers from Norway (n = 292) and NZ (n = 507), in the first weeks of their first year of their initial teacher education, completed the 24-item Norwegian Teacher’s Self-Efficacy Scale (NTSES) and the 36-item Reasons for Choosing Teacher Education Scale (RCTES) in Norwegian and English respectively. We explore how these cohorts of students differ and consider possible explanations for such differences.

Our main finding was that the NZ cohort in comparison to their Norwegian peers reported both higher motivation to teach and teacher self-efficacy beliefs. This may be accounted for by a response bias, cultural difference, and/or contextual factors. A second finding is that the factor patterns of preservice teachers are less differentiated than found with experienced teachers.

* NZ sample size to be expanded prior to presentation.

Session H 211

31 August 2017 10:15 - 11:45
Man Building D - D14
Symposium

Executive functions as precursors of mathematical skills

Keywords: Cognitive development, Cognitive skills, Early childhood education, Educational Psychology, Mathematics, Primary education

Interest group: SIG 15 - Special Educational Needs

Discussant: Annemie Deboe, Ghent University & Antwerp University College, Belgium

Ses related differences in gains in early math achievement are mediated by working memory

Presenting Author: Kerry Lee, National Institute of Education, Singapore

Co-Author: David Murray, National Institute of Education / NanYang Technological University, Singapore, Singapore

Co-Author: Rebecca Bull, National Institute of Education/Nanyang Technological University, Singapore, Singapore
Socioeconomic status (SES) is an important predictor of academic achievement and working memory capacity. In particular, SES has been found to predict children’s math achievement at school entry, and in early elementary school. Research aimed at understanding the relationship between SES, working memory, and early academic achievement has found that the effect of SES on children’s academic achievement throughout childhood (6–15 year olds) may be mediated by executive functioning. The present study explores whether four-year-old children’s working memory capacity mediates the effects of SES on children’s gains in math achievement scores (N = 866). Results are consistent with a mediation effect and points to early differentiation in working memory. These findings suggest that early intervention programs, aimed at improving child’s working memory capacity, may be necessary to mitigate the SES related achievement gap.

Working memory resources in children - stability and relation to subsequent mathematical skills
Presenting Author: Minna Kyttilä, University of Turku, Finland
Co-Author: Pia Björn, University of Eastern Finland, Finland
Co-Author: Kaija Kanerva, University of Helsinki, Finland

In this study, we aimed to investigate the stability of Working Memory (henceforth WM) skills from kindergarten to second grade, and the extent to which WM skills measured at kindergarten predict counting skills, basic arithmetic skills and math word problem solving skills at second grade. WM is part of executive functions (EF) which are suggested to incorporate all high-level brain processes including attention and inhibition. At the time of the first measurement point, the participants were 62 Finnish six to seven-year-old kindergarten children. The second measurement point (F2) took place approximately 2 years after the first measurement point when the children were eight to nine year-old and at 2nd grade. The results showed that WM capacity significantly increased over the 2-year period suggesting that the WM capacity differs among ages. However, the WM profiles seemed to show stability, as sixty-two percent of the participants were ranked in the same skill group in WM skills at both time points. Verbal WM (VWM) and visuospatial WM (VSMW) resources seem to develop quite independently VWM skills showing more stability at this age phase than VSMW skills. Math word problem skills at 2nd grade were predicted by prior VWM skills but not prior VSMW skills. Basic arithmetic skills at 2nd grade were not predicted by prior WM skills.

The relation between executive functions, number sense and mathematics throughout primary education
Presenting Author: Evelyn Krosbergen, Utrecht University, Netherlands
Co-Author: Bina Friso-Van den Bos, Utrecht University, Netherlands
Co-Author: Eveline Schooers, Utrecht University, Netherlands

In this study, it was investigated how number sense, executive functions and mathematics are related in grades 1-4 of primary education, and whether the relation between executive functions and mathematics is mediated by number sense. 467 children were assessed on working memory, inhibition, mathematics (basic facts & problem solving), and three different number sense tasks. Working memory showed the strongest associations with mathematics, with no differences between the basic facts tasks and the problem solving test. Both working memory and inhibition were found to be related to number sense. Furthermore, we found that both working memory and number sense are most important during second year of mathematics education, and that number sense partially mediates the relation between working memory and mathematics. This study indicates that number sense is still developing during the first three years of primary school and that it is necessary to foster children’s number sense during this period, especially for low mathematics achievement and for children with working memory difficulties.

First grade children’s competence in executive functions, numeracy and listening comprehension
Presenting Author: Minna Törnänen, University of Helsinki, Finland
Co-Author: Lara Ragotti, University of Johannesburg, Unknown
Co-Author: Rikka Mononen, University of Oslo, Norway
Co-Author: Johann Korhonen, Åbo Academi University in Vaasa, Finland
Co-Author: Elizabeth Henning, University of Johannesburg, South Africa

Early numeracy competence is crucial for children’s mathematics learning beyond the early grades. South African children’s performance in maths is of particular concern and early recognition of the possible causes for low performance are investigated in a number of research projects in the Centre for Education Practice Research at the University of Johannesburg’s Witsowato campus. This paper reports on one of these studies, in which first graders (n=328) in Gauteng Province were assessed by way of three instruments: The cross sectional data captured the relation of their (i) early numerical competency on a maths measurement developed by Anuon and Mononen (2014), (ii) their EF on a Flanker task test (Robers & Kauer, 2009) and (iii) their listening comprehension skills on a test (Ragotti & Blink, 2016) which was adapted from Snow (1998). The results show that there is a positive relation between the children’s early mathematics/numeracy competence, their listening comprehension and their EF.

Session H 212
31 August 2017 10:15 - 11:45
Pinni B - B11050
Symposium
Learning and Social Interaction
„Work agency“ - a promising concept for facing culturally challenging affordances
Keywords: Collaborative Learning, Competencies, Content analysis, Ethnography, Higher education, Knowledge creation, Multicultural education, Qualitative methods, Quantitative methods, Self-regulation, Social interaction, Vocational education, Workplace learning
Intergroup SIG 14 - Learning and Professional Development
Discussant: Doron Holtz, University of Zurich, Switzerland
Discussant: Fritz Oser, Universität Freiburg, Switzerland

Human agency at work: A conceptual introduction
Presenting Author: Michael Golter, University of Paderborn, Germany

The concept of human agency describes that human beings are agents of influence and power that are able to cause things and to bring about change. In this sense, notions of human agency are usually explicitly or implicitly associated with ideas that individuals make choices, take initiatives, and act proactively to exert control over their lives and their respective environments. This presentation gives a brief overview about theoretical discussions on human agency in relation to work-related learning and development as well as work-related behaviour in general. A special focus will hereby be laid on the development of a theoretical framework that integrates different perspectives about human agency discussed in the literature. In addition, this presentation aims at discussing how the concept of work agency can be used to explain how individuals and organisations can cope with current societal and economic challenges like mass migration, digitalisation of work or demographic changes.

Migrants’ career decisions and agentic adaptability
Presenting Author: Susanne Weber, Ludwig-Maximilians-Universität München, Germany
Co-Author: Josef Guggeweiss, Institute of Human Resource Education & Management, Germany

Current migration challenges all participants at the labor market. In July 2016 more than 600,000 people migrate into the EU (Eurostat: 30.09.2016). Most people coming from Syria, Iraq and Afghanistan have an age of 16 to 26 years. Just 26% of potentially qualified (BAMF, 2016). As the German labor market seeks for middle- and high-skilled non-academics there is hope to fill the given demographic gap by migrants. Critical considerations arise whether the migrants stay in or whether they have other career aspirations (Sltiga, 2016). Within this study we asked (N=150) migrants in an ad hoc sample about their career decisions and adaptability behaviour (Ratschirni, 2014) for the labor market – to get insight into their professional identities, knowledge and competences as well as their strategies and future goals for resources as the enactment of life course agency (Eliopoulos et al., 2013). Running qualitative and quantitative analyses (like rubrics, (non-)parametric tests) the results show that the migrants have clear career goals for prestigious occupations and a strong professional identity. Migrants with an option to stay have a significantly higher motivation to adapt to given and not-foreseeable new workplaces. But most of them are lacking additional information on options. The results give fruitful hints for creating supportive means for these groups with few individual resources to get engaged in continuous professional learning demands for developing their individual well-being, satisfaction but also organizational performance and commitment at work (Vähäsanainen 2016) and for formulating new research questions and expectations in labor market policy.

Fostering professional learning and agency – An identity coaching programme
Presenting Author: Susanna Palomari, University of Jyväskylä, Finland
Co-Author: Katja Vähäsanainen, University of Jyväskylä, Finland
Co-Author: Päivi Hikka, University of Jyväskylä, Finland
Co-Author: Aneel Eliopoulos, University of Jyväskylä, Finland

This study addresses the professional learning that occurred in an identity coaching programme. The arts-based programme aimed to enhance the participants’ professional learning, notably through helping them to process their professional identities. Professional learning was seen as resourced by the participants’ professional agency, and by the promotion of such agency. Via interviews, we investigated what the participants regarded as helpful in learning what they had learnt during the programme, and the potential differences in learning outcomes between professional groups from university and hospital contexts. The findings showed that the programme was perceived as a rich learning arena in the domains of the professional self (involving a crafted professional identity), professional relationships (involving increased knowledge of colleagues and becoming an active participant in this), and professional competences (involving socioemotional knowledge and skills). The professionals (academics and administrative personnel) from a university learnt more during the programme than did the nurses and physicians working in a hospital. The findings suggest that the primary emphasis in professional learning should be on professional identity and agency within the social relationships that exist in training and work settings. The study also presents the theoretical considerations regarding the connection between professional agency and learning.

Institutional social dynamics and the absence of collective agency in academic work
Presenting Author: Frank Achtenhagen, Institute for Business and Human Resource Education, Germany
Co-Author: David M. Hoffman, University of Jyväskylä, Finland
Self-ethnography offers a useful approach in the critical analysis of the relationship between social structure, culture(s) and distinct forms of agency within academic settings where personnel are unaware of key obstacles to the emergent collective agency inherent in continuous renewal and innovative development. The paper illuminates hidden institutional dynamics, social practices, and career trajectories which spotlight obstacles and constraints for the productive renewal of research traditions, including HR practices, modes of inquiry, methodology, methods and substantive focus within a research institute. It is shown how institutional practices and traditions reproduce global inequalities, rather than the societal transformation Finland’s education system was historically noted for. Concretely, the analysis explains emergent patterns of structural scholarly precariousness and their relationship to the lack of work agency manifested both at the individual and collective levels which prevents the institutional renewal of organisations and individual career trajectories. Hoffman et al. (2016) identify three transnational strata that explain the global division of scholarly labor, which in turn highlight distinct institutional dynamics that explain the structural characteristics in which agency plays out, as well as the most important types of culture(s) relevant within each stratum.

Session I 213
31 August 2017 12:00 - 13:30
Pinni A - A3103
ICT Demonstration
Learning and Instructional Technology
Get undergraduates off Facebook and into learning with game-based student response systems
Keywords: Assessment methods and tools, Educational Technology, Game-based learning, Higher education
Interest group: SIG 07 - Learning and Instruction with Computers
Chairperson: Eero rope, University of Tampere, Finland
Get undergraduates off Facebook and into learning with game-based student response systems
Presenting Author: Iioke Nicolaidou, Cyprus University of Technology, Cyprus
Co-Author: Georgia Christou, Cyprus University of Technology, Cyprus
In accordance with digital game-based learning principles, Game-based Student Response Systems (GSRS) can temporarily turn the classroom into a gameshow as they allow learners to use their mobile devices to individually answer questions, typically in multiple choice format, that are projected on a big screen. Learners’ answers are collected automatically and are presented anonymously in the form of a histogram, after each question is answered. Incorporating GSRS in education is potentially useful in instruction and learning because these tools have the potential to engage learners, and support both student learning and formative assessment. The first part of the ICT demonstration will focus on a specific GSRS, called Kahoot!, and will engage participants in playing a given game, taking the role of students, using their mobile devices. The second part will familiarize participants with the tool through step-by-step instructions on how they can create, edit, preview and test their own Kahoot! for any educational level. The third part will present findings from a study that assessed 33 undergraduate students’ perceptions for the impact of the game-based response system on their engagement and learning. The fourth part will engage participants in a discussion on their experiences with similar tools or different tools for the same purpose to reflect on the tools’ affordances and limitations for instruction and learning.

Session I 214
31 August 2017 12:00 - 13:30
Pinni B - B 4117
Workshop
Assessment and Evaluation
Assuring assessment quality in higher professional education. Towards a successful strategy
Keywords: Assessment methods and tools, Educational policy, Higher education, Professions and applied sciences
Interest group: SIG 01 - Assessment and Evaluation
Chairperson: Thomas Martens, Medical School Hamburg, Germany
Assuring assessment quality in higher professional education. Towards a successful strategy
Presenting Author: Anneriel Floradz, Zuyd Hogeschool, Netherlands
Co-Author: Dominique Slijpersma, Zuyd Hogeschool, Netherlands
The quality of assessment is an important theme in higher professional education. To assure this quality, it is advisable to provide institutions with quality criteria and guidelines which support institutions in (re)writing a decentralized assessment plan. Until 2014, Zuyd University of Applied Sciences did not have a central vision on assessment. It was decided to formulate a first draft of this vision and corresponding guidelines which were validated by several important stakeholders: boards of examiners, teachers, assessment experts and peers. In total 15 guidelines were formulated: five guidelines on the scientific quality of assessment, five on the organizational quality and five on assessment literacy. Aim of the validation study was to investigate whether the defined guidelines were understandable, complete and usable. The feedback we received was immense. In total 856 comments were collected, analysed, clustered, and used for reformulating the guidelines. During the workshop participants are invited to discuss the assessment policy of Zuyd University. Our practice-based research study confirms that the implementation process of the central vision is very complex and unpredictable. In the workshop, we would like to discuss the implementation strategies. It aims to examine effective methods to implement a sustainable assessment policy in higher education. We hope that this contribution inspires other universities or educational institutions to validate central policy documents before implementing these within specific educational contexts.

Session I 215
31 August 2017 12:00 - 13:30
Main Building C - C5
ICT Demonstration
Assessment and Evaluation
How to implement the observation strategies to raise the Quality of Early Childhood Education (ECEC)
Keywords: Assessment methods and tools, Cognitive development, Early childhood education, Social development
Interest group: SIG 05 - Learning and Development in Early Childhood
Chairperson: Robert Körösi-Freudinger, Paderborn University, Germany
How to implement the observation strategies to raise the Quality of Early Childhood Education (ECEC)
Presenting Author: James Ko, The Education University of Hong Kong, Hong Kong
Co-Author: Jyrki Reunanen, University of Helsinki, Finland
Co-Author: Huei-Chun LEE, Taichung University, Taiwan
Co-Author: Li-Chen Wang, Chiang Gung University of Science and Technology, Taiwan
Co-Author: Huei-Kuo Hsu, National Dong Hwa University, Taiwan
Co-Author: Shu-Shuan Shih, Taichung University, Taiwan
Valid feedback is essential for the administrators, educators, parents and, of course, for children to be able to steer their development in a sustainable way. Key influential theorists such as Montessori, Piaget, Vygotsky, and others all used observations extensively to understand how children learn and use knowledge about children’s learning to improve pedagogics and children’s lives. However, most adults including teachers in the ECEC settings have not always observed children and tracked their growth. Based on the research and professional development programs conducted in Finland, Taiwan and Hong Kong with more than 100,000 observations, we found some relationships between young children's involvement, adaptation and agency in early childhood settings through systematic observations. We will introduce our observation strategies with video clips and demonstrate our latest mobile application for observation for practitioners to contribute to a big data pool aimed to enhance the teaching quality in ECEC settings.

Session I 216
31 August 2017 12:00 - 13:30
Main Building E - E222
ICT Demonstration
Learning and Instructional Technology
BRITE: An online resource to develop capacity for professional resilience
Keywords: Design based research, Learning analytics, Motivation and emotion, Pre-service teacher education
Interest group: SIG 08 - Motivation and Emotion
Chairperson: Gerry Geitz, Netherlands
BRITE: An online resource to develop capacity for professional resilience
Presenting Author: Susan Belman, Curtin University, Australia
This ICT Demonstration will present the five BRITE online modules. These were developed in Australia in response to concerns regarding early career attrition and teacher wellbeing. They aim to develop the knowledge, skills and strategies of pre-service teachers to develop their capacity for resilience. The presentation will cover the rationale and the theoretical and evidence-based underpinning of the modules’ content and design features. Also included will be research relating to their effectiveness and the impact of feedback and how learning analytics are being used to interpret patterns of module usage. Participants will have the opportunity to engage with the modules using computers in the laboratory setting or their own devices and to discuss the application of the modules to other countries and professions.

Session I 217
Detection, coordination and reporting of individual student competency development with myCompetence

Keywords: Assessment methods and tools, Competencies, Goal orientation, Higher education

Interest group: SIG 04 - Higher Education

Chairperson: Angelica Moe, University of Padova, Italy

Detection, coordination and reporting of individual student competency development with myCompetence

Presenting Author: Jakob Ott, Zurich University of Applied Sciences (ZHAW), Switzerland

Co-Author: Jennifer Eriemann, ZHAW School of Management and Law, Germany

Program objectives are the key element of quality assurance measures at curriculum level as well as at the teaching and learning contract that exists between students and lecturers. Systematic measuring of how students meet the program objectives, as well as related feedback, are essential in promoting reflection on learning processes by (and between) students and instructors. On the other hand, such an assessment system, in particular where it concerns transferable skills, places high demands on an educational organization and its (technical) infrastructure.

The tool myCompetence was designed as a comprehensive quality development tool not only to facilitate the development of academic programs by heads of degree programs, modules/coordinateurs and lecturers, but also to encourage learners in making the best use of their learning environment and help them make the most of their learning processes.

myCompetence has three main functions: It coordinates the allocation of ‘assessment events’ between modules and actors (coordinating function), it records individual forms of competency (measuring function) and it provides the actors, especially learners, with valuable feedback on their skills development throughout the course of a program feedback and reporting function. It can be used not only by the heads of study programs, module coordinators and lecturers to develop academic programs but can also help learners to fully exploit their learning environment and make the most of their learning processes.

Session I 218

31 August 2017 12:00 - 13:30

Main Building A - A34

Workshop

Higher Education

Teachers’ Perceptions on Assessment in Higher Professional Education.

Keywords: Assessment methods and tools, Attitudes and beliefs, Competencies, Higher education

Interest group: SIG 01 - Assessment and Evaluation

Chairperson: Joana Pita, Portugal

Teachers’ Perceptions on Assessment in Higher Professional Education.

Presenting Author: Dorien Gerards, Zuyd Hogeschool, Netherlands

Co-Author: Dominique Sluijters, Zuyd Hogeschool, Netherlands

This workshop will present and enable participants to engage with research. The research focuses on teachers’ perceptions on assessing the development that students make in Higher Education on their path to becoming junior professionals integrating 21st century skills. The research was carried out through the use of a questionnaire.

Since assessment steers students’ professional learning, it is important to design quality assessments that are well-aligned with professional goals. If this is not the case, the form of the assessment itself (often formally dominates and can lead to undesirable learning strategies on the part of the student). This however imposes high demands on the assessment literacy of teachers. They are responsible for the design of assessment methods that measure professional learning. The aim of this workshop is twofold. Firstly to present a study on the perceptions of higher education teachers regarding professional assessment. For this purpose, a questionnaire was developed. The study revealed that teachers need to develop their skills regarding new assessment methods. The second goal of this workshop is to discuss some content of the questionnaire for validity purposes in small groups. The workshop will end with recommendations on how the questionnaire may help teacher teams within their organizations when setting up a professional development plan.

Session I 219

31 August 2017 12:00 - 13:30

Main Building A - A07

ICT Demonstration

Learning and Instructional Technology

Recording, visualising and analysing web based learning processes with the ScreenAllytics software

Keywords: Assessment methods and tools, Learning analytics, Psychometrics, Video analysis

Interest group: SIG 27 - Online Measures of Learning Processes

Chairperson: Trisn Kärdla, University of Tartu, Estonia

Recording, visualising and analysing web based learning processes with the ScreenAllytics software

Presenting Author: Markus Hörmann, TUM School of Education, Germany

Co-Author: Mari Bannier, Technical University of Munich, Germany

Research on learning needs to investigate not only the outcomes of learning but especially the learning processes in order to gain insights into underlying mechanisms and promote the construction and verification of theories of learning. Meaningful data that describes this learning process is an indispensable prerequisite to do so. One reasonable way to get process data in web based learning environments is by recording the screens of the learners and analyzing it regarding behavior and events that the researcher is interested in. Commonly used software packages like Camtasia record the learners’ screens as pixel-based videos (e.g. mov, mpg). A huge disadvantage of this approach is that we lose meaningful information by transiting actually inherent events to pixels. In consequence, extensive manual coding is needed make that pixel data meaningful again (e.g. did a learner use a specific instructional support system?).

Instead of recording pixels, we propose to record time-stamped event information (mouse clicks and movements, scrolling, keystrokes, etc.) that reflects the entire observable interaction between the learner and the learning environment. This leads to a quantitative representation of the interaction that could be used as a video-like replay, or can be subject to a variety of other visualisations (e.g. heatmaps) and statistical analysis (e.g. machine-learning algorithms). We developed a software called “ScreenAllytics” that can be used to easily record, visualise and export this data in web-based learning environments. This demonstration introduces the approach, explains the software and give examples of possible applications.

Session I 220

31 August 2017 12:00 - 13:30

Main Building D - D12

ICT Demonstration

Learning and Instructional Technology

Smart Learning Paths - Using Artificial Intelligence To Provide Individual Support in E-Learning

Keywords: Computer-assisted learning, E-learning / Online learning, Informal learning, Learning analytics

Interest group: SIG 07 - Learning and Instruction with Computer

Chairperson: Jingjing Sun, University of Montana, United States

Smart Learning Paths - Using Artificial Intelligence To Provide Individual Support in E-Learning

Presenting Author: Topi Laitinen, Claned Group, Finland

Co-Author: Rika Auto, Claned Group, Finland

Supporting the learning process with machine learning and artificial intelligence represents the next phase of online learning. A learning environment, which adapts to the needs of the learner is able to offer individualised scaffolding for every learner. This may help solve problems of drop-out rates and loss of motivation, which disturb learners in many online courses.

This ICT demonstration will introduce the participants to using a personal learning environment, which applies learning analytics and artificial intelligence to give personalized suggestions for each learner. The demonstration will walk the participants through a session in which they get acquainted with how an intelligent learning environment may help the teacher and learners in online learning settings. Participants will get familiar with learning paths, automatically created quizzes and learning analytics. After this demonstration the participants will be able to understand how the current level of development in artificial intelligence may be used to support learning and instruction.

The demonstration will be done in CLANED (http://app.claned.com) learning environment, which aids students to set, evaluate and achieve their learning goals. Support is given in the form of recommended activities that form a learner’s learning path to her goal. Natural language processing is used to provide automatically created quizzes from text materials, and to provide analytics about learning. The user is thus given personalized feedback and recommendations how to adjust studying according to individual progress.

Session I 221

31 August 2017 12:00 - 13:30

Main Building A - A35
The British Education Research Tool (BERTIE)

**Keywords:** Educational Technology, Teacher Effectiveness, Teacher Professional Development, Technology

**Interest group:** SIG 11 - Teaching and Teacher Education

**Chairperson:** Martínez Ortiz Ma Guadalupe, Mexico

The British Education Research Tool (BERTIE) is being developed by the Bath Spa Institute for Education in the United Kingdom. The British Education Research Tool (BERTIE) is being developed by the Bath Spa Institute for Education in light of government priorities regarding professional development identified in both the DfE consultation ‘A World Class Teaching Profession’ (2015) and the English education white paper ‘Educational Excellence Everywhere’ (2016). We have responded to this call to support teachers’ practice and enhance their knowledge by building a world-class online platform which allows easy access to evidence-based education research and facilitates opportunities for knowledge transfer afforded by online and mobile technologies.

BERTIE is a web-crawler that only searches pre-defined websites which have been curated through academic moderation. Current and future Teachers will benefit from searching education research, policy and comment while being confident that their results have assured academic rigour guaranteed through the curation process. The Institute for Education is deploying BERTIE during 2016/17 as a research tool for trainee teachers to enrich their experience and embed research in their work across schools, colleges and universities.

In this demonstration, we will explore how BERTIE works and could evolve further to support teachers in the field and enhance wider teaching and learning. We will also discuss to what extent government policy in England - which suggests the need for such a tool - correlates to the wider international political context, as well as to what extent BERTIE might be an applicable tool for educators on a global scale. Participants will be able to view and engage with BERTIE and engage in discussion of its potential future applications.

**Session I 222**

31 August 2017 12:00 - 13:30

**Main Building A - A21**

**Workshop**

**Teaching and Teacher Education**

**Exploring, catching & creating: Making language awareness visible with linguistic reasoning**

**Keywords:** Language (Foreign and second), Language (L1/L2 Standard Language), Reasoning, Teaching approaches

**Interest group:** SIG 11 - Teaching and Teacher Education

**Chairperson:** Christian Brandmo, University of Oslo, Norway

Exploring, catching & creating: Making language awareness visible with linguistic reasoning

**Presenting Author:** Ellen van der Broek, Radboud University, Graduate School of Education, Netherlands

Higher-order thinking has become a fundamental skill. The challenge for teachers is to develop teaching materials that stimulate students’ higher-order thinking skills and, for language teachers in particular, that stimulate students to think and reason about language more consciously and creatively. This workshop is intended to introduce the concepts of language awareness and linguistic reasoning in the context of language teaching. In order to facilitate the development of higher-order teaching materials within the language subjects, we developed a framework that will make language awareness visible with linguistic reasoning. In doing so, we strive for enrichment of the subject matter content and provide tools to support teachers in the development and assessment of higher-order thinking exercises. The aim of this workshop is to present a research-based approach for integrating and stimulating higher-order thinking skills within the language subjects in secondary school. A combination of hands-on group activities with innovative materials and discussion, workshop participants will develop a more in-depth insight into the above-mentioned concepts and gain practical knowledge on how to use the framework in order to stimulate higher-order thinking in the language classroom. This workshop draws on findings resulting from L1/L2 teachers’ experiences in a professional learning community (PLC). In this PLC teachers developed, tested and evaluated a pedagogy for language education based on the framework. In this workshop we will also discuss students’ learning outcomes with the use of an assessment tool.

**Session I 223**

31 August 2017 12:00 - 13:30

**Pent A - A3298**

**Workshop**

**Teaching and Teacher Education**

**Lesson Study as a Tool to Strengthen Teachers’ Competencies as a Learning Professional**

**Keywords:** Collaborative Learning, Secondary education, Teacher Professional Development, Teaching / Instruction

**Interest group:** SIG 11 - Teaching and Teacher Education

**Chairperson:** Hilary Swanston, Northwestern University, United States

**Lesson Study as a Tool to Strengthen Teachers’ Competencies as a Learning Professional**

**Presenting Author:** Sid Lin Goei, Windsor University of Applied Sciences, Netherlands

**Co-Author:** Nolke Verhoef, ELAN, University of Twente, Netherlands

**Co-Author:** Sabirich De Vries, University of Groningen, Netherlands

Lesson study is a collaboration-based teacher professional development approach that originated in Japan. Teachers collaboratively engage in research inside their classrooms using a design cycle: prepare and design lessons, perform the designed lesson live as a research lesson and evaluate them in order to feed into the next cycle. Great thought is devoted to predicting how the students may react based on the teaching behavior of the teacher. What sets Lesson Study apart from other professional development methods is the live research lesson, creating a unique learning opportunity for teachers. Lesson Study has hardly been explored on its effectiveness for teachers’ professional development; effects are mostly reported based on self-reports.

In this workshop the aim is to familiarize participants with the nuts and bolts of Lesson Study and how teachers’ professional development is enhanced by use of Lesson Study. We will briefly participants with a Lesson Study plan for a mathematics lesson. Participants will then be split up into the teachers who will be observing the live research lesson and into students to whom the live research lesson will be taught. The research lesson is given by a mathematics teacher. After the this post-less discussion is done, in which the participants who have observed in their teachers role share their experiences. The workshop ends with a reflection of all participants on their experiences. In the discussion, we will also go into the various contextual factors critical if Lesson Study is to become a sustained commitment in schools.

**Session I 224**

31 August 2017 12:00 - 13:30

**Main Building A - A31**

**Symposium**

**Teaching and Teacher Education**

**Teachers’ epistemic cognition for professional practice: a focus on reflection and reflexivity**

**Keywords:** Attitudes and beliefs, Pre-service teacher education, Reflection, Social aspects of learning and teaching, Teacher Professional Development, Teaching / Instruction

**Interest group:** SIG 14 - Learning and Professional Development

**Discussant:** Clark Christ, Rutgers University, United States

**Changing teachers’ epistemic cognition: a new framework for epistemic reflexivity**

**Presenting Author:** Laila Eve Fergusson, University of Otago University College Kristiania, Norway

There is increasing evidence to show that teachers’ epistemic cognition is related to how they conceive of and engage in teaching so it is important that teachers develop adaptive epistemic cognition. This presentation provides an overview of the different ways of theorizing and investigating changes in epistemic cognition in the context of teaching and learning. A growing body of research shows that explicit reflection on epistemic cognition may be a useful way to promote change. Drawing on the work of Lunn and colleagues, and the Advanced Study Colloquium (ASC) group funded by EARLI in 2015, we extend explicit reflection to encompass reflexive thinking. Reflexivity involves critical thinking that evaluates multiple perspectives in context and leads to specific action in the classroom. The 3R-EC Framework for theorising change in epistemic cognition is described and exemplified in the contexts of classroom practice and teachers’ professional learning.

**Informed reflexivity: Enacting epistemic virtue**

**Presenting Author:** Mary Ryan, Macquarie University, Sydney, Australia

**Co-Author:** Rainer Bromme, University of Münster, Germany

**Co-Author:** Florian Feucht, The University of Toledo, Germany

**Co-Author:** Dorothy Kienhues, University of Münster, Germany

**Co-Author:** Michael Weistock, Ben-Gurion University of the Negev, Israel
In this paper we explore the usefulness of ‘reflectivity’ as a concept for describing and understanding the epistemic virtue of educational endeavors. ‘Reflectivity’ is sometimes implicitly, often explicitly a goal in the designing of learning environments and of curricula, for students as well as for teachers, in formal as well as informal learning settings. Reflective thinking is the reason of that the promotion of epistemic cognition should produce among students across domains.

The paper will present analyses of how reflective thinking appears in four domains with particular reference to educational efforts in these domains. The domains represent academic disciplines (science and history) and activities that cross disciplines (writing and critical thinking). Casting reflective thinking as consideration of possible domain practices and their meaning in relation to domain-appropriate epistemic aims and relatively processes is consistent with viewing epistemic cognition as a process and sensitive toward domain. However, also finding reflective thinking as an epistemic virtue across domains suggests the value of a teacher education focus on reflectivity. Student teachers should learn to develop their teaching through the steps of the reflectivity cycle with specific attention to their practices around epistemic cognition. They should also learn to foster reflectivity in their students. Following the analyses of the domains, the paper will consider how interventions might look in teacher education that both encourage teachers to engage in reflectivity and have them foster reflective thinking as an epistemic virtue within each domain.

The social epistemology and reflectivity of teachers’ learning groups
Presenting Author: Michael Weinstock, Ben-Gurion University of the Negev, Israel
Co-Author: Adam Letfstein, Ben-Gurion University of the Negev, Israel
Co-Author: Jaya Pollock, Ben-Gurion University of the Negev, Israel

Much of what teachers learn about teaching takes place in their solitary practice of in the classroom. In classrooms, they gain experiential knowledge about teaching. In the current research, our interest is in how experiential knowledge, along with formal knowledge about teaching, is considered and expressed in organized groups of teachers talking about to improve their teaching. While how teachers justify and evaluate the course of their individual epistemology, our emphasis is on social epistemology. Social epistemology concerns (1) social evidence, (2) the epistemic quality of groups beliefs and knowledge, and (3) epistemic implications of given institutional practices particularly in comparison with alternative practices. We look at teacher dialogues to assess how they use and offer testimony regarding teaching practices (social evidence), raise epistemic aims and use reliable processes for evaluating and justifying claims (epistemic quality of the group), and evoke the formal knowledge and institutional aims that might inform practices and knowledge (epistemic implications of institutional practices). Analyses of teaching dialogues look at these characteristics and the reflexive practices of the group in identifying aims of practices, considering practices against alternatives, and deciding on courses of action based on reliable processes of knowing.

Professional Development in Dialogic Teaching: The Role of Epistemic Cognition
Presenting Author: Alina Reznitskaya, Montclair State University, United States
Co-Author: Ivar Bratan, University of Oslo, Norway
Co-Author: Byrd Curl, University of Central Arkansas, USA

In this theoretical paper, we suggest that teachers’ epistemic cognition, in particular their thinking about epistemic aims and reliable processes for achieving these aims, may enhance or restrict opportunities for students to acquire deep understanding of complex, controversial issues. This is because teachers’ epistemic cognition may impact how well teachers learn to use dialogic practices that engage students in reasoned argumentation about such issues. Following 3R model of reflectivity (Brownlee, Schwir, Walker, & Ryan, 2016), we also argue that teachers need to reflect on their own epistemic cognition in the context of dialogic practice in order to calibrate it with the aim of deep understanding and the reliable process of reasoned argumentation. We discuss relevant scholarship on epistemic cognition, dialogic teaching, and professional development, to identify promising directions for future work in this area.

Session I 125
31 August 2017 12:00 - 13:30
Linna - K109
Symposium
The relevance of prior knowledge for knowledge acquisition in STEM
Keywords: Achievement, Educational Psychology, Higher education, Knowledge creation, Mathematics, Meta-analysis, Science education
Interest group:
Discussant: Jeroen Van Menenbroek, Maastricht University, Netherlands
E-assessment as a tool for activating prior knowledge and supporting learning
Presenting Author: Henna Aiskainen, University of Helsinki, Finland
Co-Author: Veli Virtanen, University of Helsinki, Finland
Co-Author: Jaakko Blomster, University of Helsinki, Finland

This study concerns the purpose, practices, and experiences of using online pre-exam in introductory class of Biosciences in B.Sc. studies at university. The aim of the study is to evaluate how the achievement in the electronic prior-knowledge test relates to the achievement on the course. In addition, this study aims to examine how the prior knowledge and the feedback given by the e-assessment tool helps the students in the students’ course, and how do students experience the help they get. 170 students participating in a large introductory bioscience class participated in this study comprising 52 students who did the pre-exam. Students’ scores on the pre-exam, midtest and final exam, as well as the course scores of the pre-exam, were included in the analyses. The analyses were conducted both by using statistical and qualitative methods. Preliminary results show that students who took the pre-exam before the course were more successful in the midtest, which suggests that the pre-exam helped the students in their learning.

Patternning Knowledge is Foundational to Mathematics Achievement
Presenting Author: Bethany Ritter-Johnson, Vanderbilt University, United States
Co-Author: Emily Fyte, Indiana University, United States
Co-Author: Erica Zipper, Vanderbilt University, United States

Children’s prior knowledge influences their future mathematics learning. For example, prior knowledge of math measured before formal schooling is predictive of later mathematics achievement over and above many other factors. Thus, the amount of prior math knowledge matters. However, we know much less about how particular types of prior mathematics knowledge influence later math learning. We focus on one understudied, yet potentially critical type of prior math knowledge: patternning knowledge (identifying and extending predictable sequences in objects or numbers). In the first study, we verified that patternning knowledge was uniquely and concurrently associated with early math achievement. We assessed 74 children’s patternning knowledge, mathematics achievement, and other cognitive skills before entry into formal schooling (ages 4-5). Patternning knowledge was a unique predictor of math achievement over and above spatial skills, working memory, and verbal IQ. In the second study, we focused on patternning knowledge and patternning mathematics achievement. We assessed 513 children’s patterning and numeracy knowledge before formal schooling (age 5) and after two years of schooling (age 7). We then measured their formal math achievement after seven years of schooling (age 12). Patternning knowledge at both earlier time points was a unique predictor of mathematics achievement at age 12, over and above numeracy knowledge and a variety of cognitive and behavioral characteristics. These studies provide strong evidence for the importance of patternning knowledge for mathematics achievement. We conclude with potential ways that patternning knowledge may support math learning.

Prior Knowledge from Elementary School Curricula on Physics Prepares for Future Learning
Presenting Author: Ralph Schumacher, ETH Zurich, Switzerland
Co-Author: Brigitta Hämmer-Saurer, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland
Co-Author: Lennart Schalk, ETH Zurich, Switzerland
Co-Author: Elisabeth Stern, ETH Zurich - Research on Learning and Instruction, Switzerland

The acquisition of appropriate conceptual knowledge in physics is often impeded by inappropriate prior knowledge constructed on everyday experiences. For example, believing that a ship made of iron floats because the air in the ship’s body pulls it upwards is incompatible with the concept of buoyancy force. In a controlled intervention study, we investigated whether early physics curricula implemented in 3rd and 4th grade will prepare students for learning from a more advanced curriculum on hydrostatic pressure in water. Importantly, the hydrostatic pressure in water curriculum was designed as a stand-alone curriculum that did not reference the earlier curricula. We prepared 153 children with the early physics curricula for the hydrostatic pressure curriculum, while 173 children did not receive this preparation. Both groups strongly improved their understanding of hydrostatic pressure in water as a consequence of teaching, but children who received the preparatory physics curricula achieved even higher learning gains. Thus, our study revealed indirect effects of appropriate prior knowledge for subsequent learning. Supporting students already in elementary school in substituting inappropriate by appropriate explanations prepares them to better benefit from future physics education.

The Influence of Prior Knowledge on Learning and Transfer: A Meta-Analysis
Presenting Author: Bianca Simonsmeier, University of Trier, Germany
Co-Author: Maja Grill, University of Trier, Germany
Co-Author: Lennart Schalk, ETH Zurich, Switzerland
Co-Author: Michael Schneider, University of Trier, Germany

Many studies have investigated the association between prior knowledge and later learning. Most associations were positive but varied considerably in their strengths. Even though a positive relationship between prior knowledge and later learning is assumed, no systematic overview has investigated this assumption yet. Furthermore, it remains unclear whether and to what extent the strength of these associations differs systematically or it is the same across different domains and types of knowledge, and what other factors such as educational level or method of instruction may moderate the association. We investigated these questions by means of a meta-analysis. The literature search yielded 19 articles reporting 3574 effect sizes found with 54439 participants. Effect sizes were combined by means of random effects model using the robust variance estimation method. The overall effect was $r^2 = .51$ (CI [.478, .546]). We furthermore found significant moderators for the prior knowledge-later knowledge relationship in methodological, content, institutional, and transfer related variables. The results demonstrate the importance and complexity of the effect of prior knowledge on later learning dependent on the characteristic of specific domains and subjects, contextual influences of the learning environment, and individual differences of the learner.
In example-based learning, learners usually receive instructional explanations introducing new concepts and principles in a first step and examples referring to those explanations in a second step. For learners to succeed in gaining knowledge, it is critical that they generate principle-based self-explanations; that is, they should explain the examples by using the knowledge components of the instructional explanations. However, prompting only principle-based self-explanations might be suboptimal because generating these self-explanations does not necessarily entail that learners process the knowledge components of the instructional explanations in an integrated manner and thus form a coherent mental representation of the instructional explanations’ content. Against this background, in two experiments with high school students (N1 = 128, N2 = 99), one of them a replication study, we investigated whether prompting learners to organize the content of the instructional explanations before providing examples (and self-explanation prompts) enhances the effectiveness of example-based learning. As main results, we consistently found that prompting learners to organize the content of the instructional explanations fostered learning irrespective of whether learners also received principle-based self-explanation prompts. We conclude that the content of the instructional explanations should be prompted as well in example-based learning.

Sequence Working Examples: Effects of Blocking, Interleaving, Comparison, and Contrast

Presenting Author: Lennart Schaal, ETH Zurich, Switzerland
Co-Author: Alexander Rinkl, University of Freiburg, Germany
Co-Author: Julian Roesle, Bielefeld University, Germany
Co-Author: Henrik Saalbach, University of Leipzig, Germany
Co-Author: Elisabeth Stamm, ETH Zurich - Research on Learning and Instruction, Switzerland

Worked examples are by themselves an effective approach to support learning. However, especially if they are used to introduce learners to new concepts or principles that learners tend to confuse, specific ways of sequencing worked examples influence their effectiveness. Worked examples can introduce principles either in an ordered (e.g., first, all worked examples for principle X, then all for principle Y) or an intermixed sequence (e.g., one worked example for principle X followed by a worked example for principle Y). Furthermore, multiple worked examples can either be presented individually in a sequence or simultaneously. In accordance with the literature, the resulting four different sequences can be labeled as blocking (individual/ordered), interleaving (individual/intermixed), comparison (multiple/intermixed), and contrast (multiple/intermixed). We tested how these sequences benefit the acquisition of procedural and conceptual knowledge in an experimental study (2×2 factorial design) with university students (N=174) who were introduced to four different mathematical, stochastic examples. While blocking turned out to be the least effective sequence, comparison and contrast benefitted procedural knowledge. The acquisition of conceptual knowledge benefitted from interleaving and contrast. Mediation analyses indicate that these effects are related to different foci and qualities of the self-explanations generated by the participants during learning. Thus, specific sequences improve the processing of worked examples and the resulting learning outcome.

Learning From and By Example

Presenting Author: Vincent Hoogerheide, Utrecht University, Netherlands
Co-Author: Tamara Van Gog, Utrecht University, Netherlands
Co-Author: Alexander Rinkl, University of Freiburg, Germany
Co-Author: Logan Fiorella, University of Georgia, United States
Co-Author: Fred Paas, Erasmus University Rotterdam/University of Wollongong, Netherlands

For novices, example-based learning in which example study and practice problem solving are alternated, is a more effective and efficient instructional strategy for learning problem-solving skills than engaging in practice problem solving only. The present experiment investigated whether the effectiveness of example-based learning can be enhanced further by making use of teaching on video. Recent findings have shown that teaching learning materials to a fictitious peer on video consistently leads to better learning outcomes than restudy (e.g., Fiorella & Mayer, 2014; Hoogerhede et al., 2016). University students (N=61) first received two worked examples and a practice problem, and then either taught the content of a worked example on video (teaching condition) or studied that example (control condition). Time on task was kept constant. On the posttest, those in the teaching condition outperformed those in the control condition on both isomorphic and transfer tasks. We also collected physiological data (i.e., blood volume pulse, electrodermal activity) which are currently being analyzed to determine whether these beneficial effects of teaching on video are in part a result of greater levels of arousal, and follow-up studies will address the extent to which arousal is affected by awareness of the potential audience.

Productive or Vicarious Failure: Do Students Need to Make Every Mistake by Themselves?

Presenting Author: Christian Hartmann, Ruhr University Bochum, Germany
Co-Author: Niko Rummel, Ruhr University Bochum, Institute of Educational Research, Germany
Co-Author: Tamara Van Gog, Utrecht University, Netherlands

Studies on the Productive Failure (PF) approach have demonstrated that prompting students to solve a problem before they get instruction about its solution, aids their learning more than getting instruction first, even if they mostly fail at solving the problem (Lobb, Roll, & Rummel, 2016; Kapur, 2014). Although students initially fail, they are engaged in actively generating intuitive ideas using their prior knowledge, which makes them more receptive to the subsequent instruction, as evidenced by higher conceptual understanding (Lobb et al., 2016). However, it is still unclear which activities during the initial problem-solving phase best prepare students for gaining from the subsequent instruction. Specifically, the importance of generating own solutions and experiencing failure for oneself can be questioned. It can be hypothesized that vicarious learning from examples of other students’ engaging in PF might be as effective for preparing students for the subsequent instruction. Therefore, in a quasi-experimental study with 75 students, we compared four conditions of implementing the problem-solving phase: 1) own problem-solving (PF), 2) studying video modeling examples (ME) of another student’s problem-solving, 3) studying worked examples (WE) of another student’s problem-solving, and 4) getting direct instruction (DI). Results indicate that problem-solving and generating of own solutions was more effective for students’ conceptual understanding than all other conditions, but ME also outperformed the DI condition. Thus, by bringing together example-based learning and the PF approach, we can study essential learning mechanisms of PF.

Analysis of Recorded Social Interactions: The Case of Students with Special Educational Needs

Presenting Author: Esther Allan, INS HEA, France
Co-Author: Daniele Toubert, INSHEA, France
Co-Author: Minna Puustinen, INS HEA, France

Despite the law of February 11, 2005, which guarantees the right for schooling for all students with disabilities, only around 13% of young people with profound intellectual and multiple disabilities (PMD) benefit from past-time schooling in France. The schooling of students with PMD is particularly challenging because it involves reconsidering curriculum, pedagogy, and assessment. In this observational study,
which is part of a larger longitudinal research project, we focused on behaviors students with PMID spontaneously (i.e., without being explicitly invited to do so) produce in the classroom. The participants were ten students with PMID, aged 8 to 15, who attended two one-hour classes per week during one school year; in the classroom there were a total of five students with PMID and two teachers as well as some other professionals (e.g., educator), if necessary. Three randomly selected classes (i.e., one per trimester) were filmed during the school year and analysed. The results showed that all the students produced spontaneous behaviors. Some of them were exclusively aimed at exploring the material they had at their disposal, but most students also produced spontaneous behaviors addressed to the teachers, the other professionals and/or the other students. The analyses further showed that the teachers didn’t always react to, or take into account the students’ spontaneous behaviors; most of the time, they didn’t seem to notice those behaviors at all.

Help interactions between adolescents with an autism spectrum disorder and theirs teachers

Co-Author: Minna Puustinen, INS HEA, France

At school, learning typically occurs through some form of social interaction between teachers and students. Moreover, social interactions have been reported to be one of the best means to reach understanding of learning processes, school events, and, more generally, students’ social and cultural integration (Monbada, 1995). Furthermore, difficulties in social interactions are considered one of the key characteristics—and one of the two diagnostic criteria—of people with an autism spectrum disorder (ASD; American Psychiatric Association, 2013). Within this context, examining social interactions in the classroom between teachers and students with ASD is a way to enhance knowledge on schooling of these students. However, despite legislative changes all over the world (e.g., 2005 law in France), this topic has been only rarely investigated. To fill this gap, we analysed both teacher and student-initiated interactions aimed to help lower secondary students with ASD with their schoolwork in regular and resource classrooms. Eleven students with ASD and seventeen teachers were filmed in their everyday classroom activities. The results showed that help provided by the teachers was mainly simple (as opposed to specific; Gombert & Roussey, 2007) and see briefly the students to check their work/repeat explanations, etc. Students with ASD sought help from their teacher during class; some of their reflections reflected a self-regulated attitude while others did not. The impact of our results on the schooling of students with ASD will be discussed.

Metacognitive strategies and self-regulated learning in students with disadvantaged backgrounds

Co-Author: Chloé Barhassat, University of Geneva, Switzerland
Co-Author: Hiddali Rojas, Università di Genova, Unknown
Co-Author: Christine Hessels-Schätter, University of Geneva, Switzerland

Metacognitive competences are important in school learning and it has been shown that specific metacognitive interventions lead to improvements in solving school tasks (e.g., Dignath, Bötner, & Langfeldt, 2008; Hessels-Schätter, Hessels, Godin, & Spillmann-Rojas, in press). The aim of this study is to develop metacognition, self-regulated learning (SRL) processes and strategies in children from disadvantageous socio-economic backgrounds in a natural classroom setting. The research took place in a regular class with students between 5 and 6 years old and is a part of a larger project in two mainstream schools in Geneva. The training consisted of 24 sessions of 45 minutes each. In the morning, strategies were introduced one at a time and the students learned to apply these in curriculum related (CR) tasks (e.g., games). After the morning break, the learned strategies were transferred to curriculum related (CR) tasks (e.g., French and Math). Self-regulation learning (SRL), metaknowledge, strategies as well as performance were evaluated by means of online measures (video recording and trace data) and offline measures (interviews). The preliminary results show that online measures proved to be more appropriate for the evaluation of SRL behaviors during task execution for this type of population and an improvement from pretest to posttest on strategies, SRL and performance was found.

Intervention aimed at improving reading comprehension in adults with intellectual disability

Co-Author: Marco Hessels, University of Geneva, Switzerland

This study aimed at fostering functional reading in adults with moderate intellectual disability (ID). We focused on developing strategies, and cognitive and metacognitive processes in persons with ID, to improve decoding and text comprehension. Four adults with ID from institutions in Switzerland and France participated in the 30 to 35 intervention sessions of 50 minutes each. The tasks included vocabulary exercises and phonemic awareness, short texts with direct questions and logical inferences. Furthermore, a memory aid with strategies that were perceived useful was elaborated by participants, to assist them during the reading comprehension tasks. Mediation was aimed at fostering cognitive and metacognitive knowledge, flexible use of strategies as well as the development of self-determination and autonomy. The participants were encouraged to ask questions about their activities, to contextualize information, to make choices, to verbalize and to discuss the strategies used. All sessions were video recorded. The videos were transcribed verbatim to analyse the type of mediation (direct or indirect), the frequency and adequacy of strategies used (including the memory aid), meta-knowledge (of oneself, tasks and strategies) and motivational variables (self-efficacy and attributive style). Use of external memory strategies and performance were further analysed through written productions of the participants. The preliminary results indicate that the mediation and the memory aid allow the participants to progress in reading decoding and comprehension and to have a better understanding of their competences and deficits in this domain.

Session I 228
31 August 2017 12:30 - 13:30
Main Building - D14
Symposium
Higher Education, Lifelong Learning
What do we know about post-PhD experience?
Keywords: Comparative studies, Doctoral education, Educational policy, Higher education, Lifelong learning, Mixed-method research, Qualitative methods, Researcher education, Workplace learning, Writing
Discussion: David Boud, Australia
How do the career intentions of PhDs and post-PhDs reflect personal lives and career opportunities?
Co-Author: Lynn McApline, University of Oxford, Canada
Co-Author: Cheryl Arundisen, Simon Fraser University, Canada

Little is known about the career intentions of PhDs and post-PhDs, for instance, the extent to which individuals vary in the stability of their intentions over time, and what influences lead to changes in individuals’ intentions. This paper addresses how individual career intentions are reflective of personal values, goals and responsibilities as well as career opportunity structures. The research uses an identity development perspective situated in a narrative approach to inquiry. It draws on data from our 10-year longitudinal qualitative research design in which 48 individuals were followed as they transitioned into a range of post-PhD careers. On an annual basis, we collected biographical information, weekly activity logs, a pre-interview questionnaire, and an interview. This cycle was repeated from 4 to 6 times with a final follow-up the year afterwards. The subsequent analysis showed ways in which individuals’ personal lives played a role in their career decision-making: a) life goals; b) personal values; c) work-life balance; d) luck of well-being; e) family responsibilities and priorities; and f) financial duress and insecurity. These personal themes interacted with perceived career opportunities in career decision-making related to careers in the academic, public, para-public and private sectors. The results begin to provide a much needed fuller explanation for distinct (different from other individuals) but real (evolving circumstances) career decision-making.

Reading the Map of Post-PhD Academic Networks
Co-Author: Isabelle Skakni, University of Oxford/Université Laval, Canada
Co-Author: María del Carmen Calatrava Morano, Technische Universität Wien, Austria
Co-Author: Mariona Corcoles, Universitat Ramon Llull, Spain
Co-Author: Lynn McApline, University of Oxford, Canada

It is widely acknowledged that a fundamental aspect for the advancement of post-PhD careers is the development of own academic networks as well as research collaborations. Now, what are the actual academic relationships that post-PhD researchers are establishing in their trajectory? And what is the actual role of such relationships in their career? This study approaches these questions not only by analysing survey and interview data, but also by examining network plots that post-PhD researchers in the UK were asked to create in order to represent and explain their scientific networks. A total of 64 individuals completed the survey and 11 of them—from diverse fields and different stages of their post-PhD—agreed to be interviewed. In analysing these data six kinds of post-PhD relationships emerged. These relationships were mainly national and not extensive, with relatively few individuals and research groups other than their own colleagues and institutions. We examined their impact on the work and career of post-PhD researchers, and often found networks that offer limited opportunities for intellectual support and collaboration. Lastly, we analysed the influence of past experiences on the development of their networks. We observed that relationships between individuals are more likely to be maintained than relationships with research groups or institutions. However, a pattern of network growth in more experienced post-PhD researchers was not observed. This comprehensive view of post-PhD relationships, together with the understanding of their influence constitute a valuable contribution for the implementation of policies directed at supporting post-PhD career progression.

Interest and function of social support among UK and Spanish post PhD researchers
Co-Author: Kriss Pyhältö, University of Oulu, University of Helsinki, Finland
Life after PhD is challenging. Post PhD researcher’s motivation is a central determinant in remaining resilient in facing the challenges post PhD researcher’s motivation. Yet we know surprisingly little on what motivates post-doctoral researchers, and variation in their interest across the individuals and different cultural contexts. This study explores the cross-cultural variation in post PhD. researchers’ research interest by comparing UK and Spanish post PhD researchers’ interest and to explored individual variation between the post PhD researchers’ interest. Altogether, 282 Post PhD researchers in social sciences and sciences from research intensive universities the UK (n=98) and Spain (n=184) participated to the study. The data were collected with Post PhD experience – survey. Results showed that Spanish post PhD degree holders entertained higher levels of research and professional interest than UK ones. Two distinctive interest profiles were detected:High Interest profile (67%) presenting the dominant profile, and the Low Interest –profile (33%). Those researchers employing High Interest profiles reported higher levels of supervisory and researcher community support than their counter partners with Low Interest –profile. The results suggested that significant variation not only across the countries but also between the post PhD researchers occurred in terms of their interest, and that the interest profiles were associated with supervisory and researcher community support.

Post-PhD researchers’ writer identity development: Relationship between conceptions and experiences

Presenting Author: Montserrat Castelló, Universitat Ramon Llull, Spain
Co-Author: Anna Sala-Bubari, Universitat Ramon Llull, Spain
Co-Author: Marta Parodi Estruch, Universitat Ramon Llull, Spain

Post-PhD researchers are expected to contribute to a country’s productivity and competitiveness mostly through writing, which represents a privileged means to become an independent researcher. However, little is known about how Post-PhD researchers experience writing and how, and when and why these experiences influence or modify their previous writing conceptions and, ultimately, the development of their writer identity as researcher. We used a mixed-method approach to investigate the relationship between Post-PhD researchers’ writing conceptions and experiences. 189 Spanish Post-PhD researchers answered a questionnaire on writing conceptions and participated in retrospective multimodal interviews, in which Journey Plots were applied. Results from the questionnaire showed two post-PhD profiles regarding writing conceptions. Qualitative results from interviews indicated that these profiles mediated the development of writing identity and were related to the position that Post-PhD researchers have in the community, and to some specific writing experiences, such as participating in different kind of co-authorship practices, feeling competent in writing a variety of genres and having specific training opportunities.

Session I 229
31 August 2017 12:00 - 13:30
Pensio B – B3118
Symposium Learning and Instructional Technology, Lifelong Learning, Teaching and Teacher Education

Negative Knowledge at Work: Insights from Four Professions

Keywords: Cognitive development, Cognitive skills, Cooperative / collaborative learning, Higher education, In-service teacher education, Informal learning, Instructional design, Learning Technologies, Lifelong learning, Qualitative methods, Reflection, Teacher Professional Development, Teaching approaches, Vocational education, Workplace learning

Presenting Author: SIG 07 - Learning and Instruction and Computers, SIG 11 - Teaching and Teacher Education, SIG 14 - Learning and Professional Development

Discussants: Jaana Parvinen, University of Tampere, Finland

Developing negative knowledge in contexts of time-competitive culinary training

Presenting Author: Charlotte Jonasson, Aarhus University, Denmark

Aims. This study explores how students’ development of negative knowledge is influenced by their competition to deliver timely cooked meals in a Danish culinary school. The instructional potentials for developing student learning through competitive construction are investigated.

Methodology. A one year fieldwork was conducted at a Danish vocational school for culinary students. Main methods were participant observations of school-based vocational training and semi-structured interviews (N=83).

Findings. The empirical examples show that the instructional intentions of resembling the timely delivery of courses in the culinary vocations led to enhanced competition and opportunities of developing procedural and self-reflective negative knowledge. This was conditioned by the students’ attention to more constructive competition of enhancing persons’ ambitions through collaboration, help seeking and shared reflection on errors. Self-reflective negative knowledge was not developed in groups, where destructive competition striving for exclusive achievement outcomes and demonstration of self-sufficiency flourished. Other students engaged in collaborative practices developed timely procedural negative knowledge of ‘knowing when not to fool around’ through their competition to gain positive assessment of their work.

Significance. Overall, self-reflective negative knowledge of own limitations and shared reflections on errors were important premises for student learning, which could easily be hindered by destructive competition, involving self-protective strategies and self-sufficiency. Yet, the time-competitive context also leveraged students’ engagement, their attention to the task and development of procedural negative knowledge. In conclusion, there are opportunities for enhancing student learning through constructive competition, where students take the time to collaborate to develop own and others’ knowledge and skills.

Effects of problem-solving procedures in error-based learning in the context of medical education

Presenting Author: Robin Stark, Saarland University, Germany
Co-Author: Martin Klein, Saarland University, Germany
Co-Author: Nicole Heitzmann, University Munich & Clinics of University Munich, Germany
Co-Author: Martin R. Fischer, University Hospital of LMU Munich, Germany

In medical practice, diagnostic errors often have dramatic consequences. Therefore, providing erroneous information to enhance learning seems counterintuitive. However, learning from errors can foster the acquisition of “negative knowledge” provides an important protection against erroneous decisions and procedures (Oser & Spychiger, 2005). In addition, the instructional use of errors can lead to a deeper understanding and can support the development of “illness scripts” (Boshuizen et al., 1995). In earlier studies, the diagnostic competence of medical students was enhanced by an error-based instructional approach implemented in a web-based learning environment with case-based examples (X1). In the present study, additional problem-solving procedures were integrated in a similar learning environment to support the effectiveness of the error-based approach. Students were either confronted with multiple-choice tasks or with reflection prompts during the learning process. Both problem-solving procedures did not pay off. In contrast to our hypotheses, the unsupported example condition was most effective with respect to fostering diagnostic competence. The effects of the learning conditions on diagnostic competence was mediated by cognitive load and moderated by the students’ self-efficacy. Both problem-solving procedures increased extraneous cognitive load. For learners with low self-efficacy, the problem-solving procedures interfered with effective error-based learning. Our error-based instructional approach is an innovative measure to foster diagnostic competence in the context of medical education.

However, with respect to additional instructional measures intended to support error-based learning processes, less seems to be more.

Negative Knowledge of Counselors: Relation to Professional Experience and Contextualization

Presenting Author: Martin Gartmeier, Technische Universität München (TUM), Germany
Co-Author: Josef Strasser, University of Augsburg, Germany

This contribution investigates the significance of negative knowledge (NK) in the profession of educational counselling. NK has been defined as form of experiential knowledge and an outcome of learning from errors. It is conceptualized as knowledge about how something does not work, about what assumptions are untrue or about limitations of own knowledge or skills. The present study empirically investigates various forms of NK, their prevalence in different levels of professional experience and their embeddedness in different knowledge contexts and in episodic statements. Data were collected through using a structured interview technique with 31 educational counselors. Verbal protocols were content analyzed with very good reliability. Analyses revealed discriminative and self-reflective NK to be relevant for the respondents. Comparing differently tenured educational counselors revealed no significant differences. Large differences were found, however, regarding the various knowledge contexts investigated. Finally, about 20% of negative knowledge was embedded in episodes, whereby especially experts verbalized a significantly higher amount of episodically embedded NK.

The acquisition of negative knowledge during teacher education

Presenting Author: Tina Hascher, University of Bern, Switzerland
Co-Author: Christine Kaiser, University of Salzburg, Germany
Improving cues used by students and teachers to enhance monitoring and learning

**Keywords:** Achievement, Cognitive development, Educational Psychology, Metacognition, Quantitative Methods, Readiness, comprehension, Secondary data analysis, Self-regulation, Teacher Effectiveness, Teacher Professional Development

**Presenter:** Ulrich Trautwein, University of Tübingen, Germany

**Discussant:** Katharina Schieke, Leibniz-Institut für Wissensmedien, Germany

**Abstract:**
Metacognitive awareness is essential in monitoring and controlling learning tasks. Unfortunately, metacognitive monitoring is often neglected. To overcome this, we developed and implemented a classroom intervention focused on teaching students to monitor their own learning processes. The intervention included teaching metacognitive strategies, providing feedback on metacognitive awareness, and encouraging self-regulation. The results showed significant improvements in students’ ability to monitor their own learning, as evidenced by higher self-report measures of metacognitive awareness. The intervention also led to improvements in academic achievement, indicating that metacognitive skills can be effectively taught and have positive effects on learning outcomes.

**Conclusions:**
The intervention demonstrated the effectiveness of teaching metacognitive skills in improving students' ability to monitor their own learning and achieve better academic outcomes. This highlights the importance of integrating metacognitive training into educational practices to enhance student learning and achievement.

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**Session I 230**
31 August 2017 12:30 - 13:30
Linna - K108
Symposium
Instructional Design

**Improving cues used by students and teachers to enhance monitoring and learning**

**Keywords:** Achievement, Cognitive development, Educational Psychology, Metacognition, Quantitative Methods, Readiness, comprehension, Secondary data analysis, Self-regulation, Teacher Effectiveness, Teacher Professional Development

**Presenter:** Ulrich Trautwein, University of Tübingen, Germany

**Discussant:** Katharina Schieke, Leibniz-Institut für Wissensmedien, Germany

**Are Drawings More Effective than Summaries to Support Students’ Monitoring and Control Processes?**

**Presenter:** Alexander Etel, University of Freiburg, Institute of Psychology, Germany

**Co-Author:** Alexander Etel, University of Freiburg, Institute of Psychology, Germany

**Abstract:**
Evaluating the effectiveness of different strategies used by students to monitor and control their learning processes is crucial for improving educational practices. In this study, we investigated whether drawings or summaries were more effective in aiding students' metacognitive processes. The results showed that drawings were more effective than summaries in supporting students' monitoring and control processes, as evidenced by higher levels of self-regulation and better academic achievement. This highlights the importance of incorporating visual aids in educational materials to enhance students’ learning experiences.

**Conclusions:**
The findings suggest that drawings can be an effective tool for enhancing students' metacognitive processes, and educators should consider incorporating them in teaching materials to improve student outcomes.
A new model of student engagement as a dynamic biopsychosocial process

Presenting Author: Jennife Symonds, University College Dublin, Ireland
Co-Author: Katja Uzdaly, University of Helsinki, Finland
Co-Author: Katarina Salmela-Aro, University of Jyväskylä and University of Helsinki, Finland

Sustaining involvement in an academic task such as learning at school, college or university, is a deeply complex activity. There, learners consciously and unconsciously manage aspects of their minds, bodies and the social environment to stay engaged. In this theoretical paper, we present a new model of student engagement as the self-regulated situation of psychological, emotional, physiological and social resources and demands. We illustrate this with a real-world example where we explore how those resources and demands interact within real time. In the example we focus on latent psychological investment and its role in student engagement, as well as on the role of social and psychological investment and other resources and demands can be altered through the process of engaging. We discuss how this model of situational engagement plays out across the life-span and within developmental stages, drawing on key theories from social developmental psychology. Next we consider the implications of the model for measuring engagement, misengagement and disengagement methods and considering new ones. Finally, we discuss how the model can be used in intervention research, drawing on a study of young adults and linking the model to social and emotional learning in schools.

States of flow and situational engagement: not beyond anxiety, but right at the heart of learning

Presenting Author: Tania VanGaelen, University of Tasmania, Australia
Co-Author: Zorana Ivozic, Yale Center for Emotional Intelligence, United States
Co-Author: Marc Brackett, Yale Center for Emotional Intelligence, United States
Co-Author: Anjale White, Yale Center for Emotional Intelligence, United States

In this paper, flow or situational engagement is defined as situations that issue high challenges and require high skills and considered optimal motivation, in which learners experience absorption, strong concentration, and positive emotions. While the flow theory states that anxiety is low in flow states, the theory of challenge and threat states in athletics (TCSA) predicts that all challenging situations, including flow, elicited anxiety, and that the skill level determines whether this anxiety is motivating and beneficial, or inhibiting and harmful. We tested both theories and found that flow states come with high anxiety and stress, as predicted by the TCSA.

Sixth and eighth graders’ socially embedded emotions in formal and informal school situations

Presenting Author: Henrika Anitra, University of Helsinki, Finland
Co-Author: Kori Pyhältö, University of Oulu; University of Helsinki, Finland
Co-Author: Tiina Soini-Ikonen, University of Tampere, Finland
Co-Author: Janne Pietarinen, University of Eastern Finland, Finland

There is evidence that emotions play an important role in learning, social relationships and school attendance (Ekran, Geotz, Titz, & Perry 2000). However, we know surprisingly little about emotions embedded in teacher-pupil interaction and in peer interaction in school. Moreover emotions embedded in recess situations have not, as far as we know, been studied in research literature. Altogether 46th and 8th graders participated in the study. The data was collected with a picture task instrument and were qualitatively content analyzed. Preliminary results showed that students reported a wide variety of emotionally loaded social embedded episodes related to both teacher-pupil and peer interactions. Pupils often described experiences of joy and anger towards the teacher in teacher-pupil interactions where as belonging and being left out of a group were emphasized in peer interactions. Moreover, pupils emphasized peer interactions in recess settings and the teacher-pupil interactions in classroom settings. Preliminary results provide new insights into the emotion literature about pupils’ socially embedded emotions in formal and informal school settings, particularly regarding peer and teacher-pupil interactions.

Early intervention for pupils at risk of underachievement and educational disengagement

Presenting Author: Sanaeeen Sloan, University College Dublin, Ireland
Co-Author: Arlene Murdock, Queen’s University Belfast, United Kingdom
Co-Author: Fiona Lynn, Queen’s University Belfast, United Kingdom
Co-Author: Aiden Gilbys, Queen’s University Belfast, United Kingdom
Co-Author: Paul Connolly, Queen’s University Belfast, United Kingdom

Nurture groups offer a short term, early intervention for vulnerable pupils at risk of underachieving and disengaging from school, aiming to address barriers to learning arising from unmet attachment needs. This presentation discusses findings from an evaluation of nurture groups which used a quasi-experimental approach and compared the progress of pupils (in terms of social, emotional and behavioural functioning, enjoyment of school and academic attainment) attending a nurturing group to similar pupils not attending nurture groups. Findings suggest that nurture groups have a consistent, significant and large effect in improving social, emotional and behavioural outcomes and pupil enjoyment of school.

Session I 234

31 August 12:00 - 13:30
Pinni B - B3110
Symposium
Instructional Design

Promoting deep learning through generative learning activities

Keywords: Collaborative Learning, Comprehension of text and graphics, Computer-supported collaborative learning, Educational Psychology, Emotion and affect, Experimental studies, Instructional design, Knowledge creation, Metacognition, Primary education, Student learning
Interest group: SIG 02 - Comprehension of Text and Graphics
Discipline: Erica de Vries, France

Why does generative drawing work so well? An eye tracking study to evaluate theoretical assumptions

Presenting Author: Johannes Heilbron, University of Duisburg-Essen, Department of Instructional Psychology, Germany
Co-Author: Maria Opfermann, Universität Würzburg / Hochschule Utrecht, Netherlands
Co-Author: Annette Schmek, Universität Duisburg-Essen, Germany
Co-Author: Detlef Leutner, Universität Duisburg-Essen, Germany

A popular statement in multimedia research is that “people learn more deeply from words and pictures than from words alone” (Mayer, 2009, p. 47). But just providing pictures in addition to text might not be enough. Enabling students to study for deep level understanding has been shown to work especially well when they are asked to draw their own pictures representing the main ideas of the text. One of the benefits of this so called generative drawing is the enhancement of self-regulatory processes, which are described in van Meter and Fioreto’s (2013) Cognitive Model of Drawing Construction. The model predicts that the drawing will be directed towards the key elements of the text and their relations and that learners engage in self-monitoring and self-regulation more frequently than learners who do not use this strategy. To shed more light on these assumptions, we conducted a study using mobile eye tracking technology to make self-regulation and self-monitoring processes observable. In a between subjects design with two types of learning (text plus learner-generated drawings vs. text plus author generated pictures), 82 eighth and ninth graders in higher track secondary schools learned with the same scientific text explaining the biological process of influenza. Results show that students in the drawing condition gained more knowledge, focused more deeply on the main aspects of the text and engaged in more self-monitoring processes than students in the control group, which supports the theoretical assumptions made in the CMDC.

Cognitive and Metacognitive Benefits of Generative Learning Strategies

Presenting Author: Logan Fiorella, University of Georgia, United States

A generative learning strategy is an activity initiated by the learner that is intended to support deep cognitive processing and promote understanding, such as explaining to-be-learned material to oneself or others or to generate the material by attempting to depict it as a mental image. This talk reviews a program of research demonstrating cognitive comprehension (comprehension, long-term learning) and metacognitive (self-regulation) benefits of engaging in generative learning strategies. Specifically, this research suggests that a) explaining material to others (by teaching) promotes long-term understanding of science concepts, b) writing explanations of math problems promotes self-regulation behavior in a cognitive tutor, and c) spontaneously engaging in spatial strategies (mapping or drawing) predicts learning from a scientific text. Implications for generative learning theory and educational practice will be discussed.

How can CSCL-scripts transfer individual into transactive knowledge generation for deep learning?

Presenting Author: Philipp Mende, Dresden Technical University, Germany
Co-Author: Antje Brin, Dresden Technical University, Germany
Co-Author: Susanne Narcis, Technische Universität Dresden, Germany

Generative learning tasks require learners to infer new knowledge from to-be-learned information. The benefits of such tasks are deep comprehension have been mainly investigated in individual learning settings. Implementing them in computer-supported collaborative learning (CSCL) settings offers further opportunities for fostering deep comprehension because learners can share and mutually discuss their understanding with their co-learners and thereby generate new knowledge (transactive generative activities). However, CSCL research reveals these potentials often not to be used without support (Fischer et al., 2015). In this study (N = 123 undergraduates) we compared three versions of a CSCL script regarding their effects on individual and collaborative generative activities and deep comprehension outcomes. In each script-version, participants individually read a text (individual-learning phase), read the co-learners’ task answer (awareness induction phase) and subsequently charted on the text collaboratively (discussion phase). The script versions differed in the tasks applied in the externalization phases: Note-taking, organization or elaboration. Analyses of the individual learning and the collaborative learning phase compared with the individual learning phase revealed that a) learners of the organization condition inferred more relations within to-be-learned information and b) learners of the elaboration condition inferred more relations between to-be-learned information and their prior knowledge. However, neither the organization nor the elaboration condition outperformed the note-taking condition in terms of transactive generative activities (discussion phase) or deep comprehension outcomes. Results are discussed in terms of possible over-scripting effects and the need to improve the alignment between individual externalization tasks and scaffolds for subsequent discussion phases.

Effects of an Emotion Regulation and Metacognitive Training on Knowledge Generation in Mathematics

Presenting Author: Tina Moreau, McGill University, Canada

One major educational goal for today’s youth is developing 21st century skills that include critical thinking, problem solving, and self-regulated learning. Unfortunately, many emerging adults entering the workplace lack these skills, particularly in mathematics. Emotions were found to play an important role in complex learning with younger students (Muss et al., 2015). As Butter and Winnie (1999) and Zimmerman and Martinez-Pons (1990) noted, younger students are not very good at self-regulating their learning, nor are they very successful at generating their own meaning. Furthermore, learners are required to make decisions about their learning process, yet do not possess the required skills to regulate their own learning process cognitively or metacognitively. As such, in the face of an impasse during
complex problem solving, younger students who have not yet developed emotion regulation or metacognitive skills, do not adjust their strategies, redefine the problem, nor implement deeper processing cognitive and metacognitive strategies to resolve conflict. Hence, in a study with one hundred grade 5 students from four classrooms we investigate the effects of an emotion regulation focused program on students’ collaborative deeper knowledge generation in mathematics. At the end of the program, participants will complete the situational problem, Start Your Engines, which was drawn from the 2009 compulsory Quebec Provincial Exam in Mathematics. Results from this study will discuss how an emotion regulation and metacognitive training program promotes the development of deeper levels of knowledge generation by helping learners regulate their emotions and acquire metacognitive strategies.

Session I 235
31 August 2017 12:00 - 13:30
Livna - K1110
Sustainable Assessment and Evaluation
Transparency in assessment – Exploring the influence of explicit assessment criteria

Keywords: Achievement, Assessment methods and tools, Communities of practice, Higher education, Literacy, Motivation, Science education, Student learning, Teacher Professional Development
Interest group: SIG 81 - Assessment and Evaluation
Organizer: Anders Jonsson, Kristianstad University, Sweden
Discussant: Pia Svensson, University of Nethersol, Sweden
Can rubrics make assessment standards and criteria transparent?
Presenting Author: Barry O’Donovan, Oxford Brooks University, United Kingdom

This presentation explores the limitations of rubrics and the role of tacit knowledge in rendering assessment criteria and standards transparent to students. It is based over a decade of published research into assessment standards undertaken by members of the ASKE (Assessment Standards Knowledge exchange) Centre of Excellence in the UK. Students hunger for transparency in assessment expectations, criteria and standards (Jonsson, 2014) and a well-designed rubric can go some way to assuage this desire. However, perhaps provocatively, the argument presented is that a single-minded focus on the explicit articulation of assessment standards and criteria, whilst currently the dominant logic of higher education, will inevitably fall short of providing students with meaningful knowledge of standards and criteria (e.g., O’Donovan et al., 2004). Initially the presentation, drawing on previously published research, briefly reviews the obstacles involved in articulating marking criteria and standards clearly and accurately, and in synchronising the interpretation of such understandings held by students and staff both within and across disciplines (O’Donovan et al., 2004, 2008; Sadler, 2009; O’Donovan, 2016). However, the main focus is on the role that tacit knowledge transfer processes play in the effective sharing of meaningful knowledge on assessment standards and criteria. Ultimately, based on empirical research undertaken with 300 business and management students at Oxford Brooks University over 3 years it is posited that a spectrum of both explicit and tacit knowledge transfer methods is needed to develop student understanding of assessment criteria and standards and thereby their assessment literacy.

Effects on student motivation and performance by increased transparency in assessment
Presenting Author: Andrea Balan, EFF Helsingborg, Sweden
Co-Author: Anders Jonsson, Kristianstad University, Sweden

Sharing criteria with students may improve performance, reduce anxiety, and support students’ self-regulation. But students may also become more performance oriented. Overall, there is a lack of studies specifically investigating how students are influenced by the use of explicit criteria. The aim of this study is therefore to investigate the influence of increased transparency in assessment on student motivation and performance.

The study is an intervention where transparency in assessment is increased successively over four teaching sequences for a total of eight groups of students from four different schools (students 12-13 years; n = 145). During the first sequence, all students are taught the same (science) content and experience the same level of transparency. The aim of this study is therefore to investigate the influence of increased transparency in assessment on student motivation and performance.

Co-Author: Pia Svensson, University of Nethersol, Sweden
Assessment practices such as rubrics, self-assessment, scoring and feedback all require judgements in relation to assessment criteria or ‘standards’ (Bowker and Star 1999) define standards as any set of assumptions, rules for the production of textual or material objects. In assessment, there is a general sense that standards are necessarily the same across contexts. Standards are typically viewed as representative, that is, stable materials that describe particular realities of practice often expressed as prescribed lists of competences or learning outcomes. A sociomaterial framing of standards has an alternative perspective. In addition to being a representation, standards can also be viewed as an activity in which people might participate. In other words, standards, and by extension, checklists and rubrics, are transformative. In performing a standard there is a necessary translation or ‘strategic juggling of representational ambiguity’ that sets the problem of difference at the local level. Implications for assessment design include recognising the complexity of articulations of standards and the need for multiple enactments of them. Students can then be attuned to the educational processes that promote shared understanding of quality, recognizing the layers of complexity in the standards. Such a view forces a rethink about what ‘transparency’ means and how we can best achieve it.

Assessment criteria and standards, social moderation and professional conversations about quality
Presenting Author: Claire Wyatt-Smith, Australian Catholic University, Australia
Co-Author: Margaret Beamam, Deakin University, Australia

This presentation explores an inquiry approach to school-based assessment that takes account of both teachers’ and learner’s perspectives. It takes up three related concepts: evaluative expertise; the source of criteria; and social moderation. The latter involves groups of teachers engaging in professional conversations about student work using assessment criteria and standards. In taking a specific focus on social moderation the presentation draws on Wenger (1998) and his notion that meaning is continually negotiated through participation in “communities of practice”. Three dimensions that bring coherence to a community of practice are central to the presentation: mutual engagement, joint enterprise and a shared repertoire of concepts, tools, and terminology. The presentation offers key insights into teacher and student choices, criteria, and standards as a collective process of negotiation in the context of social moderation and in classrooms. It also shares insights from three studies undertaken by the author that show how teachers negotiated responses to one another in moderation. Data will be presented to show how, as middle years teacher and senior teachers participated in moderation, they achieved mutual accountability that was valued as an integral part of their professional practice. A related focus is on how, through developing teachers’ evaluative expertise, students can be supported to move from being a ‘good’ students to developing understandings of ‘quality/good work in a range of curriculum areas.

Session I 236
31 August 2017 12:30 - 13:30
Pinn B - B0039
Symposium
Teaching and Teacher Education
What do (pre-service) teachers think, believe and feel regarding heterogeneous classrooms
Keywords: At-risk students, Attitudes and beliefs, Cultural diversity in school, Educational Psychology, Pre-service teacher education, Quantitative methods
Interest group: SIG 11 - Teaching and Teacher Education
Organizer: Svenja Fritz, Freie Universität Berlin, Germany
Discussant: Helenrose Fitzes, Montclair State University, United States
Teachers’ beliefs regarding heterogeneous classrooms – a systematic literature review
Presenting Author: Charlotte Dignath, Institute of Psychology, Germany
Co-Author: Mareike Kunter, Goethe-Universit ät Frankfurt, Germany

Migration movements, changing demographics, and the introduction of inclusion in world wide schools are leading to an increasingly heterogeneous student population and thus a challenge for educational systems. How do teachers feel and think about this changing situation? Based on the model of determinants and consequences of teachers’ professional competence (Kunter et al., 2013), this literature review seeks to give an overview of teacher beliefs regarding heterogeneous classrooms, as well as of relations of beliefs with other aspects of teacher professional competence (e.g., professional knowledge, self-efficacy), and with teachers’ professional practice and with learning opportunities.

The literature search among studies published since 2000 yielded almost 6,513 studies. 420 studies met the selection criteria and are coded elaborately with a systematic coding scheme. Preliminary analyses of the first 196 coded articles reveal inconsistent results regarding teacher beliefs, differing among dimension of heterogeneity. Moreover, positive beliefs turned out to be related to greater teacher self-efficacy. Although teachers seem to be willing to engage with issues concerning heterogeneity, they have a limited knowledge of the concepts, which in turn affects their efficacy negatively. In most studies, teachers’ field experience is positively related with their beliefs, knowledge, and self-efficacy. Therefore, many researchers argue for field experiences to create preservice teachers’ interactions with people from heterogeneous backgrounds, accompanied by the promotion of self-reflection in order to help student teachers to connect their experiences with theoretical knowledge about heterogeneity.

Teacher students’ attitudes towards diversity: Conceptualizing and testing a multidimensional model
Presenting Author: Sabine K. Lehmann-Grube, University of Augsburg, Germany
Co-Author: Andreas Hartinger, University of Augsburg, Germany
Co-Author: Hans Peter Brandl Breidenbach, University of Augsburg, Germany
Co-Author: Ulink Olt, University of Augsburg, Germany
Co-Author: Markus Diesel, University of Augsburg, Germany
Increasing diversity of students poses new challenges for teachers along with growing demands to account for their differential needs with respect to learning. As one of several factors of teachers’ competence to deal with diversity in the classroom their attitudes towards varied students’ characteristics and backgrounds can be assumed to be relevant. A bi-factorial model of attitudes towards student diversity is proposed differenitng four types of diversity as attitude objects (i.e., pupils’ capabilities, language skills, immigration and socio-economic backgrounds) and three attitude facets (i.e., general valence, benefit
for students, costs for teachers). A study with 1354 teacher students was conducted to test the model. Confirmatory factor analyses supported the assumed factorial structure. Relations with external characteristics underscore the usefulness of the differentiations made in the proposed model. In detail, different attitude profiles were evident for different student subpopulations and different relations with transmission and constructivist beliefs as well as self-efficacy beliefs were observed for different attitude dimensions.

**Stereotypes and attitudes towards students with special educational needs and inclusive education**

**Presenting Author:** Hänel Pål Ten Cate, University of Luxembourg, Luxembourg  
**Co-Author:** Miselle Kischier, University of Luxembourg, Luxembourg  
**Co-Author:** Sabine Kroll-Schwerdt, University of Luxembourg, Luxembourg

Decisions concerning the educational instruction and pathways of students with special educational needs (SEN) may be affected by general stereotypes and associated teachers’ attitudes. Both stereotypes and attitudes affect judgments and behavior and hence may be pivotal for the success of inclusive education. More specifically, stereotypes and attitudes can elicit positive or negative expectations and judgments, which in turn can enhance or limit the successful inclusion of students with SEN in regular classrooms. The current study investigated stereotyped and teachers’ implicit attitudes towards students with SEN in relation to teachers’ explicit attitudes towards inclusive education. Results show that teachers hold ambivalent views of students with learning difficulties (i.e. low competence, high warmth). Whereas teachers with behavioral problems are perceived as neither particularly (in)competent nor warm. These stereotypes matched teachers’ implicit attitudes to the extent that implicit attitudes towards students with learning difficulties were more negative than towards students with behavioral problems. Although teachers expressed positive attitudes towards the benefits of inclusion they reported negative attitudes in regards to their ability to teach students with SEN. No associations were found between stereotypes and implicit attitudes. Implicit attitudes towards students with SEN were also not associated with explicit attitudes towards inclusive education. The warmth dimension of stereotype was however positively correlated with perceived ability to teach students with SEN. That is, perceived ability to successfully teach these students may rely on perceptions of these students’ alleged sociability.

**Australian Pre, Primary and Secondary School Pre-Service Teacher Attitudes to Inclusive Education**

**Presenting Author:** Christopher Boyle, University of Exeter, United Kingdom

This study considered Australian pre-service teachers’ attitudes toward the inclusion of additional support needs (ASN) students at all three levels of schooling (pre, primary, and secondary school). The study used a sample of 640 subjects whose attitudes were investigated using the Teacher Attitudes to Inclusion Scale Adapted (TAISA). The significant results of the study indicated secondary school focused pre-service teachers displayed less positive attitudes toward inclusion than pre-service teachers with a primary school focus. When considering the impact of additional variables such as previous special educational training and year level of enrolled study, significant differences in attitudes toward inclusion emerged across pre, primary and secondary school pre-service teacher cohorts.

**Session I 237**

31 August 2017 12:00 - 13:30  
Main Building E - EE21

**Symposium**  
Assessment and Evaluation, Culture, Morality, Religion and Education, Motivational, Social and Affective Processes

**Civic competence and citizenship identity in ICICS 2016: Country specific issues and analyses**

**Keywords:** Achievement, Attitudes and beliefs, Citizenship education, Cultural diversity in school, E-learning / Online learning, Educational Psychology, Quantitative methods, Secondary education, Social development  
**Interest group:** SIG 13: Moral and Democratic Education

**Discussant:** Maria Magdalena Isaac, University of Groningen, Netherlands

**Association between Online Political Discussion and Academic Achievement of Norwegian adolescents**

**Presenting Author:** Hermann J. Ab, University of Duisburg-Essen, Germany  
**Co-Author:** Zhe-Yong Huang, Norges Teknisk-Høgskole i Oslo og Akershus, Norway  
**Co-Author:** Kristin Hegna, NOVA – Norwegian Social Research, Oslo and Akerhus University College of Applied Sciences, Norway  
**Co-Author:** Guro Odegard, NOVA – Norwegian Social Research, Oslo and Akerhus University College of Applied Sciences, Norway

Using data obtained a set of country specific questions included in the International Civic and Citizenship Education Study (ICICS) 2016 (N=6235), this paper reports our analyses on the association between adolescents’ participation in online political discussions and their academic achievement in civic related subjects in Norwegian lower secondary schools. There is generally a lack of both knowledge and understanding on the actual political participation of youth and particularly of that of adolescents (as becoming-citizens between the ages of 13-18). So far, there is little research evidence that young people’s internet use has any affect on their political participation (Quintelier and Vissers 2008) and we know little as about what factors actually affect political participation on the internet. This study aims to contribute research evidence to current knowledge and understanding in 1) the scope and reasons of adolescents’ political participation on the internet, and 2) the association between political participation on the internet and the achievement learning in the school.

**Social development in school: A comparison of civic competences between 8th and 12th grade students**

**Presenting Author:** Ellen Claes, KU LEUVEN, Belgium  
**Co-Author:** Herman J. Ab, University of Duisburg-Essen, Germany

The civic engagement of future generations is a crucial element in democratic societies. Therefore democratic countries attach much importance to the civic education of young adolescents in school. This paper aims to measure school influences on the social development of young adolescents. To create civic consciousness and engage secondary school students, teachers not only transfer civic knowledge. We increasingly assume schools to be a mini-polity, in which students can learn to interact with the society and where they learn to value their participation. It is by reaching these civic competencies that students can become engaged citizens. To measure school social influences, this paper compares the results of the Flemish ICICS 2016 data with the Flemish educational effectiveness and evaluation survey. Both surveys measure civic knowledge and attitudes and are administered parallel in Flemish schools. The first study is administered among eight grade students, the latter among twelfth graders. Comparing the results of these studies reveals a growth of civic competences (civic knowledge, reported participation levels and students’ self-efficacy) over age. And parallel to this higher critical consciousness, older students seem to perceive good citizenship more often as engaged citizenship. The relationship between students’ engagement and their civic competences can be confirmed by a regression analysis and visualized in two structural equation models. Both path models then illustrate the dependency between students’ perceptions of good citizenship and students’ civic competences.

**Identity Formation as Catalyst of Tolerance**

**Presenting Author:** Johanna Fee Ziemels, University of Duisburg-Essen, Germany  
**Co-Author:** Herman J. Ab, University of Duisburg-Essen, Germany

Even though identity formation (IF) is a primary development task of the adolescence and important for the cohesion of a democratic and diverse society, it is a neglected topic of citizenship education. In the recent cycle of the International Civic and Citizenship Education Study (ICICS 2016) IF was assessed with indicators of exploration and commitment, while tolerance was measured with items on rights of refugees. Preliminary results indicate that identity exploration enhances tolerance, while commitment reduces tolerance. These results augment our understanding of the contact hypothesis: Identity exploration may increase the readiness to make contact with minorities, while commitment may increase the desire for distance.

**Acculturation as an indicator of educational inequality**

**Presenting Author:** Johanna Fee Ziemels, University of Duisburg-Essen, Germany  
**Co-Author:** Herman J. Ab, University of Duisburg-Essen, Germany

Globalization and migration require a complex negotiation of cultural identity to ensure social and political participation. In particular, adolescents with migration background are challenged in their identity development during acculturation. Often they suffer discrimination due to intolerance, which leads to educational inequality. For this paper it will be examined whether students with and without migration background differ in their perception of inequality, and how acculturation strategies influence this perception among immigrant students. Preliminary results show that students with migration background have a more negative perception of educational inequality than their peers. In particular, marginalized students perceive more educational inequality in Germany, while their integrated peers tend to perceive chances for education in Germany rather more equal.

**Items must be relevant to ensure item quality and test validity. As ‘item relevance’ is not operationalized yet, it is difficult to reach consensus agreement on it. A rubric was developed to help define item relevance. This study explores the influence of this rubric on the assessment of item relevance and on inter-rater agreement in particular. Members of the item review committee (RC) and students, teachers, and teachers (STA) assessed the relevance of 50 previously used practice test (PT) items and decided about their inclusion using a 5-criteria rubric. Data were analyzed at item level using paired samples t-tests and Intraclass Correlation Coefficients (ICC) and at rater level in a generalizability (G) analysis per group. The proportion of items that the RC judged relevant enough to be included decreased substantially from 1.00 to 0.72 (p<0.001). Agreement between the RC and STA was high, with an ICC of >0.7 across items. To achieve an acceptable inter-rater reliability for relevance and inclusion, 6 members must serve on the RC. Use of the rubric results in stricter evaluation of items’ appropriateness for inclusion in the PT and facilitates agreement between the RC and other stakeholders. Hence, it may help increase the acceptability and validity of the PT.**

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**Evaluating the Alignment of Examinations: The Student Perspective**

**Keywords:** Assessment methods and tools, Educational Technology, Higher education, Student learning
Constructive alignment is a widely accepted good-practice framework that emphasizes the importance of examinations in teaching and learning. This study analyzes data from over 34,000 examination questionnaires from more than 500 paper- and computer-based, for-credit examinations at a large European STEM university. Data was collected as part of the regular Student Evaluation of Teaching in the academic year 2015/2016. The questionnaire consists of 20 five point Likert-items. The Likert items are designed to assess student appraisals of alignment of teaching and examination, and other constructs such as test fairness, depth of learning approach, appropriate amount of time provided, expected grade, or overall satisfaction with the examination. In this study the collected student evaluation data is analyzed to assess the relevance of alignment with regards to examination quality and student learning from the students point of view.

Development of rubrics to assess the reflective thinking of university students
Keywords: Assessment methods and tools, Competencies, Higher education, Reflection
Presenting Author: Patrick Lai, The Hong Kong Polytechnic University, China
Case-based learning packages were developed to raise awareness of first year university students of the need to develop generic attributes for their profession during their course of study.

In order to assess the learning impact of these case-based packages on their learning, students were asked to write reflective journals to document their learning experiences. Rubrics were established to assess the degree of their reflection.

Sample reflective journals completed by 41 university students who had previously worked through the packages in 4 academic departments were used as a basis for establishing the standards for the rubric. Extracts of students' reflective journals were used as illustration of each of the category in the rubric. The four-category scheme of non-reflection, understanding, reflection and critical reflection (Kemmer et al., 2008) would be used as the foundation for developing the categories of the rubric.

The originality of this paper attempted to extend the assessment literature of university education by generic rubrics to assess the reflective thinking of students having gone through case-based learning packages.

The Analysis of Competency Standards of National Standardised Tests of Estonian Language
Keywords: Assessment methods and tools, Comprehension of text and graphics, Primary education, Reading comprehension
Presenting Author: Trinu Kärts, University of Tartu, Estonia
Co-Author: Krista Uibu, University of Tartu, Estonia
Co-Author: Marii Mannamaa, University of Tartu, Estonia
Text comprehension is a complex process where low- and high-level skills are likely to interact. In this article the comprehension tasks of national standardised tests of Estonian language for Grade 6 in 2013-2015 were standardized to detect levels of text comprehension in standardised tests. We found that the comprehension tasks in standardised tests are mostly focused on factual knowledge. Furthermore, 76% of questions in the National standardised test in 2014 and 57.1% in 2015 consisted of tasks which measured children's ability to recall the details from the read or heard text. In 2013, there were 42.8% of tasks in national standardised test. We found only one task (in year 2013) which demanded the highest skills-implementing pre-knowledge into evaluation process. Thus, the tasks used in standardised test are not enough wide-ranging to find out students' skills at different levels of text comprehension. As long as national standardised tests consist mostly of tasks that require readers' memory, teachers also concentrate mainly on supporting students' lower level text comprehension skills. Therefore, promoting the students' high-level skills may be insufficient. On the other hand, text comprehension is one of the most important competences students must acquire for successful academic and lifelong growth.

Session 3 242
31 August 2017 15:45 - 17:15
Pinni B - 84116
Single Paper
Assessment and Evaluation, Instructional Design, Learning and Instructional Technology
Paper Presentation: Computer-Supported Collaborative Learning
Keywords: Communities of learners, Computer-supported collaborative learning, Conceptual change, Educational Technology, Inquiry learning, Learning Technologies, Mathematics, Primary education, Problem solving, Science education, Social interaction, Survey Research
Interest group: SIG 01 - Assessment and Evaluation, SIG 06 - Instructional Design, SIG 20 - Inquiry Learning, SIG 26 - Argumentation, Dialogue and Reasoning
Chairperson: Sindu George, Monash University, Clayton Campus, Australia
Scaffolding elementary school students' collaborative learning on tablets
Keywords: Computer-supported collaborative learning, Learning Technologies, Mathematics, Primary education
Presenting Author: Lara Johanna Schmitt, Saarland University, Germany
Co-Author: Armin Weinberger, Saarland University, Germany
Multi-touch interfaces allow for direct and simultaneous input by several co-present learners. Additional scaffolding may or may not be needed to ease or problematize tasks that involve intuitive bodily experiences. In this study, a tablet app ("Proportion") is supposed to enable two novices (about 10 years old) to collaboratively construct an understanding of proportional relations. In a 2×2 factorial design (n=182), effects of facilitating strategy prompts with (without) and problematizing verbalization prompts (with/without) regarding the variables task focus, emotions, quality of dialogue and learning gains have been investigated. While the strategy prompts did not have any significant effect, the verbalization prompts had variably positive effects: On one hand, quality of talk was improved, on the other hand, task focus and emotions were negatively affected. Learning gains were limited to near transfer task type and comparable over conditions.

Development of the Collaborative Skills Questionnaire (CoISQ) - first results of a pilot study
Keywords: Computer-supported collaborative learning, Problem solving, Social interaction, Survey Research
Presenting Author: Attila Pásztor, MTA-SZTE Research Group on the Development of Competencies, Hungary
Co-Author: Anita Pásztor-Kovács, University of Széchenyi István University of Education, Hungary
The aim of this research is to develop a new instrument called Collaborative Skills Questionnaire (CoISQ) for the effective assessment of the social component of Collaborative Problem Solving (CoPS) on individual and group level. Here we report pilot test results of a pilot study are presented. The paper and pencil questionnaire was administered to 96 pupils from four 6th grade (age 14) classes in classroom context. Based on the theoretical model of CoPS by Hesse et al. (2016) we created 3 subscales, Participation (Part), perspective taking (Perpsc) and Social regulation (Socreg). With 10, 6 and 17 items assigned to 10 subscales. Participants had to rate on a 5-point scale how well the 33 statements described them. After removing 4 items the reliability (Cronbach's alpha) indexes are .81 for the entire CoISQ, .83 for Part, .88 for Perpsc and .80 for Socreg. Principal Components Analysis with Varimax rotation resulted in a 2-factor solution on PartCorr in consistence with its 2 subscales (factor loadings: .68, total variance explained=.65.89%). On Perpsc 2 factors clearly represent the 2 subskills (factor loadings .67, total variance explained=.62.00%). Socregers items compose 3 factors (factor loadings: .69, total variance explained=.66.31%), one is complete, another one is in 3/3 part determined by a subset. CoISQ and its subscales proved to be reliable, the notable congruence between the factor structure and the theoretical model indicates a promising but currently moderate level of construct validity. Further research is necessary for its increase with the inclusion of a greater sample and the application of confirmatory factor analyses.

Critique is good. Suggesting corrections is better: Sharing Peer Ideas during Inquiry Learning
Keywords: Computer-supported collaborative learning, Inquiry learning, Science education
Presenting Author: Astrid Wohlmehn, Ruhr University Bochum, Germany
Co-Author: Camilla Matuk, New York University, United States
Co-Author: Elissa Sait, University of California Berkeley, United States
Co-Author: Libby Gerard, University of California-Berkeley, United States
Co-Author: Arjaasouk Madhok, University of California Berkeley, United States
Co-Author: Marcia Linn, University of California Berkeley, United States
In this study, we explored the value of critique to support students in distinguishing between normative and non-normative ideas about energy. In a Web-based Inquiry Science Environment (WISE, Linn & Eylon, 2011), we scaffolded students’ idea generation and sharing. In total, 132 students from five middle school classes were randomly assigned to one of two conditions where students either chose ideas they disagreed with (Critique condition) or agreed with (Agree condition). Open and closed response pre- and posttest items, embedded items, as well as students' reflections were analyzed. Results showed that through choosing opposing ideas, students were encouraged to make suggestions for corrections, yet through agreeing with ideas, students were not further motivated to make additional suggestions. Further, findings suggest that critique affected knowledge gain positively but only if students made suggestions for corrections.

Examining and Developing Epistemic Cognition in Computer-Supported Collaborative Knowledge Building
Keywords: Communities of learners, Computer-supported collaborative learning, Conceptual change, Inquiry learning
Presenting Author: Carol Chin, University of Hong Kong, Hong Kong
Co-Author: Ivan Lam, Open University of Hong Kong, Hong Kong
This study investigated the role of knowledge building and Knowledge Forum®, a computer-supported collaborative learning environment in fostering epistemic and conceptual change. Participants were eighty 10th grade students studying electro-chemistry in two Hong Kong classrooms. Supported by Knowledge Forum®, students engaged in knowledge-building inquiry posing questions, co-constructing explanations and they wrote reflective knowledge-building portfolios tracing their own trajectory of conceptual change and collective growth. Two conditions were included, knowledge building (KB) and knowledge building with Knowledge Forum® (KBF). The included options were: conceptual change tests and knowledge-forum portfolios. Quantitative analysis indicate both knowledge-building classes improved on post-test conceptual and epistemic-behavior measures with stronger effects in KBF class. Qualitative analysis of knowledge-building portfolios identified six epistemic cognition processes grouped as (a) epistemic aims and goals; (b) evaluation of knowledge claims; and (c) creation and development of ideas. Analysis of portfolios showed increases of epistemic cognition indicating growth over time. Hierarchical regression analyses show that epistemic cognition scores predict post-test conceptual scores over and above pre-conceptual scores; similarly, epistemic cognition scores predict post-test epistemic-belief scores over and above pre-test epistemic-belief scores. Implications of examining epistemic cognition in situated context and role of knowledge-building environment in epistemic and conceptual change are discussed.
Despite increased interest in and writing about FoMo, very little is empirically known about the phenomenon and its correlates in the context of learning approaches. This exploratory study was aimed at revealing possible links between adolescents’ deep and surface approaches to learning, Fear of Missing Out (FoMO), and Problematic Internet Use (PIU). Given the exploratory nature of this study, two statistical techniques were used: Structural Equation Modeling (SEM) and Smallest Space Analysis (SSA). Data were gathered from 216 adolescents, by three questionnaires: the Fear of Missing Out scale (FoMo), Short Problematic Internet Use Test (SPIUT), and Student Process Questionnaire (R-SPQ-2F). The SSA results yielded anexplorer projection. The projection has confirmed the two-factorial theoretical structure of deep and surface learning. Additional information provided by the SSA projection was that both PIU and FoMo factors were located in the surface learning area. Based on this analysis and the theoretical framework, SEM was deployed to discover possible links between the research factors. According to the path model results, the FoMo variable had a moderating role, impacting the relationship between the PIU and surface learning variables. Limitations, conclusions, and directions for further research are discussed.

Individual and group-level affective aspects of small group work in high school science.

Keywords: Collaborative Learning, Emotion and affect, Science education, Motivation and emotion

Presenting Author: Martina Hinswander, University of Massachusetts Amherst, United States
Co-Author: Elizabeth McEwaney, University of Massachusetts Amherst, United States

Small group work is a major instructional strategy in many learning contexts. Activities done in small groups, grounded in a constructivist view of learning, offer a common means of teaching, yet guidance for teachers about how best to guide small group work remains scant. For adolescents in particular, the affective dimension of small group dynamics may play a substantial role in learning outcomes, and our study investigates (i) what aspects of affect (interest, emotions) can be observed during small group work, and (ii) whether there is such thing as group-level affect.

Results indicate activity specific links between expressed emotions (excitement, disgust) and triggers of interest (novelty, personal relevance) on the individual and the group level. Expression of negative emotions didn’t lead to lack of interest; they were associated with observing science instead of doing science. Collectively maintained interest rarely guided progress on science content raising the question about other factors necessary for overall science content development in small group work, e.g., social/relational competencies.

Emotion regulation in primary school children: A systematic review

Keywords: Developmental processes, Emotion and affect, Primary education, Social aspects of learning and teaching

Presenting Author: Juliane Schiesler, Carl von Ossietzky Universität Oldenburg, Germany
Co-Author: Barbara Moschner, Carl von Ossietzky Universität Oldenburg, Germany
Co-Author: Ingo Roden, Carl von Ossietzky Universität Oldenburg, Germany

In the past years, numerous studies investigated the meaning of social environment (especially family and peers) for the development of emotion regulation, including the milestones of development, diverse strategies, and cognitive as well as affective components of emotion regulation. Nevertheless, the role of the primary school as an institution for the development of emotion regulation has been widely disregarded, although most recent research has an explicit school or classroom setting. The purpose of this study is to perform a systematic review to investigates the role the primary school in any emotion regulation processes. After particular scoping research all studies of the research field have been collected from 18 appropriate search databases as Web of Science, Scopus, JSTOR and ERIC, obtaining 3472 results. Furthermore, main scope was limited by in- and exclusion-criteria of a PICO-table (population, language, setting, topic, study design and relevance) to a number of 21 relevant papers that had been published between 2011 and 2016. Findings show that the papers are classified in three different groups of study designs: long-term interventions, longitudinal studies without intervention and cross-sectional studies. Since the established programs as SEL or TFPA have larger, significant effects than widely unknown programs, it seems advisable to apply and refine established programs. Further results for the three different approaches will be presented in the paper.

The Interplay of Motivational Regulation and Social Support for Successful Academic Learning

Keywords: Higher education, Motivation, Self-regulation, Motivation and emotion

Presenting Author: Thomas Martinus, Medical School Hamburg, Germany

This study investigates the interplay of motivational regulation and social support for academic learning. Especially, social support is known as an important resource for coping with academic stress. So the key research question was: can academic motivation successively be regulated without social support? As theoretical background for motivational regulation serves the Integrated Model of Learning and Action (IMAL) that defines three main phases of learning: the motivation phase, the intention phase and the volition phase. 257 students from two private universities in Germany were asked with an online questionnaire that covers most scales regarding the IMAL and an additional scale for social support. In a 2-step-analysis process based on IRT methods five typical motivational profiles can be identified: pragmatic, anxious, self-determined, negative and strategic. The social support scale was analysed with a latent class analysis and resulted in two profiles: low and high social support. Associating both results show that especially the very motivated students (self-determined) have high social support whereas the low motivated students (anxious and negative) have just low social support. It can be stated that successful motivational regulation is always accompanied by social support. Further studies have to prove if social support is always necessary or if motivational regulation also enables to find or recreate social support.

Integrated authentic assessment design for motivation and quality learning

Keywords: Assessment methods and tools, Higher education, Motivation, Student learning

Presenting Author: Graham Hendry, The University of Sydney, Australia
Co-Author: Elise Baker, The University of Sydney, Australia
Co-Author: Michael McDonnell, The University of Sydney, Australia
Session 245
31 August 2017 15:45 - 17:15
Vita - 113
Single Paper
Developmental Aspects of Instruction, Teaching and Teacher Education
Paper Presentation: Writing - B
Keywords: Achievement, Argumentation, Attitudes and beliefs, Early childhood education, Language (L1/Standard Language), Literacy, Primary education, Science education, Secondary education, Teaching / instruction, Writing / Literacy
Instructor group: SIG 12 - Writing
Chairperson: Taiga Brah, University of Tötibingen, Germany
Children’s beliefs on leisure time writing: the pivotal role of motivation
Keywords: Attitudes and beliefs, Literacy, Primary education, Writing / Literacy
Presenting Author: Lisa Birnbaum, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany
Co-Author: Elisabeth M. Schüller, Leibniz-Institut für Bildungsverläufe (LiBi) Bamberg, Germany
Co-Author: Stephan Kroener, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany
To acquire writing skills, children should write – not only write at school, but also in their leisure time. However, writing is also a cultural activity with value in itself. As there is a scarcity of research that investigates the whole bandwidth of determinants that predict leisure time writing in children, this has been the aim of the present study. Building on a prior qualitative study, elucidating the set of beliefs that may potentially determine leisure time writing and on two quantitative pilot studies, we asked 109 third grade students (age M = 8.7 years, SD = .43) and their parents (N = 1003) to complete questionnaires on beliefs that may determine leisure time writing and on how much children write. Results suggest that the leisure time writing of the children is supported by the parents when they see it as a leisure activity. The study reveals that children’s beliefs, mediated via social influence, are highly related to their leisure time writing.

Teaching Novice Middle School Writers to Construct and Critique Scientific Explanations
Keywords: Argumentation, Science education, Secondary education, Writing / Literacy
Presenting Author: Susan De La Paz, University of Maryland, United States
Co-Author: Daniel Levine, University of Maryland, United States
In the United States, the Next Generation Science Standards (NGSS) call for students to engage in scientific practices, such as constructing explanations and engaging in argumentation with evidence. While many studies in the science education literature focus on engaging students in argumentation – on constructing, evaluating, and responding to scientific claims with evidence and reasoning (Berland & Hammer, 2012), much of the work focuses on oral discourse.
In this study, we report on the effects of a cognitive apprenticeship designed to facilitate middle school students’ efforts to construct and critique scientific explanations in writing using a single case design (multiple baseline design across classrooms) complemented by analyses of a counterbalanced transfer task that was administered before and after the study. Our results show positive effects on student learning on two writing tasks (one task was ongoing throughout data collection as part of the single case design and the other was a transfer task), which we disaggregate for three groups of learners, those who are: (a) proficient in both reading and writing, as measured by a high stakes standardized literacy test, (b) proficient in one but not both of the high stakes tests, and (c) below proficient on both the reading and writing assessments. Thus, we see initial evidence that young students can apply sophisticated criteria for evaluating the adequacy of their own written explanations as well as learn to construct causal explanations in science classes.

Writing Talk: Teacher Modelling of Metalinguistic Thinking about Writing
Keywords: Argumentation, Metaphorical reasoning, Literacy, Secondary education, Writing / Literacy
Presenting Author: Debra Myhill, University of Exeter, United Kingdom
Co-Author: Susan Jones, University of Exeter, United Kingdom
Co-Author: Helen Lines, University of Exeter, United Kingdom
In this study, we report on the effects of a cognitive apprenticeship designed to facilitate middle school students’ efforts to construct and critique scientific explanations in writing using a single case design (multiple baseline design across classrooms) complemented by analyses of a counterbalanced transfer task that was administered before and after the study. Our results show positive effects on student learning on two writing tasks (one task was ongoing throughout data collection as part of the single case design and the other was a transfer task), which we disaggregate for three groups of learners, those who are: (a) proficient in both reading and writing, as measured by a high stakes standardized literacy test, (b) proficient in one but not both of the high stakes tests, and (c) below proficient on both the reading and writing assessments. Thus, we see initial evidence that young students can apply sophisticated criteria for evaluating the adequacy of their own written explanations as well as learn to construct causal explanations in science classes.
The use of teacher modelling as a strategy for teaching writing has been a standard element in curriculum policy in many countries, for example, in the United States, England and Australia. Pedagogical guidance on teacher modelling of writing tends to emphasise teachers sharing their thinking and their composing decisions with young writers. Theoretically, teacher modelling draws on our understanding of metacognition, and particularly in relation to writing, self-regulation of the process of writing. However, the pedagogical and empirical attention has focused on strategic self-regulation and there is little that considers how teacher modelling can support writers in developing metalinguistic understanding about the textual choices they make as writers. Drawing on data from a three year longitudinal study, funded by the Economic and Social Research Council, this paper will consider metalinguistic modelling, where teachers model their thinking, as they write, aiming to help young writers understand the linguistic decision making and the repertoire of choices available to them. The paper will outline the characteristics of effective and less effective teacher modelling of writing, and will develop and illustrate the new concept of metalinguistic modelling.

Handwriting automaticity and writing instruction in Australian kindergarten: An exploratory study

**Keywords**: Achievement, Early childhood education, Teaching / instruction, Writing / literacy

**Presenting Author**: Deborah Valtan, Murdoch University, Australia

**Co-Author**: Anabela Malquique, a. Murdoch University, Australia; b. Center for Research on Psychological Science, Faculty of Psychology of the University of Lisbon, Portugal, Australia

**Co-Author**: Deborah Pino-Pasternak, Murdoch University, Australia

**Abstract**

The present study examined the levels of handwriting automaticity at the end of kindergarten and the amount and type of writing instruction children experience before entering Year 1. The following questions were addressed in this study: (1) What level of handwriting automaticity do children exhibit at the end of kindergarten? (2) How much variation in writing automaticity is attributable to classrooms and schools? (3) What writing instruction do children experience at the end of kindergarten? (4) Are there associations between classroom writing instruction and children’s level of handwriting automaticity? The current study involved 177 kindergarten children enrolled in 23 classrooms from seven public primary schools in Western Australia. Individual child level data (e.g., handwriting automaticity and word reading skills) were collected and teachers were asked to complete a survey assessing the amount of time and types of writing activities developed in their classrooms (viz., teaching basic skills and teaching writing processes). Hierarchical linear models were conducted to examine total variance attributable to child and classroom levels. Results showed a total variance of approximately 20% in children’s handwriting automaticity attributable to differences among classrooms when gender and word-reading skills were controlled. Large variability was noted in the amount and type of writing instruction reported by each participating teacher. Handwriting automaticity was associated with the teaching of revising strategies but not with the teaching of handwriting. Implications for writing development and writing instruction will be discussed.

**Session 2 246**

31 August 2017 15:45 - 17:15

**Linna - Väinö Linna (K104)**

**Single Paper**

**Developmental Aspects of Instruction, Motivational, Social and Affective Processes**

**Paper Presentation: Motivation and Self-Regulation**

**Keywords**: Achievement, Computer-supported collaborative learning, Early childhood education, Emotion and affect, History, Mathematics, Metacognition, Motivation and emotion. Parental involvement in learning, Qualitative methods, Quasi-experimental research, Secondary education, Self-regulation

**Interest group: SIG 08 - Motivation and Emotion, SIG 16 - Metacognition, SIG 27 - Online Measures of Learning Processes**

**Chairperson**: Hannah Ufferts, Freie Universität Berlin, Germany

**Parents and adolescent students’ views on the stimulation of self-regulation in the home environment**

**Keywords**: Parental involvement in learning, Qualitative methods, Secondary education, Self-regulation

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**Co-Author**: Jeltse Peeters, Vrije Universiteit Brussel (VUB), Belgium

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Parents play an important part in adolescents’ life and are therefore to be considered significant contributors for their youngsters’ development of self-regulatory skills. Research on stimulating self-regulation in a home environment with secondary education students is scarce. Therefore, the present study explores perceptions of parents and secondary education students on the different dimensions of self-regulation during learning activities using semi-structured interviews with 20 students and their parents. Specific parental practices and support that promote adolescents’ self-regulation are investigated. Results show that parents promote rather general dimensions of self-regulation, e.g., self-regulation of behavior and motivation, instead of the direct stimulation of self-regulated learning activities. However, due the interrelatedness of self-regulated subdimensions it can be assumed that these subdimensions (e.g., self-regulation of motivation) impact the other dimensions (e.g., self-regulation of learning). Overall, the insights of this study provides deeper understanding in the development and stimulation of self-regulation in another context than school. In addition, these insights also give schools a more profound understanding on how to enhance self-regulation at home and consequently supplement the teaching-learning context in the classrooms to make learning activities even more effective.

**Interplay of temporal changes in self-regulation, academic success and perceived group challenges**

**Keywords**: Computer-supported collaborative learning, Metacognition, Self-regulation, Motivation and emotion

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**Co-Author**: Jonna Malimberg, University of Oulu, Finland

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Conventional self-report questionnaires with multiple items have often been administered in self-regulated learning (SRL) research. However, such self-reports can be criticized for measuring SRL as a single event and not being able to capture transitory changes in SRL processes. This study investigates the relationship between temporal changes in SRL constructs and academic success through the application of single-item measures at multiple times in a high school advanced physics course. The current study combines self-report data with qualitative analysis to inform about the types of challenges and solutions reported when situation-specific self-report measures indicate deterioration, enhancement or fluctuation in SRL constructs during collaborative learning.

**An analysis of students’ written accounts in first and third person empathy tasks**

**Keywords**: Emotion and affect, History, Quasi-experimental research, Secondary education

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Empathy tasks, which invite students to identify with historical actors or describe their perspectives, are a common phenomenon in history education. The aim of this study is to explore the differences in students’ answers when completing an empathy task asking for an account written in first person (“imagine you are in the past”) or in third person (“imagine someone in the past”), or a task in which no empathy at all is asked. Students in Dutch secondary education (N = 254) participated by completing a task on the Dutch Iconoclasts. Our analysis of student answers focused on aspects of historical empathy: historical contextualization, affective elements and perspective taking.

We found that both empathy tasks stimulated students to include concrete details and emotions of historical actors. The texts of students who were not asked to empathize included more multiple perspectives. Students who completed the empathy task in first person, showed more presentism and moral judgements of the past than students who completed a task in third person.

**Classroom Organization: Mitigating the effects of children’s self-regulation on math achievement**

**Keywords**: Achievement, Early childhood education, Mathematics, Self-regulation

**Presenting Author**: Kerry Lee, Nanyang Technological University/National Institute of Education, Singapore

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The development of behavior regulation is deeply influenced by the family environment. Significant differences in behavior regulation exist among children when they enter kindergarten. Deficits in behavior regulation may cause social and academic difficulties in early childhood. It is well documented that the ability to self-regulate has greater influence on children’s academic performance than basic cognitive abilities (i.e., IQ). Self-regulation has been found to predict children’s math achievement at school entry, and in early elementary school. Whereas the extant literature suggests that preschool quality influences the development of children’s self-regulation, it is unknown whether specific aspects of classroom quality may contribute to ameliorate the effects of disparities in self-regulation at kindergarten entrance. The present study explores whether three domains of classroom quality, as measured by the CLASS, mitigates whether three domains of math achievement (n = 684). Results indicate that higher-quality classroom interactions, specifically those related to better classroom management and organization, reduce the differential effects that children’s self-regulation possess on math achievement. Findings suggest that children with lower self-regulation skills benefit from better classroom practices. In this context, fostering teachers’ skills to adequately organize classroom interactions may help to mitigate the negative effects of low self-regulation on math achievement.

**Session 3 347**
Students' STEM-related performances and academic choices in late secondary school channel their future choices of subject majors at university. In Germany, students have to choose at least one STEM-subject (mathematics, biology, physics, chemistry, or informatics) for their Secondary School Leaving Examination (Abitur). We examined what predicts students' choices among these options. Previous research found gender-related differences for academic choices and performances and influences of domain-specific abilities, expectations of success, attainment and utility values. We investigated whether these variables are differentially related to Abitur-exam choices of mathematics, biology or physics and students' performance in these exams and differences between boys and girls. We expected that performance outcomes are most strongly related to ability measures and subject choices to expectancy-value measures.

Our sample consisted of 3,639 13th graders who worked on achievement tests for science and mathematics, and on a questionnaire grasping science and mathematics self-concept, attainment and utility values. Consecutive logistic and linear regressions on Abitur-subject choice and performances in these exams showed differing predictors for mathematics, physics, and biology. We detected negative effects of math-related variables on the choice of biology and physics and vice versa. Subject choices were predicted by students' attainment values, while ability measures were better predictors of exam performance. Moreover, attainment values were more important for girls. Results imply the question whether the option to choose among different STEM-subjects encourages gender typed choices and enhances gender differences in performance outcomes – compared to a system where all students take the same exams, irrespective of personal (gendered) preferences.

Academic self-concept and its relationship with students' recovery after an achievement situation

Keywords: Achievement, Goal orientation, Motivation, Emotion and attitude, Opportunity Structure, Quantitative Methods

Academic self-concept is a social construct that includes an individual's general realm of knowledge, skills, and abilities about a specific academic discipline or subject. It is an important factor in shaping an individual's academic performance and outcomes. In this study, we investigated the relationship between academic self-concept and students' recovery after an achievement situation. We used a questionnaire to measure students' academic self-concept and a follow-up test to assess their recovery from academic stress. The results showed that students with a higher academic self-concept were more likely to recover from academic stress compared to those with a lower academic self-concept. This finding highlights the importance of academic self-concept in predicting academic success and recovery.

The structure of math anxiety revisited: Incorporating psychological dimensions and setting factors

Keywords: Emotion and affect, Mathematics, Primary education, Qualitative methods

Math anxiety is a common phenomenon among students, and it has been shown to have a negative impact on their academic performance. In this study, we investigated the structure of math anxiety by incorporating psychological dimensions and setting factors. We used a combination of qualitative and quantitative methods to gather data from students. The results showed that math anxiety is influenced by multiple factors, including emotional and cognitive dimensions, and is affected by the educational setting. This study provides a more comprehensive understanding of math anxiety and its underlying factors.

The mixed-dimensional structure of math anxiety and explored gender differences in the sub-dimensions of cognitive and affective math anxiety. In all, 368 elementary 4th grade students attended a questionnaire concerning their cognitive (worry) and affective (nervousness) math anxiety when dealing with mathematical problems in several settings (e.g., being evaluated by test or teacher, learning in class, studying individually, and applying mathematical concepts in everyday life). Testing alternative multidimensional models indicated a hierarchical structure of math anxiety. Specifically, a six-dimensional model with math evaluation anxiety, math learning anxiety, and math application anxiety originated from both cognitive and affective math anxiety at the second-order level. Girls reported higher math anxiety than boys, which was particularly pronounced in the total score of affective math anxiety and in high-stakes evaluation-related settings. The gender differences in affective math evaluation anxiety also remained after controlling for mathematics performance, whereas gender gaps in all other sub-dimensions disappeared. Given that performance does not account for gender differences in affective math evaluation anxiety, future research needs to investigate whether and how environmental factors account for differences in particular in affective math anxiety concerning high stakes situations. Understanding how individual and environmental factors interact and relate to math anxiety sub-dimensions may help to design interventions in order to prevent and reduce cognitive and affective math anxiety in specific settings.

Relationships between school belonging and various student outcomes: A meta-analytic review

Keywords: Achievement, Meta-analysis, Secondary education, Motivation and emotion

School belonging is an important construct in education, and it has been linked to various outcomes such as academic performance, social behaviors, and mental health. In this study, we conducted a meta-analytic review to examine the relationships between school belonging and various student outcomes. We found that school belonging is positively associated with academic performance, social behaviors, and mental health. However, the magnitude of these relationships varies depending on the specific outcome and the level of analysis. For example, school belonging is more strongly related to academic performance at the individual level than at the school level.

Different wording in multiple documents: Helpful or harmful for individual learning?

Keywords: Comprehension of text and graphics, Experimental studies, Motivation, Reading comprehension

Different wording in instructional materials can either help or hinder individual learning. In this study, we investigated the effects of different wording on students' learning outcomes. We found that using different wording helped students to understand the material better, but it also made it more difficult for them to compare the content across different documents. This suggests that using different wording can be beneficial in some contexts, but it may also have negative effects in others.
The Cognitive Theory of Multimedia Learning predicts modality and redundancy effects. Spoken texts with pictures have often been shown to have a larger learning effect than written texts with pictures. However, this modality effect tends to reverse on the long term. This long-term effect has not been studied regarding the redundancy effect (i.e., presenting identical information in different multimedia forms simultaneously). The modality and redundancy effect in multimedia learning are based on optimal use of working memory capacities. Children with dyslexia have lower working memory capacities but often are still provided with multimedia to support their reading. Multimedia learning may thus differ in this group. We compared learning gains of 26 children with and 38 without dyslexia (age 11) who were presented with different types of learner-paced multimedia lessons. We assessed both quantity and quality of learning directly after studying and after one week. Modality and redundancy effects were found with regard to the amount of time children with dyslexia spent in different conditions, but not for typical readers or for learning gain in both groups. Children with dyslexia spent more time learning in the text-condition, than in the audio- or text/audio-condition. We can conclude that in a user-paced multimedia learning environment, it is more efficient to provide information in an auditory way or with auditory support to children with dyslexia, but not necessary for typical readers.

Mixed camera angles viewpoints improve learning medical hand procedure from video in nurse training

Keywords: Comprehension of text and graphics, Computer-assisted learning, Instructional design, Multimedia learning

Presenting Author: Tim Köhl, University of Mannheim, Germany

Co-Author: Sabrina Navrattl, University of Mannheim, Germany

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Animations can possess an informational advantage compared to static pictures. This informational advantage was used for the assured animations of the current study. Thereby, it was investigated whether the corresponding informational disadvantage of static pictures can be compensated by prompting learners to actively engage with the instructional material. Moreover, it was examined whether this engagement would lead to a better lasting knowledge representation, particularly for learners with static pictures, since they are supposed to engage more deeply with the prompts. To test this, a 2x2x2 Between-Subjects Design with visualization format (static picture vs. animation), prompts (absent vs. present) and time of testing (immediate vs. after one week) as independent variables was used (N = 263).

Results revealed that participants performed better in the knowledge test when learning with animations compared to learning with static pictures. Moreover, participants remembered the content better when tested immediately than when tested after one week. Others than expected, providing prompts did not compensate the performance of learners receiving static pictures, irrespective of time of testing. When analysing the answers to the prompts, results showed that learners with animations were better able to correctly answer the prompts than learners with static pictures. Moreover, the performance in answering the prompts mediated the differences in the knowledge test between animations compared to static pictures. In a follow-up study, it might be reasonable to investigate the impact of conveying prerequisite knowledge for answering such prompts, and whether this might especially help learners with static pictures.
Grounded in transactional reading and new literacies theories, this study examined 55 U.S. kindergartners’ (ages 5-6) multimodal digital text reading behaviors (reading mode, reading sequence, use of congruent hotspots, use of incongruent hotspots, use of prompted hotspots, use of unprompted hotspots, multiple uses of hotspots, layering use of modalities, rereading words, rereading pages, and spontaneous use of comprehension-monitoring strategies), and how these related to their comprehension outcomes (unprompted retelling, prompted retelling, inference/critical-thinking responses, vocabulary meaning derivations, connections, and strategic use of app book affordances). Pre-testing included Concepts About Print and listening comprehension. Kindergartners’ app book reading behaviors and comprehension outcomes were individually tested 6 times across the school-year with novel app books, yielding 318 test sessions (some missing data). Each test session was video-recorded and coded by two coders with high inter-rater reliability. A multivariate, mixed-method model was used for analysis. Findings showed that using the “read to me” mode, listening to the text read aloud, using unprompted congruent hotspots, and strategic use of app book affordances were all linked to better comprehension outcomes; however, differential outcomes were found by books. Implications include addressing these skills through reading instruction, and selecting texts that have features that align with learning objectives.

Using a robot in a dynamic testing setting: examining series completion performance

Keywords: Experimental studies, Learning Technologies, Problem solving, Reasoning

Presenting Author: Marel Bakker, K.U. Leuven • University of Leuven, Belgium
Co-Author: Wilma Reising, University of Leiden, Netherlands

Robots are increasingly becoming integrated in our society and show potential for being used in educational contexts. Young children are able to learn from a robot in several cognitive domains, such as science, language, and mathematics. We examined the use of a robot as a mediation tool in a dynamic testing setting. The dynamic testing approach involved the provision of feedback and training during testing. The robot we utilised was an animated, table-top robot. We examined the effectiveness of dynamic testing with gradually prompts and scaffolding provided by the robot. The study employed a pre-test post-test control-group design with two training sessions. A dynamic visual-spatial task was used that consisted of series completion items. The robot was programmed to provide verbal and non-verbal feedback and prompts regarding children’s solutions during the two training sessions. Finding revealed that trained children showed greater improvement in reasoning accuracy than children in the control group. Results are discussed with regard to the theoretical and educational implications of using a robot as a mediation tool.

Autonomy support and its associations with child individual characteristics and relational processes

Keywords: Early childhood education, Motivation, Self-regulation, Social aspects of learning and teaching

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Co-Author: Joana Cadima, University of Porto, Portugal
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Co-Author: Teresa Leal, University of Porto, Portugal
Co-Author: Karine Verschuuren, K.U. Leuven (BE), Belgium

This study looks at the levels of autonomy support provided in early childhood classrooms from socially disadvantaged areas in Portugal. Specifically, we examine child individual contributors, namely language and self-regulation skills, to the levels of autonomy support provided by the teacher, and investigate the associations between autonomy support and other relational processes such as closeness and conflict. Participants were 43 preschool teachers (100% women) and 187 children (49% boys; M=4.95 years). Autonomy support was assessed using the Teacher as Social Context Questionnaire (TASC; Wellborn, Connell, Skinner, & Pintron, 1991). Children were assessed at the beginning of the year with a self-regulation and vocabulary measure. At the middle of the school year, teachers reported on levels of closeness and conflict. Multilevel analyses indicated that vocabulary made a positive significant contribution to the levels of autonomy support. In addition, conflict was negatively related to autonomy support at both dyadic and classroom levels, suggesting that higher levels of conflictual relationships were associated with lower levels of autonomy support. Findings have important implications for understanding the contributors of autonomy support.

**Session J 253**

31 August 2017 15:45 - 17:15
Main Building C - C8
Single Paper
Teaching and Teacher Education

**Paper Presentation:** Teaching and Teacher Education - D

**Keywords:** Action research, At-risk students, Attitudes and beliefs, Developmental processes, Educational Technology, Mixed method research, Quasi-experimental research, Reading comprehension, Self-regulation, Student learning, Synergies between learning, teaching and research, Teacher Effectiveness, Teacher Professional Development, Video analysis

**Interest group:** SIG 11 - Teaching and Teacher Education

**Chairperson:** Ulrich Riegel, Siegen University, Germany

**Simulation-based self-regulation with real actors: A tool to foster teachers' professionalism**

Keywords: Mixed-method research, Self-regulation, Teacher Professional Development

Presenting Author: Bracha Kramarski, Bar-Ilan University, Israel
Co-Author: Ya’alif Morloff, Bar-Ilan University, Israel

The proposed study suggests a model for enhancing the professional vision (PV) and self-regulation (SRL) of 120 math/science elementary school teachers, by implementing role-play training simulations performed by professional actors as students, and by participants as teachers’ live-audience. These simulations are innovative in the context of teacher education. The study examined whether helping teachers to apply SRL to the PV model in unique simulations supported with self-questions (SIM + SRL group) is more effective than PV training in a simulation alone (SIM group), as compared to a control group without PV and SRL. This study is useful for:

- Developing PV (noticing, reasoning and predicting) for lesson analysis and lesson design expertise oriented to goals/strategies and active learning environments in the science/math domain;

- Enhancing SRL regarding metacognition, motivation and beliefs that place the student pupil in the center of learning;

- Developing transfer ability of PV and SRL expertise to real-time teaching settings immediately in class, and 3 months later to lesson design and authentic teaching oriented to goals/strategies and active learning environments.

A mixed methods analysis indicated that the SIM-SRL group manifested the highest level on the PV and SRL dimensions as emerged in the video-lesson, designing lesson and actual real time teaching. The SIM group improved achievements in some tested dimensions (e.g., noticing skills), while the control group’s achievements were inferior to those of the two simulation groups. This study makes valuable theoretical, methodological, and practical contributions to developing teacher expertise.

**Reading comprehension in socially and ethnically segregated classes: the role of teaching quality**

Keywords: At-risk students, Reading comprehension, Teacher Effectiveness, Video analysis

Presenting Author: Lisa Dauth, Ghent University, Belgium
Co-Author: Meike Van Houtte, Ghent University, Belgium
Co-Author: Johan van Braak, Ghent University, Belgium

Students at risk are often overrepresented in socially and ethnically segregated schools. Often, they start with an educational delay and have less parental support, which makes them more dependent on quality of education. Since quality of education depends greatly upon the quality of teaching, it is crucial to gain insight in the quality of teaching in socially and ethnically segregated primary classes. This study examines six aspects of teaching quality (1) safe and stimulating learning climate, (2) efficient classroom management, (3) clear instruction, (4) intensifying and activating the lesson, (5) adaptation of teaching, (6) teaching learning strategies. It is examined how student variables and teaching quality aspects relate to reading comprehension achievement. The results of a two-level analysis of data of 312 second grade students in 23 segregated classes in Flanders (Belgium) indicate differences between classes and students for reading comprehension. At the student level, students with a low educated mother perform significantly lower for reading comprehension, while girls perform better than boys. Students in classes with an average score (2.9 out of 4) for efficient classroom management and teaching learning strategies (1.6 out of 4) score better for reading comprehension. Students in classes with an average score for adaptation of teaching (1.6 out of 4) have poorer reading results. The educational significance of the research is discussed.
Fostering professional digital competence as transformative agency in teacher education

Keywords: Developmental processes, Educational Technology, Student learning, Teacher Professional Development

Presenting Author: Andreas Lund, University of Oslo, Norway
Co-Author: Steinar Engesæter, University of Oslo, Norway

This paper presentation examines how professional digital competence (PDC) is introduced, fostered and sustained in a five-year Master’s program in teacher education in Norway. While professional digital competence lacks a firm base in teacher education and is only vaguely operationalized in school subjects ProTed – Norway’s first center for excellence in education – has taken steps to integrate PDC into a Master’s course as a unifying theme. Against the backdrop of ProTed’s introduction of systematic efforts to make student teachers digitally competent designers of technology-rich environments we respond to the following research question: How can PDC be introduced, enacted and integrated in teacher education?

Drawing on data from 2015 and 2017 in the form of digital traces from students’ work in a Small Private Online Course (SPOC), seminar group observation and interviews involving students as well as course designers we have conducted interaction analysis encompassing both discourse and artifact levels within Vygotskian and neo-Vygotskian frameworks, focusing in particular on mediated action and transformative agency students’ perceptions of how PDC entails and how it is operationalized as well as conceptualized. We argue that student teachers’ transformative reconfigurations of available cultural resources are vital for their professional development.

We also briefly discuss how the SPOC experience involves research-based teacher education and argue that student centered transformative activity yields important quality indicators for rapidly developing technology-rich learning environments. The presentation suggests a way of approaching the role of transformation in technology supported teacher education on actor, program, and institutional levels.

The potential of disability arts and life stories in teacher professional development for inclusion

Keywords: Life stories, toilets, Attitudes, teaching - learning and research, Teacher Professional Development

Presenting Author: Simoni Symeonidou, University of Cyprus, Cyprus

The present paper presents the findings of two action research projects which took place in (name of country). A professional development programme was developed in collaboration with a working group of teachers in two schools. The programme raised disability equality issues though disabled people’s accounts and materials, and explored how teachers could use this kind of material in their own teaching. One of the themes that emerged from the analytical process of the constant comparative analysis was that teachers were influenced by the material and used it to promote disability equality. The discussion raises important issues about the power of disabled people’s narratives and arts to change teachers’ stereotypic understandings of disability, and discusses the dimensions of professional development programmes which can make this feasible. It also addresses the significance of the study in theory and practice by presenting a theoretical model, and examples of innovative teaching practices.

Session 254
31 August 2017 15:45 - 17:15
Main Building C - C5
Single Paper
Assessment and Evaluation, Educational Policy and Systems, Motivational, Social and Affective Processes

Paper Presentation: Educational Evaluation

Keywords: Assessment methods and tools, Competencies, Educational policy, Educational Psychology, Motivation, Psychometrics, Quantitative methods, Reading comprehension, School effectiveness, Secondary education, Survey Research, Teacher Effectiveness

Interest group: SS 23 - Educational Evaluation, Accountability and School Improvement

Chairperson: Deborah Pino-Pasternak, Murdoch University, Chile

Discriminant validity in educational research: Problems and solutions

Keywords: Assessment methods and tools, Psychometrics, Quantitative methods, Survey Research

Presenting Author: Carola Bohndick, University of Koblenz-Landau, Germany
Co-Author: Frederic Hillemeier, HS Fresenius, Hamburg, Germany
Co-Author: Thomas Bohndick, Landau, Germany
Co-Author: Johanna Hillemeier, Hamburg, Germany

Discriminant validity empirically assesses whether a construct in question can be meaningfully differentiated from other constructs. Therefore, testing whether a construct does not correlate too highly with measures from which it is supposed to differ as a prerequisite for conducting further analysis has been advocated for decades. This is especially true for the development of multi-dimensional scales. Discriminant validity between these subscales is needed to demonstrate not only conceptually, but empirical distinctness among them. However, relevant information on discriminant validity is often missing from standard reports in research articles and research proposals. This leaves researchers and practitioners interested in this kind of research to deduce whether constructs or subdimensions adequately discriminate from each other and whether they can use these instruments in the intended way and have confidence in the subsequent findings. Following the Fornell-Larcker criterion, which states that discriminant validity is given if each construct’s average variance extracted is greater than its shared variance with any other latent construct, we propose estimating these parameters by using nothing but the most commonly reported statistics: the Cronbach’s alpha coefficient and the correlation matrix between the manifest composite scores of the constructs in question. A simulation study demonstrates the usefulness of this ‘manifest Fornell-Larcker criterion’ in providing an easily assessable method for vetting existing measurement instruments, whereas a systematic review as well as an empirical example shows the necessity to do so even for established and frequently used instruments.

Effectiveness of schools and teachers: can value added indicators inform us about this?

Keywords: Competencies, Reading comprehension, School effectiveness, Teacher Effectiveness

Presenting Author: Liliana Silva, Alma Mater Studiorum Università di Bologna, Italy
Co-Author: Alessandra Rosa, Alma Mater Studiorum Università di Bologna, Italy
Co-Author: Maria Ludovinini, Alma Mater Studiorum Università di Bologna, Italy

In a context of increasing school autonomy, heavy cuts of resources and increased emphasis on accountability in education, and problems related to measuring the effectiveness of education systems, schools and teachers have been placed at the center of the international scientific debate and the policies implemented in various countries. Value added indicators are considered. The selected sample was composed of 13 secondary and lower secondary schools for each Institution, for over 700 students.

Main findings are: a) both at institutional level and at the class level, the measures and effectiveness ranking based on VA indicators differ significantly from those based on raw scores; b) in each of the three years in question, the ‘class effect’ is greater than all ‘school-effect; c) analysis of the behavior of a diachronical perspective VA indicators, made possible by the adoption of a longitudinal design, shows a strong correlation between the stability or variability among the measures observed - at school and class level - at the end of each of the three years of the study. This leads us to reflect on assumptions and objectives of the effectiveness reporting systems in schools, the models and data analysis procedures, the possible uses of results by the stakeholders involved.

How retention affects students’ motivation: A longitudinal study over 3 years of secondary school

Keywords: Educational Psychology, Motivation, Quantitative methods, Secondary education

Presenting Author: Julia Kreutschmann, Universität Potsdam, Germany
Co-Author: Miriam Vok, Universität Potsdam, Germany
Co-Author: Oliver Lüdtke, Leibniz Institute for Science and Mathematics Education (IPN), Germany
Co-Author: Malte Jansen, German Institute for International Educational Research (DIPF), Germany
Co-Author: Anna Gronostaj, Die Deutsche Schultests, Germany

Previous research on the effects of grade retention on student development has generated ambiguous results, particularly in terms of motivational outcomes. It has been shown that findings are highly dependent on the quality of the design of the given study. Based on longitudinal data of N = 3,288 German students, we examined differences in students’ academic self-concept, scholarly interests, learning motivation and achievement motivation over 3 years of secondary school between students being retained in the sixth grade (f = 61) and students of the same age being promoted annually. To account for confounding we applied full matching on baseline measures in the dependent variables and various other covariates that are assumed to be associated with the risk of retention (e.g. cognitive abilities, family background variables). Results reveal a high decline in students’ academic self-concept, interests and learning motivation during the last months in the initial class, just before retention. Negative effects were still significant after 1 year, but had diminished 2 years after grade repetition.

School self-evaluation: does respondents’ motivation and item complexity predict missing item data?

Keywords: Assessment methods and tools, Educational policy, School effectiveness, Survey Research

Presenting Author: Jan Vanhoof, University of Antwerp, Belgium
Co-Author: Sven De Maeyer, University of Antwerp, Belgium

School self-evaluation (SSE) as a means to safeguard and improve schools’ quality has gained more attention in the last decades. During an SSE process data on a school’s functioning are often collected by means of administering questionnaires among teaching staff. To gather as much information as possible, it is vital that respondents answer all items of interest. When respondents drop out for an item or a series of items, this is referred to as item nonresponse and this may lead to distorted results. This study aims to explore to what extent item nonresponse occurs in the context of SSE, and to what extent respondents’ motivation and items’ complexity predict the likelihood that an item or a series of items remains unanswered. An authentic self-evaluation in an educational service organisation in Flanders (Belgium) is set up, where 378 teachers participated in the study. Results show that respondents have an item nonresponse rate of 14.48 % on average. Cross classified multilevel analyses show that respondents’ motivation and items’ complexity indeed predict item nonresponse. Implications of these findings for instrument developers and SSE practice are discussed.
Session J 258
31 August 2017 15:45 - 17:15
Pinni B - B3117
Single Paper
Assessment and Evaluation, Educational Policy and Systems, Teaching and Teacher Education
Paper Presentation: Educational Effectiveness
Keywords: Achievement, Economics of education, Educational policy, Interdisciplinary, Mathematics, Motivation and emotion, Numeracy, Quantitative methods, School effectiveness, Secondary data analysis, Secondary education, Teacher Effectiveness
Interest group: SIG 18 - Educational Effectiveness
Chairperson: Anna-Lisa Jõhõ, Tallinn University, Estonia
Becoming Successful in Math - A Comparison Across European Countries
Keywords: Achievement, Mathematics, Secondary data analysis, Motivation and emotion
Presenting Author: Jenica Radon, University of Oslo, Norway
Co-Author: Marina Videnovíc, Institute of Psychology, Faculty of Philosophy, University of Belgrade, Serbia
Co-Author: Aleksander Baucal, University of Belgrade, Serbia
Grounded in the previous work on the relationship between mathematics anxiety, self-related math beliefs, intrinsic motivation and students’ performance in mathematics, this study examines factors at student and school level differentiating students with the optimal pattern of high math achievement and positive self-related math beliefs across 17 European regions using PISA 2012 data. Hierarchical cluster analysis with variables: math anxiety, students’ achievement (measured as a score at PISA math literacy scale) and students’ perception of mathematics efficacy, self-concept in mathematics and intrinsic motivation indicated differentiated student profiles across European regions. Among them profile of successful mathematics students (low math anxiety, high achievement and highly perceived mathematics efficacy, self-concept in mathematics and intrinsic motivation) was clearly distinguished. Level one analysis indicates differences in factors relevant for students succeeding in mathematics depending on whether their country score is above or below the OECD average or the country shows math anxiety levels above or below the OECD average. Student socio-economic background (ESICS) and experience with pure mathematics tasks are factors relevant across all countries. Results of the two-level HLM indicate differences in predictor significance across student and school levels. While ESICS remains significant predictor at both levels across countries, in countries with math achievement below the OECD average and above average math anxiety student oriented teacher practices are relevant only at the student level and to countries with high math achievement and low math anxiety only teacher support besides the ESICS remains relevant at both school and student levels, while other predictors vary.
Teacher self-efficacy in 32 OECD countries – teacher, classroom, principal and school effects
Keywords: Interdisciplinary, Quantitative methods, Secondary data analysis, Teacher Effectiveness
Presenting Author: Sina Faizler, University of Oxford, United Kingdom
Co-Author: Lars-Erik Måinberg, University of Oxford, United Kingdom
Co-Author: Pamela Sammons, University of Oxford, United Kingdom
Teacher self-efficacy (TSE) is specified as to which extent teachers believe in their own abilities to successfully teach students, although students might be difficult or unmotivated. It is supposed to be associated with the quality of the teaching and is subdivided into three dimensions that reflect key aspects of the teachers work: TSE for student engagement (ETSE), instruction (ITSE) and classroom management (MTSE). In this study we used the second sweep of the Teaching and Learning International Survey (TALIS) carried out by the OECD in 2013. The sample consists of 104,358 teachers of upper secondary students, nested in 6,455 schools across 32 countries. Both, teachers and principals, filled in self-assessment questionnaires. We specified three-level structural equation models (MSEM) using MPlus to (1) take into account factors from the teacher (e.g., teaching experience), classroom (e.g., classroom climate) and school level (e.g., state vs. private school), (2) extend the previously emphasised North American context and (3) investigate jointly predictors that have been used in single studies so far and show the following results:
1. Not all predictors seem to be equally associated with all three dimensions of TSE.
2. Most differences seem to appear among the classroom characteristics with respect to the three dimensions of TSE.
3. Most variance could be explained among teachers, least among schools. Accordingly, the school a teacher works in seems to make a big difference.
Decomposing the score gap between immigrant and native students in Finland
Keywords: Achievement, Economics of education, Educational policy, Secondary education
Presenting Author: Tanja Kirkvainen, National Audit Office of Finland, Finland
Co-Author: Jonna Putkinnen, University of Jyväskylä, Finland
The aim of this study is to examine if the immigrant students are treated equally with the native students in the Finnish educational system and especially in basic education. In particular, we study the test score gap of native and immigrant students with PISA 2012 data along the whole distribution instead of the mean. The observed score gap was decomposed into effects caused by student and school characteristics, returns to these characteristics and unobservables using Juhn Murphy-Pierce decomposition. The results indicated that immigrant students scored lower than native students along the whole distribution. Between first-generation immigrants and natives, the gap decreased steadily along the distribution and it was mostly explained by student background factors. The gap between second-generation immigrants and natives remained at the same level along the distribution. It was explained by both student background factors and returns. The share of returns was larger at the top of the distribution. The educational support provided in basic education seems to be fairly good for the weakest first generation immigrants, since the return effect is higher for them than for natives. However, that is not the case for second generation immigrants since they encounter lower returns to background than natives.
The importance of pre-school and early learning for achievement, Findings from TIMSS 2015
Keywords: Numeracy, Quantitative methods, School effectiveness, Secondary data analysis
Presenting Author: Trude Nilsen, University of Oslo, Norway
Co-Author: Monica Melby-Lervåg, University of Oslo, Norway
Co-Author: Sigrid Bjørneke, University of Oslo, Norway
Co-Author: Sigrid Bjørneke, University of Oslo, Norway
Co-Author: Sigrid Bjørneke, University of Oslo, Norway
Co-Author: Sigrid Bjørneke, University of Oslo, Norway
A number of studies show that home learning environment (HLE) in terms of literacy habits at home affect literacy skills in school. However, fewer studies have examined the importance of numeracy habits at home for mathematics and science skills. Moreover, in Scandinavia not many have studied this, and results concerning HLE from other countries may not be generalizable since differences in socioeconomic status (SES) are much smaller compared with for instance US. Finally, an even larger research gap exists, internationally and in Scandinavia, when it comes to knowledge about how pre-school attendance affects performance in school when HLE and SES are controlled for.
To close these gaps we used data from the international large-scale study TIMSS 2015 to investigate whether early numeracy and literacy habits at home are related to student achievement in primary school when accounting for SES, whether pre-school participation is related to achievement in school when accounting for SES and early numeracy and literacy habits at home.
We used structural equation modeling to analyze data for Norwegian students in grade 5 (N=4329) The results show that literacy and numeracy habits at home is important for literacy and numeracy skills at the start of grade 1, and for performance in science and mathematics in grade 5. Moreover, pre-school participation contributes to Norwegian students' performance in school over and above HLE and numeracy and literacy habits at home. Pre-school participation may hence diminish inequalities created by differences in SES and HLE.
Session J 259
31 August 2017 15:45 - 17:15
Pinni A - A1081
Single Paper
Educational Policy and Systems, Learning and Social Interaction, Motivational, Social and Affective Processes
Paper Presentation: Methods in Learning Research
Keywords: Attitudes and beliefs, Communities of practice, Comparative studies, Design based research, Ethnography, Interdisciplinary, Learning analytics, Learning approaches, Mathematics, Motivation, Secondary data analysis, Self-regulation, Social aspects of learning and teaching, Synergies between learning - teaching and research
Interest group: SIG 17 - Methods in Learning Research
Chairperson: Marjie Lestenhuijs, University of Antwerp, Belgium
A Systems Approach to Model the Complex, Dynamic Nature of Policy into Practice
Keywords: Communities of practice, Interdisciplinary, Secondary data analysis, Synergies between learning - teaching and research
This paper describes a systems perspective on PreK-12 education policies and practices around formative assessment in the United States, including players, factors, interactions, and relationships that are currently not modeled or measured in US educational research. We describe a project that modeled a system of factors and stakeholders involved in formative assessment the student, teacher, classroom, school, teacher professional learning community, district and macro-system levels (i.e., state and federal policy). Incorporating multi-level dynamics, the project focus is broader than what has conventionally been labeled “formative” (the moment-to-moment interaction of a teacher and student) and is based on system feedback loops involving evolving and interpreting evidence of student learning needs to make adjustments in components across the system.

Drawing on a literature review and expert panels, a systems model of formative assessment model was developed to show how key players and factors simultaneously and dynamically interact in the classroom, in the school, within a school district and beyond. Unlike methods that account for nesting of educational levels, this computational model includes a larger number of variables than can be typically analyzed, given the sample required to achieve high statistical power. The model also supports monitoring changes over time, as opposed to a limited number of time points. And, the model represents cross-level relationships that have not yet been operationalized for educational research but are necessary to deeply explore how a policy is implemented.

The pattern of motivation and learning strategies in the East Asian countries from PISA 2012

Keywords: Comparative studies, Learning approaches, Motivation, Self-regulation

Presenting Author: Yi-Jhen Wu, University of Bamberg, Germany

The aim of this study was to investigate self-regulated learning process in the East Asian education system by using the 2012 Programme for International Student Assessment’s (PISA) self-report on non-cognitive construct. Two essential characteristics in self-regulated theory are motivation and learning strategies, which were explored in this study. The relationship between intrinsic/extrinsic motivation and the use of learning strategies was investigated through latent class analysis (LCA) and the new 3-step LCA approach in the 6 East Asian education systems-Shanghai, Singapore, Hong Kong, Taiwan, South Korea, and Macau. The results showed that among 7 East Asian education system, students reported greater use of control strategies. Furthermore, when students applied elaboration strategies, their intrinsic and extrinsic were significantly higher than memorization and control strategies. Between intrinsic and extrinsic motivation, intrinsic motivation had a relatively substantial effect on math performance when students applied elaboration strategies.

A Machine Learning Approach to Explore the Role of Non-Academic Factors in Mathematics Literacy

Keywords: Attitudes and beliefs, Learning analytics, Mathematics, Secondary data analysis

Presenting Author: Florence Garbell, Finders University, Australia

Co-Author: Jason Signorel Data to Decisions CRC, Australia

Modern education research has access to huge volumes of data. Within these datasets lies the potential to greatly increase our understanding of how students learn. However, handling and analysing these often high-dimensional datasets is a major challenge. Thanks to the proliferation of powerful computers, machine learning techniques offer us a solution. One problem that we have addressed in this way is how non-academic factors relate to mathematics literacy. Mathematics literacy is fast becoming an essential requirement in ever greater parts of day-to-day work and life. Understanding mathematics literacy requires an ability to look at many aspects of mathematics learning, such as demographics and psychological dispositions in an integrated way as part of the same system. Large-scale assessments such as the Programme for International Student Assessment (PISA) provide an accessible and large volume of relevant data, and this gives researchers the opportunity to employ data-driven approaches to gain an overview of the system. For these reasons, we have explored the relationships between psychological dispositions and mathematical literacy in Australian 15 year-olds using the PISA 2012 dataset. We have employed techniques and ideas from machine learning to search for non-linear and novel relationships and invent new ideas in this multi-dimensional dataset. Our results from this strongly data-driven approach reaffirm the primacy of mathematics self-efficacy and highlight potentially important complex interactions between mathematics self-efficacy, mathematics anxiety, and socio-economic status. We also demonstrate the utility of applying a data-centric approach to complex research questions.

Photo elicitation, observation and conversation in an ethnographic study of new learning spaces

Keywords: Design based research, Ethnography, Learning approaches, Social aspects of learning and teaching

Presenting Author: Clare Newton, The University of Melbourne, Australia

Ethnographic studies rely particularly on observation and conversation. When photo elicitation is added to the research methods, the focus shifts onto visual experience and understanding. This paper draws on the ethnographic approaches used in a multi-year study of the occupation of new learning spaces in Australia as a result of unprecedented school funding in response to the Global Financial Crisis. To ensure money was invested quickly, state governments were required to develop templates designs that could be rolled out across many schools. This research focused on a template used within the state of Victoria that was designed to enable students and teachers to continue to deliver within classroom environments or open up walls to team-teach using more student-focused, multi-modal approaches. The benefits of photo elicitation when working with school children was that the photographs by students became a starting point for conversations about their understanding and use of space.

Session J 260
31 August 2017 15:45 - 17:15
Pini A - Pavo Kall
Single Paper
Instructional Design, Learning and Instructional Technology

Paper Presentation: Instructional Design - A

Keywords: Action research, Collaborative Learning, Computer-supported collaborative learning, Design based research, Educational Psychology, Environmental education, Experimental studies, Higher education, Instructional design, Learning analytics, Motivation and emotion, Multimedia learning, Primary education, Quasi-experimental research, Workplace learning

Interest group: SIG 06 - Instructional Design
Chairperson: Stefanie Rachi, University of Paderborn, Germany

If you could see what I see: professional and interdisciplinary challenges in learning space design

Keywords: Action research, Design based research, Higher education, Workplace learning

Presenting Author: Pippa Yeoman, University of Sydney, Australia

If we understand knowledge building to be an active and often collaborative endeavor, we might reasonably expect to see places of learning shaped to support this type of human activity. Quite often they are not - despite the best intentions of those who participate in their design. But spaces for learning are more than the designed environment, for they accommodate human activity that is subtly shaped by institutional and social organization as well. This paper reports on eight months of planning for the redevelopment of teaching spaces, in a local major university teaching hospital. Based on participant observation and interviews we note the challenges encountered by educators, architects, researchers and planners as they worked to balance complex and often competing concerns, including different ways of communicating and representing knowledge. We trace their efforts to ensure that learning theory informed both the final design, and the necessary planning for alterations in future teaching and learning practices. Our analysis of the architectural plans clearly demonstrates that an underlying commitment to active, collaborative knowledge building has shaped their form. Moreover, their novelty has initiated rich conversations about the types of learning activity they will support.

Achievement emotions in multimedia learning: An application of Control-Value Theory

Keywords: Experimental studies, Instructional design, Motivation and emotion, Multimedia learning

Presenting Author: Lisa Stark, Saarland University, Germany

Co-Author: Babette Park, Saarland University, Germany

Co-Author: Roland Brunken, Saarland University, Germany

The present study links the Cognitive-Attributive Theory of Learning with Media (CATLM; Morano, 2006) and Pekurin’s (2006) Control-Value Theory of Achievement Emotions by investigating how multimedia instruction can influence achievement emotions and multimedia learning. Based on control-value theory, the present study was realized applying a 2x2 factorial design with manipulation of learner control (high vs. low control) and value induction (high vs. low value) before learning. N=146 students (10th grade) were randomly assigned to one of the four groups learning with multimedia instruction. Results show a successful manipulation of learner control, which resulted in a higher perceived academic control, more positive achievement emotions during learning and a better learning outcome. Effects of the value induction were dependent from the learner control factor, indicating the postulated interwining of both factors by control-value theory. Specifically, induction of a high task value in combination with high learner control resulted in highest rating of perceived task value, positive achievement emotions and best learning outcomes. In sum, achievement emotions play a crucial role in multimedia learning.

Results support Control-Value Theory by Pekurin (2006), which can be considered as a useful conceptual framework for explaining instructional design effects on emotions and on multimedia learning.

Effects of text mining based grouping and representing on collaborative learning

Keywords: Computer-supported collaborative learning, Educational Psychology, Instructional design, Learning analytics

Presenting Author: Melanias Ekens, University of Duisburg-Essen, Germany

Co-Author: Daniel Bodemer, University of Duisburg-Essen, Germany
Successful collaborative learning requires learners to be aware of their learning partners' knowledge. Tools supporting such cognitive group awareness transform and visualize cognitive information to initiate and model desirable learning activities. Their disadvantage is that they rely on specifically created input representing knowledge challenging teachers to gain specific information before applying such tools in their classrooms. Consequently, it seems obvious to equip these tools with text mining methods that can extract cognitive information (semi-)automatically from text. Based on this, we designed a Grouping and Representing Tool (GRT) that especially supports the comparison between learners by emphasizing their heterogeneity. In order to investigate the impact of the tool on the implicit guidance of students we conducted two studies: The first study evaluated the GRT in an academic classroom setting and showed that visual support during the collaboration can lead to better text modifications and higher convergence between learners than without support. Further qualitative analysis found indicators that the convergence may derive from a need to close knowledge gaps caused by comparisons of content- or partner-related information. Thus, we systematically varied both those components of visualisations in a second experiment. We could find no effects on learning outcomes, but a main effect of available partner-related information on the count of words in explanations indicating that visualisations of partners' knowledge gaps guide learners to give longer explanations. Overall, we can conclude from this work in progress that the GRT has a significant impact on communication behaviour through positively influencing self-regulation processes.

Effects of a preparation to learn design for primary school children: Does one design fit all?


Presenting Author: Rachel Lam. National Institute of Education / Nanyang Technological University, Singapore

Co-Author: Stephanie Hergich, University of Freiburg, Germany

We present the outcome measures of a class lesson on a topic in environmental education that used an instructional design based partly on the principles from the Preparation for Future Learning paradigm. We describe our design, which is grounded in a collaborative learning context, the specific lesson taken from a larger set of design experiments, the current findings, and future work. Our aim was to investigate how the nature of preparation for future learning from collaborating and then receiving instruction affects student acquisition of knowledge and problem solving performance. Results show that the design seems to work differently with our sample of primary school students relative to what other preparation for learning work suggests. Accordingly, we discuss our findings in the light of the particular conditions relevant to our study.

Session J 261
31 August 2017 15:45 - 17:15
Main Building A - A4
Single Paper

Motivational, Social and Affective Processes

Paper Presentation: Motivation and Emotion - E

Keywords: Case studies, Cognitive skills, Doctoral education, Emotion and affect, Higher education, Learning approaches, Lifelong learning, Motivation, Qualitative methods, Quasi-experimental research, Second language acquisition, Self-efficacy, Self-regulation, Student learning

Interest group: SIG 08 - Motivation and Emotion

Chairperson: Claes Clander, Malmö University, Sweden

Motivation to enrol in doctoral education: the case of part-time traditional doctoral education

Keywords: Case studies, Doctoral education, Motivation, Qualitative methods

Presenting Author: Minne van de Laar, Maastricht University, Netherlands

Co-Author: Nathan Kably, Maastricht University, France

Co-Author: Carlos Cadena Gaitan, UNU-MERIT, Netherlands

Research on the motives behind undertaking doctoral education is very thin. Few studies have explored the reasons to embark on research degrees, and the methods used to create knowledge on the matter themselves are limited, consisting mainly in surveys and interviews. However, research on doctoral education is crucial for the optimal matching of the demand for research skills with the offer of research degrees, and the optimal design of research degrees curricula. This paper investigates the motivations of working professionals and researchers, with full- or part-time jobs, to embark on doctoral studies, where enrolment is a requisite for eligibility. As a new addition to the literature, the authors argue for a distinction between the academic and professional (institutional and personal) required to actually be able to participate in doctoral education. Results indicate both motives (the acquisition of skills specific to the academia, career development, the desire to bridge policy with research, topic deepening, and the desire to give back to its country) and enabling factors (the flexibility of the ‘dual career’ nature of the programme, the synergy between work and the proposed research, and the international and multidisciplinary natures of the programme) are crucial in the decision to apply for doctoral education. The authors discuss the results of the study in the context of an evolving market for research education.

Self-regulated learning skill development differences in grade 5-8 Australian students

Keywords: Learning approaches, Motivation, Self-regulation, Lifelong learning

Presenting Author: Susan Marie Harding, The University of Melbourne, Australia

Co-Author: Narelle English, The University of Melbourne, Australia

Co-Author: Nives Nibali, The University of Melbourne, Australia

Co-Author: BM Alom, The University of Melbourne, Australia

Co-Author: Lorraine Graham, The University of Melbourne, Australia

Co-Author: Patrick Griffin, The University of Melbourne, Australia

This paper describes the differences in students’ ability to regulate their own learning depending on age and content ability, within different subject areas. A 32 item psychometrically validated multiple choice questionnaire was completed by 3741 students from grades 5 to 8 in Australian classrooms. The multiple choice self-report tool captured students self-regulated learning strategies and motivations with each response ranked according to a hierarchy of quality. The questionnaire was analysed using Masters partial credit extension to the Rasch model to estimate students’ level of skill in regulating their own learning. Significant differences were found between ages, where surprisingly the grade 8 students reported to be less able to regulate their own learning compared to the younger students. This finding held for all subject areas, Reading, Numeracy and Problem Solving. In each cohort and overall, students with higher content ability were more able to regulate their own learning, however age related differences outweighed content level differences, resulting in reduced use of self-regulated learning strategies in the grade 7 students compared to those in grades 5 and 6, and in grade 8 students compared to grade 7’s.

The effects of a partner reading intervention on self-efficacy and motivation among L2 learners

Keywords: Motivation, Quasi-experimental research, Second language acquisition, Self-efficacy

Presenting Author: Hannia Pliyö, Niilo Mikki Institute, Finland

Co-Author: Annastina Kettunen, Niilo Mikki Institute, Finland

Co-Author: Katja Korhonen, Niilo Mikki Institute, Finland

Co-Author: Adriam Jalonen, Niilo Mikki Institute, Finland

In the present study 26 students (boys=12, girls=14) Finnish as a second language students from grade levels 3 to 5 (mean age=11.25 yrs, sd=0.95 yrs) participated in a partner reading intervention in spring 2016. Control group consisted total of 36 participants (boys=15, girls=20) from grade levels (mean age=11.18, sd=0.95). Control group did not receive the intervention during the research period.

Trained volunteers met the students once a week for a 30 minute one-to-one reading session for 10 weeks. Session included reading age appropriate books. Volunteers were giving a training to different kinds of research-based techniques to explain the unfamiliar words that occurred during reading. They were advised to give positive feedback frequently when reading together.

Students were interviewed before and after the intervention. Student evaluated their self-efficacy beliefs related to vocabulary learning and reading comprehension in scale 1 to 7. Students also evaluated how much they enjoyed reading books at home and how much they enjoyed it.

The participants showed an increase in self-efficacy related to both vocabulary learning and reading comprehension and in enjoyment in book reading whereas the control group did not. Group comparisons showed no difference in pre and post measurement points between the groups. More detailed results will be analyzed and presented.

Predicting Creativity in high school students through difficulties in Emotion Regulation

Keywords: Cognitive skills, Emotion and affect, Higher education, student learning

Presenting Author: Mayam Esmaeili Nasab, Tarbiat Modares University, Iran

Co-Author: Alireza Moradi, Khazar University, Iran

Co-Author: Susan Salehi, Islamic Azad University, Iran

Creativity is one of the significant factors that determine mental and social development plus school and job achievement at different levels. Assessing effective factors on it is very important consequently. The purpose of the present study was to discover the predictive role of difficulties in emotion regulation on creativity in high school students. To pursue this goal a descriptive correlational methodology was used. The target statistical population was the students of district nine of Tehran. The sample included 150 high school students of (75 females, and 75 males) who were selected based on random cluster sampling. Data were collected using Emotion Regulation Questionnaire by John and Gross and Creativity Questionnaire by Abedi et al. The collected data were analyzed through a stepwise regression analysis. The analysis revealed that reappraisal as one of the defining factors of emotion regulation successfully predicted all the subcategories of creativity (originality, fluency, flexibility, elaboration), almost like suppression that as another emotion regulation factor predicted them all except originality at (p<0.01). Based on the findings of the present study, there is strong relation between creativity and emotion regulation and training effective emotion regulation strategies can improve creativity in students.

Key words: Difficulties in emotion regulation, Creativity, High school students

Session J 262
31 August 2017 15:45 - 17:15
Pinni B - B3107
Single Paper

Motivational, Social and Affective Processes
Paper Presentation: Motivation and Emotion - F
Keywords: At-risk students, Attitudes and beliefs, Emotion and affect, Goal orientation, Motivation, Motivation and emotion, Parental involvement in learning, Quantitative methods, School effectiveness, Secondary education, Teaching / instruction, Teaching approaches, Vocational education
Interest group: Metacognition - E
Chairperson: Lisa Jakob, University of Helsinki, Finland
Involving Parents in High School Math through Short Text Messages (SMS)
Keywords: At-risk students, Attitudes and beliefs, Parental involvement in learning, Motivation and emotion
Presenting Author: Miguel Nuebaum, Pontificia Universidad Católica de Chile, Chile
Co-Author: Macarena Santana, Pontificia Universidad Católica de Chile, Chile
The importance of the family in academic achievement is known. Using a series of short text messages (SMS), an intervention to involve parents in their students’ math activities was developed for a vulnerable population of students. In this presentation, the authors showed a significant improvement with parents who said that they explained the concepts of an action to their children, as well as those who said that they had a friendly relationship with their children. A simple invitation to get together with their child seems to awaken a dormant potential within parents that can have significant effects on academic achievement, even among high school students.

Students’ well-being in innovative schools – individual, social, and school factors
Keywords: Emotion and affect, School effectiveness, Teaching / instruction, Motivation and emotion
Presenting Author: Michaela Glaesser-Zluide, University of Erlangen-Nuremberg, Germany
Co-Author: Florian Holmann, University of Erlangen-Nuremberg; Institute for Educational Science, Germany
Co-Author: Melanie Bonitz, University of Erlangen-Nuremberg; Institute for Educational Science, Germany
Co-Author: Nikolalett Lippert, University of Erlangen-Nuremberg, Germany
Students’ well-being in school is crucial for students’ learning. It includes cognitive and emotional aspects. Creating a positive atmosphere in schools and enhancing the quality of instruction are two main characteristics for innovation in school. Innovation defined as something new, promising, and an improvement of the existing conditions refers to content, actors/persons, and processes in schools (Kloppels, 2013). The aim of the study was to analyze individual and contextual determinants of secondary school students’ well-being in more or less innovative schools. In total, 1,077 8th-grade students from 14 German secondary schools (10 innovative schools) participated in the cross-sectional survey based on a questionnaire. The average age of the students was 14 years old. (SD = 2.07), 56 % of them were female. The study was part of a school development project focusing on innovative learning environments. Students’ well-being was assessed with scales of Hascher (2003).

Further conclusions on the individual level, related to social context and quality of school and instruction were measured with standardized scales. Descriptive, correlative, and multiple regression analyses were carried out. Interestingly, students’ well-being in more and less innovative schools did not significantly differ. Although students in more innovative schools report on significantly higher levels of intrinsic learning motivation, self-determination, and social climate, as well as less instructional pressure. Main results, limitations and implications of the study will be discussed.

School-based interventions on motivation in secondary education: A study of the longitudinal effects
Keywords: At-risk students, Goal orientation, Motivation, Vocational education
Presenting Author: Arnoud Prince, Inholland University of Applied Sciences, Netherlands
Co-Author: Alexander Minnaert, University of Groningen, Netherlands
Co-Author: Marie-Christine Oopdenakker, University of Groningen, Netherlands
Studies show a decrease in students’ motivation in secondary education. In this study we investigated whether we could stop this decline using two school-based interventions. Two groups of pre-vocational secondary education teachers were trained in either self-regulated strategy instruction, or behavioral consultation combined with strategy instruction. We tested the longitudinal effects of the two interventions were tested on students’ goal orientations. The growth curves revealed different developments over time for the group the received the intervention combined teacher consultation with strategy instruction on task orientation, ego-enhancing orientation and ego-defeating orientation as compared to the control group. For the strategy instruction only condition, no differences were found in the developments of students’ goal orientations as compared to the control group. The outcomes suggest that combining the instruction of self-regulation strategies with teacher consultation on student problem-solving can stop the downward trend in student motivation, even on the long term.

Test anxiety in secondary education: development and effects of learning environment characteristics
Keywords: Quantitative methods, Secondary education, Teaching approaches, Motivation and emotion
Presenting Author: Marie-Christine Oopdenakker, University of Groningen, Netherlands
Test anxiety (TA) is a widespread phenomenon in education with important adverse effects on academic performance. Research suggests that test anxiety (TA) plays an important role in students’ learning and motivation; students with low TA engage in more cognition, use more cognitive strategies and are more likely to persist at learning. While theory/research focused on individual differences in motivation/TA, nowadays the interaction between the self and the classroom macrocontext receives more attention on a questionnaire. The average age of the students was 14 years old. (SD = 2.07), 56 % of them were female. The current study, the development of 566 students’ TA in 20 grade 7 secondary education classes (mathematics, English) was investigated and the link with learning environment characteristics (e.g., class type (heterogeneous/homogeneous), teacher’s instructional and management/control behaviour) was explored. Self-determination theory was used as the encompassing framework and guided the selection of LE characteristics. Multilevel growth curve modeling was applied and attention was paid to the general development of TA and the deviation to this development at class and student level. Results reveal a general increase of TA over time, but also differences between classes and students within classes. In addition, important links with learning environment characteristics and interactions between learning environment characteristics and gender are found.

Session J 263
31 August 2017 15:45 - 17:15
Pezzi S - B417
Single Paper
Assessment and Evaluation, Learning and Instructional Technology
Paper Presentation: Metacognition - E
Keywords: Attitudes and beliefs, Comprehension of text and graphics, Computer-assisted learning, Educational Psychology, Metacognition, Motivation, Multimedia learning, Problem solving, Quantitative methods, Self-regulation
Interest group: SIG 16 - Metacognition
Chairperson: Christian Müller, Institute of Psychology, Germany
Which glasses do you wear? The relation between adaptability and epistemological beliefs in science
Keywords: Attitudes and beliefs, Educational Psychology, Metacognition, Quantitative methods
Presenting Author: Ronny Scheier, University of Oslo, Germany
Co-Author: Øystein Gutttersrud, The Norwegian Centre for Science Education, Norway
Students are exposed to vast amounts of knowledge that might be complex and subject to change over time due to scientific progress. This exposure requires them to be adaptive, that is, to constantly adjust their thinking, learning, and affect in order to successfully solve information-rich and knowledge-lean problems. The present study examines the extent to which students perceive their individual adaptability and how these perceptions relate to their epistemological beliefs (EB) about the “development of scientific knowledge”. This aspect of EB stresses the tentative and developing nature of science. On the basis of a national large-scale data set of 1,662 Norwegian tenth-grade students, we estimated the correlations among two aspects of adaptability (i.e., cognitive-behavioral and affective adaptability) and beliefs about the development of scientific knowledge. Moving beyond the construct level or, more specifically, factor correlations, we tested the extent to which students’ individually perceived adaptability had an impact on their responses to statements about their EB by means of moderated factor analysis. Our analysis revealed that adaptability was positively correlated with sophisticated rather than naive EB in science. Furthermore, the EB scale functioned differently with respect to different levels of adaptability. The results of this study indicate that students perceive the development of scientific knowledge through the lenses of their adaptability.

Using implementation intentions to support self-regulation in multimedia learning
Keywords: Comprehension of text and graphics, Metacognition, Self-regulation, Multimedia learning
Presenting Author: Emily Hoch, Leibniz-Institut für Wissensmedien, Germany
Co-Author: Katharina Schleer, Leibniz-Institut für Wissensmedien (IfW), Germany
Co-Author: Anne Schueler, Leibniz-Institut für Wissensmedien (IfW), Germany
Multimedia learning (i.e., learning with text and pictures) not only requires learners to use adequate cognitive strategies but they also have to control their motivation during learning. Therefore, sophisticated self-regulation of cognitive and motivational processes may impact learning outcome positively. In the reported study, self-regulatory processes were supported by the use of implementation intentions, that is, if-then plans aimed at supporting goal-directed (learning) behavior led to specific favorable opportunities. A control group without instruction and three experimental groups being instructed with implementation intentions relating either to invested effort, self-efficacy, or learning strategies, were compared (N = 132). In line with our hypotheses, results indicated that supporting learning strategies or invested effort increased learning outcome compared to the control group. However, against expectation implementation intentions relating to self-efficacy were not helpful or might even be harmful for learning. Over-confidence is discussed as a possible explanation.

Learning from problem-solving tasks: Effects of prior knowledge and degree of control
Keywords: Computer-assisted learning, Metacognition, Problem solving, Self-regulation
Presenting Author: Christoph Mengelkamp, University of Wuerzburg, Germany
Co-Author: Lorelana Mihalci, Webster University Geneva, Switzerland
A possible explanation for why students do not benefit from learner-controlled instruction is that they are not able to accurately monitor their own performance. Low prior knowledge (LPK) students are more likely to perform poorly under learner control, not only because of their lack of prior knowledge, but also because of their inaccurate judgments about their own performance (e.g., Ease of Learning Judgments - EOLs; Retrospective Confidence Judgments - RCJs). The purpose of this study was to investigate whether and how prior knowledge affects the accuracy of metacognitive judgments made during learning, and how this accuracy moderates the effect of learner control on performance when solving genetics problems. One hundred sixty undergraduate students were randomly assigned amongst the conditions of a 2 (high prior knowledge - HPK vs. LPK) X 2 (full learner control - FLC vs. restricted learner control - RLC) between-subjects factorial design. Results will be available well before the conference, and discussed with regard to the effect of prior knowledge on monitoring accuracy and the interaction between monitoring accuracy and degree of learner control on performance. The results will provide insight into how prior knowledge affects monitoring accuracy in the context of self-regulated learning from problem-solving tasks.

**Help-seeking assistance in ILE: effect on perceptions of help and use of learning aids**

**Keywords:** Computer-assisted learning, Metacognition, Motivation, Self-regulation

**Presenting Author:** Nathalie Huot, University of Toulouse, France

**Co-Author:** Julie MuTel, Université Toulouse Jean-Jaurès, France

**Co-Author:** Jean Christophe Skaaktov, Université Toulouse Jean-Jaurès, France

When students are learning with interactive learning environments (ILEs), they often use available learning aids in an unproductive way (Alven et al., 2003). To foster help-seeking behavior, some researchers implement computerized metacognitive tutors. However, these tutors often fail to reduce help-seeking avoidance (Rolli et al., 2011). We supposed that help-seeking perceptions as a threat for autonomy, or for self-esteem could explain the lack of help-avoidance reduction. To that end, we tested a metacognitive tutor designed to diagnose and reduce perceived threat related to help-seeking. This motivational-metacognitive tutor (MM Tutor) was compared to a neutral metacognitive tutor (M Tutor) and a no-tutor condition (control). We assessed the evolution of help-seeking perceptions, help-seeking behavior and learning performance from 212 university students who learn autonomously. As expected, our results showed a reduction of perceived threats related to help-seeking in the MM Tutor condition.

However, there was no difference related to the use of aids and learning performance between experimental groups. This result raised the question of the application of models elaborated for a social learning context within a computerized context.

**Session J 264**

**31 August 2017 15:45 - 17:15**

**Main Building A - A32**

**Single Paper**

**Teaching and Teacher Education**

**Paper Presentation: Teaching and Teaching Education**

**Keywords:** Attitudes and beliefs, Educational Technology, Instructional design, Knowledge creation, Language (Foreign and second), Motivation and emotion, Pre-service teacher education, Qualitative methods, Secondary education, Student learning, Teacher Professional Development, Teaching approaches

**Interest group:** SIG 11 - Teaching and Teacher Education

**Chairperson:** Jeannine Turner, Florida State University, United States

**Stories of resilience. Exploring resilience among part-time trainee teachers in the Netherlands**

**Keywords:** Pre-service teacher education, Qualitative methods, Secondary education, Motivation and emotion

**Presenting Author:** Barbara Roosken, Fontys University, Netherlands

When describing how beginning teachers felt when they first started teaching trainees talk about sinking or swimming, this paper investigates what teaching experiences, strategies and factors impact on early career teachers’ (ECTs’) resilience in secondary colleges in the South of the Netherlands. Semi-structured interviews were conducted with twelve individual ECTs from three different cohorts.

Data was collected over a 2-year period and included the following: 22 audio-taped interviews with ECTs, line drawings, relational maps, 7 ECTs’ portfolios and the researcher’s memos. The participants recalled their teaching experiences by means of analysing critical incidents that occurred in their classrooms. The research design was a multiple case study approach. A thematic data analysis was used to examine the ECTs’ experiences (Guest et al., 2012; Braun & Clarke, 2013) with the help of ATLAS.ti 7 software.

The findings show that the ECTs were often expected to take on the full range of teaching tasks in isolation with little support to cope with all the demands of their new role. The ECTs found that personal factors such as self-efficacy and a sense of agency helped develop their resilience as well as contextual resources provided in schools. By identifying strategies that impact on resilience, this research has strengthened the guidelines on which induction programmes at Teacher Education Colleges can be made. It is suggested that ECTs are mentored around developing resilience strategies in order to increase their confidence to work and teach in a new school environment.

**Language awareness from a teachers’ perspective: Tensions between difficulties and possibilities**

**Keywords:** Attitudes and beliefs, Language (Foreign and second), Secondary education, Teaching approaches

**Presenting Author:** Ellen van den Broek, Radboud University, Graduate School of Education, Netherlands

**Co-Author:** Adriaan Meijer, Radboud University, Graduate School of Education, Netherlands

**Co-Author:** Ans van Kemna, Radboud University, Netherlands

**Co-Author:** Sharon Unsworth, Radboud University, Netherlands

In this paper, we present the results of an exploratory multiple-case study focusing on teachers’ cognition about a language awareness (LA) approach to foreign language education. This approach could stimulate the development of higher-order thinking skills within the language subjects by using knowledge about language to reflect on the language skills. LA can be defined as ‘the development of a conscious and perspective in language learning, language teaching, and language use’ (Association for Language Awareness, 2012). As research on the topic of LA is still scarce in the Netherlands, ten secondary school teachers were interviewed and asked about their views on LA, whether they recognise examples of LA in their own teaching practices, and which possibilities and difficulties they foresee when it comes to implementing such an approach. Classroom observation was served as the basis for the semi-structured interviews. The aim of this paper is to induce new understandings of LA in the context of Dutch upper secondary foreign language education, gain insight into teachers’ cognition about LA, and identify similarities and differences between teacher’s cognitions. Findings reveal interesting variability across teachers, in their views on LA, as well as the possibilities and difficulties they foresee when implementing such an approach to foreign language education. Furthermore, findings reveal numerous tensions between professional, contextual and attitudinal factors. However, this variability can be used in order to facilitate the practical implementations of this approach.

**Teaching computational thinking in preservice teacher education with scaffolded programming scripts**

**Keywords:** Educational Technology, Instructional design, Pre-service teacher education, Teaching approaches

**Presenting Author:** Charoula Angelis-Valanides, University of Cyprus, Cyprus

**Co-Author:** Kamini Jaipal-Jamani, Brock University, Canada

Computational thinking is an essential skill for the 21st century. Teacher education departments, however, do not currently have the knowledge to promote computational thinking in their programs. The question, then, becomes how to include the teaching of computational thinking in teacher education courses. The present study directly addresses this issue. In particular, the study proposes the use of scaffolded programming scripts as one method for teaching computational thinking in preservice teacher education. In this study, scaffolding programming scripts were used in the context of educational robotics activities in a science education lesson about gears. The study reports significant effects on preservice teachers’ computational thinking skills and discusses implications and future research directions.

**Exploring general pedagogical knowledge in teacher education - a learning oriented approach**

**Keywords:** Pre-service teacher education, Student learning, Teacher Professional Development, Knowledge creation

**Presenting Author:** Christian Kräler, Teacher Education and School Research, Austria

The aim of this paper is to contribute to the question of general pedagogical knowledge (GPK) in teacher education (TE). Within the growing tensions between cost reduction (or avoiding overspending) and system development, improvement and optimisation, governments and international organisations tend to design and operationalize educational questions/challenges with the often hidden economic based structure and logic (indicators, standards, controlling biased progressions...). The tension for researchers is therefore whether to conform to this hidden logic by designing research projects in an economically adequate way or do we have alternatives? Whereas Shulman provided one of the first comprehensive theoretical models on teacher knowledge, Voss and König’s work sought to operationalize and measure general pedagogical knowledge (a specific aspect of Shumans model). In doing so, their approaches have missed the priority, gradients of operationalizations of GPK, for instance used by the OECD. In contrast, our current research project entitled pKTE (pedagogical Knowledge In Teacher Education) suggests an alternative perspective on pedagogical knowledge in teacher education. It allows us to more adequately explore crucial questions of GPK in TE like gender, migration and aspects of diversity. We suggest a learning oriented epistemological model based on the knowledge concept of Mittelstädt (instrumental knowledge and orientation knowledge), an analytical definition of GPK, Bruner’s concept (1960) of fundamental ideas as a framework for content and the dimension of learning-teaching orientation.
Paper Presentation: Teaching and Teacher Education - M
Keywords: Attitudes and beliefs, Competencies, Content analysis, Cultural diversity in school, Educational policy, Qualitative methods, Quantitative methods, Student learning, Survey Research, Teacher Effectiveness, Teaching / instruction
Interest group: SIG 11 - Teaching and Teacher Education
Chairperson: Sanne van der Ven, Utrecht University, Netherlands
A Salutogenic View of Teacher Attraction: Career Stories of Teachers who Left Teaching
Keywords: Content analysis, Educational policy, Qualitative methods, Teaching / instruction
Presenting Author: Hayata Yirun, Oranim Academic College of Education, Israel
Co-Author: Lily Orland-Barak, University of Haifa, Israel
Many countries report on a high percentage of teachers who leave the profession before retirement. Most of the explanations, such as teacher burnout, adopt a pathogenic point of view which perceives attrition as a negative work outcome. In contrast, the qualitative project that this paper is based on, which aims at characterizing the career decision-making processes of 34 Israeli teachers over ten years adopts a salutogenic perspective. This means viewing attrition as a career decision which reflects the meaning teachers attach to their work. Drawing on a model which identifies three orientations toward work (job, calling and career), this paper will describe career stories of teachers who left teaching in order to illustrate how their work orientation shaped their decision.

Student surveys as measures of instructional quality
Keywords: Quantitative methods, Student learning, Survey Research, Teacher Effectiveness
Presenting Author: Kirsti Klette, University of Oslo, Norway
Co-Author: Astrid Roe, University of Oslo, Faculty of Education, Norway
There are multiple ways of assessing teacher quality; recently, student surveys have been introduced as one possible reliable measure. In the present study we use a validated survey (the Tripod Student Perception Survey) to investigate to what degree students can provide nuanced information about teachers’ instructional quality. The sample includes students from mathematics classrooms (n = 1125) and language arts classrooms (n = 1100) from 49 Norwegian lower secondary schools (grade 8). By comparing how students assess their teachers in these two subjects, we have found a huge variation between classrooms and schools and a big variation between items in the ratings of each teacher. We identify that students are consequently more positive towards their teachers in mathematics, which is directly linked to the ways teachers enact their teaching - statistically significant differences in favor of mathematical teachers were found on several items. This difference between subjects reinforces the finding that this survey measures important factors concerning teaching quality rather than generic attitudes towards, for example, mathematics. We did not find any gender differences on any items, which is somewhat surprising. The present study shows the benefits of asking students specific questions about teaching – tailored to measure instructional quality - rather than general questions about school and subjects. A key contribution of the present study, that should be relevant for researchers and policymakers alike, is empirical data illustrating how detailed student surveys can provide targeted and nuanced information about the repertoire of teaching practices of a single teacher.

Differentially instructed teachers’ expectations on student achievement
Keywords: Attitudes and beliefs, Competencies, Student learning, Teaching Effectiveness
Presenting Author: Lena Holmer, University of Education St.Gallen, Switzerland
Co-Author: Benita Affolder, University of Teacher Education St.Gallen, Switzerland
Co-Author: Christian Bluehwaier, University of Teacher Education St.Gallen, Switzerland
For academic learning processes to be effective, teachers’ professional competences are essential. It is composed of cognitive abilities (professional knowledge) as well as professional convictions and values (e.g. teacher’s beliefs). There are a few studies about teachers’ professional competences, especially about teachers’ professional knowledge and its impact on instructional quality and/or students’ achievement. Though as of today, there is less empirical evidence regarding the impact of non-cognitive aspects such as underlying beliefs. Teachers’ expectation concerning students’ achievement can be classified as a special form of teachers’ beliefs. These expectations are belonging to the non-cognitive aspects of teachers’ professional competence and are therefore important for both instructional quality and students’ achievement. Since Rosenholt and Jacobson investigated the Pygmalion effect in 1968, it has been replicated and confirmed by other authors. But we don’t know how important it is in addition to the teacher’ professional knowledge. Within the context of the longitudinal study Outcomes of Teacher Education (German: Wirken der Lehre bildung, WLB), a Swiss extension of the international comparative study TEDS-M, we build on these assumptions and investigate the expectancy effect controlling for professional knowledge. The analyses are based on answers of 30 primary teachers and 548 students.

Differentially instructed teaching as a basis for teachers’ expectations and achievement: introducing the DI-QUEST instrument
Keywords: Cultural diversity in school, Quantitative methods, Teacher Effectiveness, Teaching / instruction
Presenting Author: Katrin Struyven, Vrije Universiteit Brussel (VUB), Belgium
Co-Author: Catherine Couvergi, Vrije Universiteit Brussel (VUB), Belgium
Co-Author: Julia Ortu Frisonet, Vrije Universiteit Brussel (VUB), Belgium
Co-Author: Esther Gheysens, Vrije Universiteit Brussel (VUB), Belgium
Student diversity is a reality which teachers have to deal with on a daily basis. Differentially instructed instruction aims at meeting student difference in learning in order to provide all students with the best possible learning opportunities. This paper introduces the DI-QUEST, a 30-item survey intended to measure teachers’ philosophy and practices of differentially instructed instruction. Two goals are central to this study: (1) to construct an instrument that allows for describing the philosophy and approaches to teaching of teachers that differentiates in their classrooms (DI-QUEST) and (2) to develop a model that allows to predict the extent to which teachers differentiate their practices (DI-QUEST Model). The instrument was developed for both primary and secondary school teachers and administered to a group of 1,573 teachers from 94 different schools in Flanders, Belgium. An exploratory and confirmatory factor analysis was carried out to investigate the factor structure of the questionnaire. As a result, five factors were measured in the DI-QUEST. Two factors measured the teacher’s philosophy, two factors measured the practical principals and the final factor covered three kinds of differences in learning which can be taken into account students’ readiness, learning profile and interests). The DI-QUEST-model with the best parameters revealed four factors (both philosophical factors, namely growth mind set and ethical compass, and both practical approaches, called flexible grouping and output-input), which functioned as significant predictors of the fifth factor (differentially instructed, which was an independent variable). Implications for schools, educators and researchers will be discussed, including the limitations.

Session J 266
31 August 2017 15:45 - 17:15
Pini B - B3039
Single Paper
Assessment and Evaluation
Paper Presentation: Online Measures of Learning Processes
Keywords: Assessment methods and tools, At-risk students, Learning disabilities, Mathematics, Numeracy, Primary education, Reasoning, Secondary education
Interest group: SIG 27 - Online Measures of Learning Processes
Chairperson: Kerstin Holker, RWTH Aachen University, Germany
A computer-based assessment tool for early identification of child-dren with maths difficulties
Keywords: Assessment methods and tools, At-risk students, Numeracy, Primary education
Presenting Author: Karin Herzog, University of Duisburg-Essen, Germany
Co-Author: Antje Eilert, University of Potsdam, University of Johannesburg, Germany
Co-Author: Annemarie Fritz-Strattmann, University of Duisburg-Essen, Germany
The individual differences of children entering school are of great predictive importance for their later success in school. For this reason the factors influencing early numerical abilities have been focused by scientists from the fields of maths education, neuroscience and psychology. Based on different theoretical approaches and among others, numerical concepts like number sense and counting abilities as well as neuronal systems of magnitude comparison abilities have been discussed. With knowledge of early predictors, at-risk children for maths difficulties can be identified already when they enter school. A new intervention test (INESSSENCE) and a computerized test (MARKO Scheme) have been developed and validated to detect such children. This submission aims to investigate to what extent both tests identify the same children and face the question, how different the theoretical backgrounds can be integrated. Results of a study with German children (n=129) show major commonalities of the test results. Most children, who were identified as At-risk children using both tests, showed poor performance and showed a low performance in the magnitude comparison tasks already had crucial concepts. A greater number of children with age-appropriate concept development scored poorly in the neuroscience-based test. Since neural reasons are very unlikely, poor abilities regarding working speed, motoric or number symbol knowledge are taken into account.

Identifying early difficulties in mathematics: eDia, the online diagnostic assessment tool
Keywords: Assessment methods and tools, Mathematics, Primary education, Reasoning
Presenting Author: Gyunyong Molnar, University of Szeged, Hungary
In this paper, we examine the applicability of an online diagnostic assessment system in the field of mathematics administered to students at the beginning of schoolifying research results in developmental psychology and learning mathematics into account, we developed a three-dimensional model of mathematical knowledge that distinguishes: the direct curricular and subject aspects of mathematical knowledge (MD); the reasoning aspect of mathematical knowledge (MR); and mathematical literacy (ML). We empirically validated the three-dimensional model of mathematical knowledge based on research results collected among first graders with eDia, the Hungarian online diagnostic assessment system. The study sample was drawn from first graders (aged 6–7, n=5115). Testing took place in the
computer labs at participating schools, using the available desktop computers and browsers. The internal consistency of the instrument was high both at the test (p=0.942) and subtest levels (α_MD=0.89; α_MR=0.83; α_ML=0.89). As within the three-dimensional model, significant and high correlations were found between the pairs of dimensions (MD MH=0.658, MD ML=0.749, MH ML=0.634, p<0.001) at all levels. We also tested the one-dimensional model with the three dimensions combined under one general factor. The three-dimensional model fit well (CF=0.965; TLI=0.963; RMSEA=0.054) and better (CF=0.999; TLI=1.0; RMSEA=0.000) than the one-dimensional model, indicating the multidisciplinary, literacy and reasoning dimensions of mathematical knowledge are empirically distinguishable. Based on the results, we can conclude that computer-based assessment can be carried out even at the very beginning of schooling without any modern touch screen technology, using a general browser and the school infrastructure.

A mathematical screening for measuring basic skills in 5th and 6th grade

Keywords: Assessment methods and tools, At-risk students, Primary education, Secondary education

Presenting Author: Antje Ehrli, University of Potsdam, University of Johannesburg, Germany

Co-Author: Annette Fritz-Stittmann, University of Duisburg-Essen, Germany

Basic arithmetic competencies acquired in primary school are prerequisites for the acquisition of mathematical competencies in secondary school (Duncan et al. 2007; Stevenson & Newman 1986), which build the foundation for a sustainable algebra understanding in higher grades. But empirical evidence of national and international educational studies shows that about 20 % of the 15 year old students in many countries have limited abilities in math (Frey, 2016). To tackle this problem a mathematical test package for end of 5th and beginning of 6th grade students have been developed. A screening evaluates whether difficulties within the following three mathematical areas can be observed: understanding of part-whole relationships, of multiplication and division and of place-value system. If students with difficulties are identified, a more detailed test is conducted in order to find out where exactly the difficulties are located. The test package is based on Item-Response-Theory and grounded on theoretical as well as empirical evidence. We introduce the mathematical screening for measuring basic skills with a sample of primary school students (N = 842, 51 % girls). The 27 items are Rasch scaled. A criterion- referenced test was established. The cut-off-value is crucial to decide whether or not a detailed test is conducted. In the here presented sample 32 % of the students show difficulties in the three mathematical areas mentioned above. Our results imply a need for fostering that builds up profound prerequisites for further education and the job market.

CODY: A computer-based screening for mathematical learning disabilities in elementary school

Keywords: Assessment methods and tools, At-risk students, Learning disabilities, Primary education

Presenting Author: Joerg Tobias Kuhn, WWU Muenster, Germany

Co-Author: Julia Raddatz, University of Münster, Germany

Co-Author: Christian Dohel, University of Jena, Germany

Co-Author: Heinz Holling, University of Münster, Germany

Children with mathematical learning disabilities (MLD) display substantial deficits in arithmetic skills, which strongly affects their educational progress and mental health. This study evaluated a computer-based screening test (CODY) for identifying elementary school children at risk for MLD (grades 2-4). Overall, N = 1,175 children participated in this study. The CODY assessment focuses on four domains: Core markers (dot enumeration, number and magnitude comparison), number processing (transcoding, number line task, number sets, missing number), calculation (addition, subtraction, multiplication), and working memory (visual matrix span). A confirmatory factor analysis revealed a good fit. Retest reliability was good (r = 0.80), correlations with two other standardized mathematics tests were high (r = 0.68 – 0.74). We also found that school grades r = 0.56 as well as teacher judgements of MLD r = 0.48 correlated strongly with CODY scores. Finally, ROC analyses indicated good classification accuracy with respect to MLD (AUC = 0.86 – 0.89). In conclusion, CODY is a simple, efficient assessment for elementary school children at risk for MLD.

Session 2 267

31 August 2017 15:45 - 17:15
PinB B - 81937
Single Paper
LifeLong Learning, Motivational, Social and Affective Processes, Teaching and Teacher Education

Paper Presentation: Professional Development and Vocational Education

Keywords: Assessment methods and tools, Cognitive skills, Competencies, Educational Psychology, Intelligence, Language (Foreign and second), Lifelong learning, Mathematics, Primary education, Secondary education, Social aspects of learning and teaching, Teacher Professional Development, Vocational education, Workplace learning

Interest group: SIG 14 - Learning and Professional Development

Chalhoebat, Markus P. Neuroschwander, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

Professional situation of gifted adults. Career biography, job position and job satisfaction

Keywords: Cognitive skills, Intelligence, Social aspects of learning and teaching, Vocational education

Presenting Author: Kristina Köger, University Hohenheim, Business Education, Germany

Co-Author: Eveline Wurthke, Goethe-Universität Frankfurt, Germany

Co-Author: Mano Schlegier, Goethe-Universität Frankfurt, Germany

In recent years, there has been an increasing public and scientific interest in giftedness with a special focus on educational issues. However, research mainly concentrates on gifted children and adolescents. Empirical findings about gifted adults in professional life are lacking, even though it is a field of particular interest for vocational education, human resource management and organizational psychology. In some studies, authors point to non-linear career biographies of gifted and the risk of social conflicts at the workplace as well as their preference for independence and creative working tasks. The aim of this contribution is to shed light upon the professional situation and career development of gifted adults. A questionnaire on socio-demographics, education, job position, career development and job satisfaction was administered online. The sample consisted of n=227 members of Mensa in Deutschland e.V., the main German association for gifted people and a member of Mensa International, whose members have a tested IQ equal to or larger than 130 points. Descriptive results indicate a very well educated sample of participants who predominantly work in the fields of law and economics, natural sciences, and engineering. One third of the sample is self-employed, only 26.8% have superior positions with responsibility for up to 650 employees. Gifted adults in the sample like their occupations, but often lack the feeling of being challenged adequately. The findings offer a first insight into the professional situation of gifted adults and will be further substantiated by means of interviews.

One-to-one assessment interviews: Teachers’ expertise in understanding mathematical thinking

Keywords: Assessment methods and tools, Mathematics, Primary education, Teacher Professional Development

Presenting Author: Wendy Leyshon, Australian Catholic University, Australia

In this paper, we outline the benefits to teachers' expertise of the use of research-based, one-to-one assessment interviews in mathematics. Drawing upon our research and professional development work with teachers and students in primary and middle years in Australia and the research of others, we share data which indicate that the use of such interviews builds teacher expertise through enhancing teachers' knowledge of individual and group understanding of mathematics, including misconceptions and preferred strategies, and also provides an understanding of typical learning paths in various mathematical domains. The use of such interviews also provides a model for teachers' interactions and discussions with students building both teachers' pedagogical content knowledge and their subject matter knowledge. We report briefly on a separate study which indicated that similar benefits were evident to preservice teachers who used the assessment interview with students, and on another study in which teachers used an interview to inform their work with students with Down syndrome.

Vocationally educated graduates moving on from education to the labour market: A systematic review

Keywords: Secondary education, Vocational education, Workplace learning, Lifelong learning

Presenting Author: Eva Vermeer, KU Leuven, Belgium

Co-Author: Nele De Cuypere, KU LEUVEN, Belgium

Co-Author: Eva Kyndt, KU LEUVEN, Belgium

Entering the labour market is seen as a crucial phase in life, which influences vocational outcomes, career development, and future career success (Koen et al., 2012). Recent graduates should be prepared for this school-to-work transition because “preparation is a key ingredient to success in transitioning to the world of work” (Akkermans et al., 2015, p. 67). This importance of preparation is also argued by Nicholson (1999) in his transition model as preparation is one of the four transitional phases.

Former research indicated the importance of initial education for preparing final year students (Akkermans et al., 2015). Among these students, lower educated graduates experience more difficulties than higher educated graduates when entering the labour market (Akkermans et al., 2015). The difficulties experienced by these lower educated graduates are probably related to different conditions when entering the labour market, such as differences in support in finding a job, required skills according to the employer, and job outcomes (Arum & Shavit, 1995; Kerckhoff, 2002). To gain insight in how education can support the transition of lower educated graduates, the literature was systematically reviewed. More specifically, we analysed the structural factors within education and personal resources of students investigated in literature, contributing to vocational outcomes within this school-to-work transition.

Within this systematic literature review, we analyse how lower educated graduates are prepared for the school-to-work transition through initial education. More specifically, we analyse the structural factors within education and personal resources of students contributing to vocational outcomes during this transition.

Development of English competency at vocational schools depending on number of lessons and job field

Keywords: Competencies, Educational Psychology, Language (Foreign and second), Vocational education

Presenting Author: Carolin Raetzer, FernUniversität in Hagen, Institut fuer Psychologie, Germany

Co-Author: Jan Tank, FernUniversität in Hagen, Institut fuer Psychologie, Germany

In depth knowledge of English is deemed to be one of the basic skills coping job-related and social standards (Tenorth, 2001). Due to the marginal role of English as a subject of instruction at vocational schools in Germany, the commission of enquiry recommended to introduce English as compulsory teaching for one hour.

The aim of the study is to investigate the effect of English lessons on the development of English competency attending to the teaching time and the job field.

1236 students of 65 vocational schools completed several tasks at three different measuring times (December 2014, July 2015, 2016) Text construction tests (e.g. C-Tests) were used for measuring their current level of English skills. Multilevel regression analyses were conducted because of the hierarchical structure of data with students and nests nested within schools.

After controlling for variables on the first level, the analyses revealed evidence for both predictors on school-level to affect differences in students' average performance. Mean English competences between students with one English lesson a week differed due to vocationalal differences. These differences increase by comparing the second condition with one English lesson a week and the third condition with two English lessons a week. These first findings suggest the importance of implementing English lessons as compulsory instruction at vocational schools to prepare students adequately for their professional career.
Enhancing dialogic argumentation in teacher-orchestrated discussions in mathematics and physics

Keywords: Argumentation, Mathematics, Science education, Teacher Professional Development

Presenting Author: Ritu Kaushik, University of Jyväskylä, Finland
Co-Author: Mahsa Hekmat, University of Jyväskylä, Finland

This paper reports on a study of teacher-orchestrated discussions in mathematics and physics classrooms to enhance discursive argumentation. Teachers were trained to facilitate discussions in which students engaged in critical thinking and logical reasoning. The study findings indicate that teacher guidance played a significant role in facilitating student participation and encouraging argumentative discourse. The results highlight the importance of teacher facilitation in promoting higher-order thinking skills among students.

The role of peer feedback script on students' argumentative essay writing and knowledge acquisition

Keywords: Argumentation, Collaborative Learning, Computer-supported collaborative learning

Presenting Author: Ritu Kaushik, University of Jyväskylä, Finland
Co-Author: Pasi Nämänen, University of Jyväskylä, Finland

The study examined the impact of peer feedback scripts on students' argumentative essay writing. Results showed that peer feedback scripts significantly improved students' argumentative writing skills, with a particular emphasis on the development of logical reasoning and critical thinking. The findings suggest that the use of feedback scripts can be a valuable tool in enhancing students' writing abilities and knowledge acquisition.

The use of argument organisers in outlining physics content knowledge for teaching purposes

Keywords: Argumentation, Higher education, Physics education

Presenting Author: Ramakrishnan, University of Helsinki, Finland
Co-Author: Maria Hekmat, University of Jyväskylä, Finland

The study explored the use of argument organisers to facilitate the structuring of physics content knowledge for teaching purposes. The results indicated that the use of argument organisers can effectively help teachers in organizing and presenting physics content in a coherent and logical manner, thereby improving the teaching and learning process.

The role of peer feedback script on students' argumentative essay writing and knowledge acquisition

Keywords: Argumentation, Collaborative Learning, Computer-supported collaborative learning

Presenting Author: Ritu Kaushik, University of Jyväskylä, Finland
Co-Author: Pasi Nämänen, University of Jyväskylä, Finland

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Fostering Students’ Professional Vision on Theological Discussions by Lesson Clips

Keywords: Pre-service teacher education, Religious studies, Video analysis, Knowledge creation

Presenting Author: Ulrich Riegel, Siegen University, Germany

This paper gives first evidence on effects of analyzing video clips on the students’ professional vision in the realm of religious education by using data from a course on Theological Discussion. Professional vision is conceptualized according the two dimensions of noticing and reasoning (Seidel & Stümer 2014; van Es & Sherin 2002). Each dimension has been operationalized according to four indicators. In the course the students (N = 48) commented on lesson clips (each about 4 min) at three times (N = 144), getting input about the theory and practice of Theological Discussion in between. These comments have been rated according to the students’ ability to notice and to reason. While all ratings show sufficient inter-rater reliability (Cohen’s κ > .35), Friedman-Test indicates changes between the three times of commenting as significant on only three variables: the frequency of words used in the comments, the frequency of scientific concepts referred to in the comments, and the frequency of given alternative practices. The changes on the other five variables are not significant. The paper will describe and discuss these results.

Session K 270

1 September 2017 08:30 - 10:00
Main Building 2 - D13
Single Paper
Assessment and Evaluation, Learning and Social Interaction, Teaching and Teacher Education

Paper Presentation: Professional Development

Keywords: Achievement, Attitudes and beliefs, Competencies, Learning approaches, Mathematics, Motivation, Problem solving, Quantitative methods, Student learning, Teaching / instruction, Vocational education, Workplace learning

Interest group: SIG 14 - Learning and Professional Development

Chairperson: Claudia Roovers, University of Bern, Germany

The influence of students learning experiences on learning results in complex learning environments

Keywords: Achievement, Learning approaches, Student learning, Teaching / instruction

Presenting Author: Mandy Hornet, University of Technology Dresden, Germany

Complex learning environments and their characteristics are expected supporting deep learning and generating applicable knowledge. Empirical results differ and do not confirm this expectation in any case. Searching for reasons, one explanation is that learners need to have skills to orient themselves in complex learning environments to be able to plan, manage, monitor and reflect their learning processes. It can be assumed, that the quantity and quality of prior experiences in open learning environments influences how the learners use the learning potential of complex learning environments. Therefore, this study investigates learning experiences and their influence on learning results from a business case study lesson.

Data were gathered by an experiences questionnaire and knowledge pre- and post-tests demanding different dimensions of cognitive processes for solving. The questionnaire data revealed a four-factor structure for the quality of experiences: (1) the perception of the own depth of learning in open and complex learning environments; (2) the attitudes towards characteristics of complex learning environments (complexity, reality, task identity), (3) towards different lesson concepts, and (4) cooperation.

The analysis of learning results demanding analysis and apply knowledge in the post-test showed significant influences by the variable school, and an interaction effect between school and the quantity of experiences with open learning environments. The results give insights into the effect of experiences on learning and especially upon learning results in complex learning environments.

The Role of Beliefs and Motivational Variables in Enhancing Word Problem Solving

Keywords: Attitudes and beliefs, Mathematics, Motivation, Problem solving

Presenting Author: Nonnanat Pongsakdi, University of Turku, Finland

Co-Author: Eero Laakkonen, University of Turku, Finland

Co-Author: Teija Laine, Centre for Teacher Training, Turku, Finland

Co-Author: Koen Veerman, University of Turku, Finland

Co-Author: Minna Hannula-Sormunen, University of Turku, Finland

Co-Author: Erno Lehtinen, University of Turku, Finland

Word problem solving and mathematical modelling are widely seen as important aims of mathematics learning, which can prepare students to use mathematics in everyday situations. However, teachers face difficulties in teaching mathematics that go beyond arithmetic. Several researchers have shown that the differences in student performance cannot be explained purely as the result of differences in cognitive skills, but the role of beliefs and motivational variables must also be taken into account. This study is about a Word Problem Enrichment programme (WPE) designed to encourage teachers to use innovative, self-created word problems to improve student mathematical modelling and word problem solving performance. A positive impact of WPE on student word problem solving performance was found in a previous study focusing on cognitive factors only. However, it is unknown if WPE has an impact on student beliefs about word problem solving and how WPE works for students with different motivation in learning mathematics. This study investigated the impact of WPE on student beliefs about word problem solving by using Latent Profile Analysis and Structural Equation Modelling to analyse relations among the different cognitive, motivation, and belief factors. A total of 170 fourth- and sixth-grade students from elementary schools participated. Results showed that the effects of WPE are various depending on student initial motivation level. The impacts of WPE on student beliefs were found only in students with a low initial motivation level, while its impacts on student problem solving performance were found only in students with a high initial motivation level.

Learning in the Icelandic dual VET system: Integration of school and work-based learning

Keywords: Competencies, Student learning, Vocational education, Workplace learning

Presenting Author: Elsa Elísadottir, University of Iceland, Iceland

The goal of the study is to look at how the different implementation of the VET dual system in Iceland relates to the integration of learning at school and work and the competency developed at each site. Research on learning in a dual system has indicated that an effective implementation of the dual system is contingent upon successfully integrating learning at school and work. In the certified trades in Iceland the dual system varies considerably in terms of the duration of the work-based learning and the sequencing of school- and work-based learning periods and this variability should impact the integration and learning at the two sites. An electronic questionnaire on learning at school and work was sent to recent graduates, workplace trainers, and teachers in all 51 certified trades in Iceland (N = 2838). Data was collected May to September 2016 and 867 participants answered (24% response rate). The presentation will focus on results relating to ratings of which general and work-related competencies are developed at each site, and ratings on what the dual system, as well as careers on what the integrated dual system in Iceland is important to understand the intricacies and outcomes of the current system.

Comparing trainees’ competences in the technical domain between Germany and Switzerland

Keywords: Achievement, Competencies, Quantitative methods, Vocational education

Presenting Author: Leo van Waveren, Technical University of Kaiserslautern, Germany

An accepted model for technical occupations is the multidimensionality of professional competence, separating content knowledge and its application(Nikolaus & Seeber, 2013). Furthermore, a number of studies found that in the technical domain content knowledge itself is again a multi-dimensional construct with dimensions structured by content, as it was successfully demonstrated, for example, for car mechanics (Schmidt, Nikolaus, & Weber, 2014). Problem solving, usually applying to an analytical construct (i.e. proposing necessary corrections to malfunctions (Abele, Walker, & Nikolaus, 2014), is highly dependent on content knowledge, as discussed by Nikolaus (2012).

In the feasibility study by Baethge and Arends (2009) it was concluded, that for Germany and Switzerland the two occupations, car mechanics and automation technicians for automation technology, both share much of their curriculum with their respective counterparts to warrant an empirical comparison. This paper uses findings from a pilot study on car mechanics from both countries to gather insights into expectable differences between the two countries in regard to the achieved professional competences underlying content knowledge and analytical problem solving as its application at the end of vocational training. Findings from a second study are presented in which a competence model, developed and empirically tested for the German occupation, was applied for a comparison between both countries.

Session K 271

1 September 2017 08:30 - 10:00
Virta - 113
Single Paper
Learning and Social Interaction

Paper Presentation: Social Interaction in Learning and Instruction - B

Keywords: Content analysis, Design based research, Learning and developmental difficulties, Literacy, Motivation, Motivation and emotion, Parental involvement in learning, Primary education, Social aspects of learning and teaching, Social interaction, Synergies between learning - teaching and research, Teacher Effectiveness, Teacher Professional Development, Teaching approaches

Interest group: SIG 15 - Social Interaction in Learning and Instruction

Chairperson: Anne-Mari Kuisimaki, The University of Helsinki, Finland

Challenges and learning potentials at the boundary: Encounters of educational research and practice

Keywords: Content analysis, Design based research, Social interaction, Synergies between learning - teaching and research

Presenting Author: Ulrike Hartmann, University of Wuppertal, School of Education, Germany

Co-Author: Jasmin Deicrstan, Goethe-University Frankfurt, IDEA-Research Center, Germany
Following the notion of evidence-based practice in education, researchers are supposed to provide schools with significant evidence that can guide them in practical decisions. In turn, teachers are supposed to stay informed about latest results from educational research to make practical decisions on a sound scientific basis. Yet, researchers and teachers often bemoan a wide gap between the results of educational research and daily school life. Our interview study aims to illustrate what kind of challenges researchers and teachers face when they exchange information or communicate directly with each other. Second, we identify learning potentials that can stem from cooperative efforts between educational research and school practice, relating to the concept of boundary crossing (e.g., Akkerman & Bakker, 2011; Akkerman & Brunning, 2016). 10 educational researchers and 10 teachers from Germany participated in the study. We identified three categories of challenges, being 1) a lack of individual resources, 2) emotional/ motivational challenges, and 3) challenges regarding the differences between the systems of research and practice. We also address four learning potentials in our interview data (i.e., Identification, Coordination, Reflection, and Transformation), and show how they relate to the experiences and potential benefits of research-practice-encounters. Our paper takes up the ideas on boundary crossings and the learning potentials that can stem from such crossing actions, and applies these thoughts to the field of educational research and school practice.

Effects of Parental and Teachers’ Positive Feedback on their Children’s Reading Motivation
Keywords: Literacy, Motivation, Parental involvement in learning, Primary education
Presenting Author: Frank Helmsch, Paderborn University, Germany
Co-Author: Fabian Hoya, Paderborn University, Germany

Parental and teachers’ support are considered as important prerequisites for children’s learning. In particular, parental and teachers’ feedback play important roles for children’s learning processes. This study examines whether differences in children’s reading motivation, self-concept and self-efficacy can be predicted by their perceptions of their parental and teachers’ positive feedback on reading processes. For this purpose, N = 84 third and fourth grade students completed a questionnaire concerning their reading motivation, their self-concept and their self-efficacy beliefs. In addition, they were asked to give information about their perceptions of their parental and teachers’ feedback on reading processes. The results of a structural equation model show that children’s perceptions of their parental feedback predict their intrinsic reading motivation. The correlation between children’s perceived parental feedback and their intrinsic motivation is mediated by their reading self-efficacy beliefs. Children’s perceptions of their teachers’ feedback show no effect on their reading motivation.

Effects of teacher training to reduce pupil inattention and hyperactivity in elementary classroom
Keywords: Learning and developmental difficulties, Primary education, Social aspects of learning and teaching, Teacher Professional Development
Presenting Author: Markus P. Neuenschwander, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland
Co-Author: Sara Benini, Scuola Universitaria Professionale della Svizzera Italiana, Switzerland
Co-Author: Jennifer C. Fräul, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

Average intelligent pupils who show higher levels of inattention and hyperactivity in classroom face more school adjustment challenges than their peers. The aim of this study was to develop a training program for elementary classroom teachers expected to reduce the pupils' inattention and hyperactive behavior in the classroom. We assumed that pupils' attention and hyperactivity is influenced by classroom management strategies on the class level (1), on the individual pupil's level (2), and by effective collaboration strategies with the target parents (3). In a course the approach was taught to teachers and they put it into action.

An experimental design was used to test the effects of this program: 42 teachers (full training, AB), 54 teachers (reduced training, A) and 41 teachers (no training, control group) filled out questionnaires on target pupil measures before and after the training (one pupil per classroom). In addition, the pupil’s behavior was systematically observed during one lesson (45 minutes) by trained research collaborators before and after the teacher training.

Analyses of variances indicated a significant interaction effect for the pupils’ social integration (groups A and AB: Increase from pretest to posttest, control group: decrease). Attention deficit decreased more in group AB than in control group (significant interaction). The decrease of the pupils' hyperactivity was stronger in group AB than in control group, however insignificant.

The training showed how elementary teachers can successfully be taught in classroom management strategies on the class level as well as on the individual level.

Nonviolent Communication and dealing with classroom conflicts: a qualitative study
Keywords: Social interaction, Teacher Effectiveness, Teaching approaches, Motivation and emotion
Presenting Author: Markus Domann, Otto Friedrich-Universität Bamberg, Germany
Co-Author: Eveline Wittmann, TUM School of Education, Germany

In the daily life of a teacher, conflicts are omnipresent and challenging (Ruedl 2014, Wittmann/Weylandt 2010, 112; Kounin 1976; Noëling 2007 151.). Although they may influence learning and social interaction not only in a negative way (Simmel 1908), we can determine that they often throw up a lot of challenging aspects for the conflict participants. In classrooms, they can produce a negative learning atmosphere and emotional stress for teachers and students, and may also create school abstinence and reduce the real time for learning (Schaarshmidt 2005, 42; Helmske/Weinert 1997, 135). The aspects mentioned are the reason why the authorities in school systems and teacher education request solutions and ask for the integration of courses in the curriculum that promote the conflict communication competence of teachers and teacher trainees (KMK 2004, 16). The concept of Nonviolent Communication (NVC) has been suggested and promoted to address this issue (Roseneberg 2002; 2003). However, scant empirical evidence exists regarding the question whether such a concept can be successfully implemented in school classes. Hence, we conducted an explorative qualitative interview study with 41 NVC-trained teachers concerning challenges and achievements they achieved using NVC in classes. The research question was: Is NVC a valuable communication model to handle teacher-student-conflicts? The results underline that NVC is an effective classroom management tool to solve interpersonal conflicts; it also shows that there are identifiable types of NVC-trained teachers who have different experiences and achievements with the model. This typification may serve to specify research questions on the viability and efficiency of NVC implementation in classrooms and to improve future NVC teacher trainings.

Session K 272
1 September 2017 08:30 - 10:00
Main Building E - E301
Single Paper
Assessment and Evaluation, Learning and Social Interaction, Learning and Special Education

Paper Presentation: Early Childhood Education

Keywords: Achievement, Assessment methods and tools, Competencies, Early childhood education, Educational policy, Learning disabilities, Motivation, Numeracy, Parental involvement in learning, School effectiveness, Social sciences, Special education
Interest group: SIG 05 - Learning and Development in Early Childhood
Chairperson: Lina Markauskaite, The University of Sydney, Lithuania

Linking Personal Qualities to Socioeconomic Differences in Early Language Competences
Keywords: Competencies, Early childhood education, Parental involvement in learning, Social sciences
Presenting Author: Tobias Linberg, Leibniz Institute for Educational Trajectories (LIfB), Germany

This paper presents results on socioeconomic inequalities in language competencies of preschool children using data from the German National Educational Panel Study (NEPS). The analytical framework chosen goes beyond usual mediators including also children’s personal qualities for the explanation of early social inequalities. Methodologically it goes beyond usual mean-based methods using quantile regression to research size and shape of inequalities (by education background, social class, and income). The main findings indicate (1) a group of linguistically early left children from families with little education and (2) that a child’s curiosity and openness to new experiences contributes over and beyond language stimulations experienced at home to the explanation of socioeconomic differences in preschool age. The findings can contribute to the discussion on equality of opportunity at an early stage.

Preschool self-evaluation in Italy: a theoretical framework
Keywords: Assessment methods and tools, Early childhood education, Educational policy, School effectiveness
Presenting Author: Cristina Stringher, Istituto Nazionale per la Valutazione del Sistema Educativo di Istituzione e di Formazione (INVALSI), Italy

Monitoring quality in Early Childhood Education and Care (ECEC) settings can be a powerful lever to ensure that children benefit from stimulating experiences in these services. In the absence of quality provision, outcomes for children may be null or even pernicious.

In spite of world-famous excellence in Italian ECEC, such as Reggio and Montessori education, at system level Italy does not yet have a centralized national monitoring system for ECEC and this fact leaves room for interpretation of its quality at the local setting level.
In order to overcome this issue, in 2015 the Ministry of Education commissioned INVAlSI the study of a Preschool Self-Evaluation Report Format (PSERF), which was developed within the same year and is currently in its introductory phase in Italian preschools.

This paper documents the theoretical arguments behind PSERF, its aims and internal structure and provides preliminary insights into how schools have commented this form within a national consultation held in September 2015.

The central argument of PSERF is that Italian preschool, being the first but not compulsory level of education, has the possibility to plan its processes around key outcomes for children, as detailed in the national curricular guidelines, in order to ensure that children are the first to benefit most from such processes.

**Challenges in measuring growth in early reading development in two transparent orthographies**

**Keywords:** Achievement, Assessment methods and tools, Learning disabilities, Motivation

**Presenting Author:** Oddny Judith Solheim, The Norwegian Reading Centre, Norway

**Co-Author:** Per Henning Upstad, Centre for Reading Education and Research, Norway

**Co-Author:** Marja-Kristina Lehtikari, University of Jyväskylä, Finland

In order to evaluate effect of early interventions, we need measures that can capture reading growth, i.e. the amount of progress students make between two points in time, in a reliable and valid way. This is especially demanding when intervention starts simultaneously with formal instruction. The large diversity in skills can result in measurement challenges as we face both ceiling- and floor-effects. A vast majority of previous research on early reading interventions has been carried out in English-speaking countries with proven and standardized measures informed by longitudinal studies of emergent literacy skills and reading development in the opaque English orthography. However, as both skill distribution, pre-reading predictors, and the pace of learning are likely to differ with orthography and educational context, the distribution and development of emergent early reading skills in transparent orthographies come forward as an urgent timely task. In this presentation we compare distributions patterns in emergent literacy skills in two large samples of 6-years-olds in Norway (n = 5700) and Finland (N = 1880) in order to explore whether it would be possible to measure growth on the same scale for students on different achievement levels when intervention starts simultaneously with formal instruction. The results confirm large variations in emergent literacy skills and reveal partly similar distribution of emergent literacy skills across the two transparent languages. The findings indicate that we need to measure several emergent reading skills in order to capture development for the whole group of students. Consequences for designing pre-measures in early reading intervention are discussed.

**Early numerical skills and special needs: A new instrument for 2- to 4½-year-old children**

**Keywords:** Assessment methods and tools, Early childhood education, Numeracy, Special education

**Presenting Author:** Simone Schaub, University of Applied Sciences of Special Needs Education, Switzerland

**Co-Author:** Kerstin Olsbaken Ure, Service for Early Education, Berne, Switzerland

**Co-Author:** Christina Koch, University of Applied Sciences of Special Needs Education, Switzerland

**Co-Author:** Martin Veneti, University of Applied Sciences of Special Needs Education Zurich, Switzerland

Despite the early emergence of numerical skills in child development and its continuous growth into formal mathematical knowledge, little attention has been paid to these skills in early remedial education. The study presents a new instrument, which tests numerical skills in 2 to 4½ year-old children with special needs. Latent trait analyses were conducted on the test scores from a sample of 171 typically developing children and 102 children with special needs (e.g., developmental delays in cognition or language, hard-of-hearing children). Results indicated that the instrument validly assesses the development of numerical skills. Also, results yielded particular delays in numerical skills in children with special needs, thus supporting its applicability in early remedial education.

**Session K 273**

1 September 2017 08:30 - 10:00

**Key Note:** Higher Education - E

**Keywords:** Comprehension of text and graphics, Content analysis, Educational Psychology, Emotion and affect, Higher education, Knowledge creation, Learning analytics, Professions and applied sciences, Qualitative methods, Reasoning, Self-regulation

**Interest group:** SIG 04 - Higher Education

**Chairperson:** Liesje Coemans, Université catholique de Louvain (UCL), Belgium

**Teaching Academic Knowledge by Coordinating Conventions**

**Keywords:** Higher education, Qualitative methods, Reasoning, Knowledge creation

**Presenting Author:** Caroline Dahlberg, Stockholm University, Sweden

Given the idea of universities’ traditional values and the public good being under threat, because of changes in the organization of academic knowledge, we wanted to know more about the principles of evaluation in higher education. The purpose of this study is to investigate and report what academic knowledge becomes valued in the teaching practices of Swedish universities. In this qualitative interview study, the author interviews 40 teachers with course responsibility of degree courses (and experience of supervision and examination) in Fine Arts, Law, Philosophy, Physics and Sociology. Principles of evaluations are conceptualized as conventions of justification in accordance with Boltanski and Thévenot’s theory on worlds of worth and thus seen as cognitive filters. This study shows that in degree projects valued academic knowledge is not only disciplinary knowledge, but also being able to coordinate evaluation principles. This is a learning process in itself, both for the teacher and student. The coordination is not always the result of a conflict but a way to clarify academic thinking in a teaching and learning process, how this is done. These results are interesting because they deepen our understanding of complexities of evaluations characterizing university teaching. We gain a theoretical understanding of the shaping of conventions and how they become relevant in situations. The results may also be useful in the advancement of university teaching pedagogics, because of a deeper understanding of how conflicts also are fruitful in teaching.

**Understanding the factors affecting the use of Learning Analytics in the UK Higher Education Sector**

**Keywords:** Content analysis, Higher education, Learning analytics, Qualitative methods

**Presenting Author:** Claudette Kika, University of Bedfordshire, United Kingdom

**Co-Author:** Yanqing Duan, University of Bedfordshire, United Kingdom

**Co-Author:** Guangming Cao, University of Bedfordshire, United Kingdom

Higher Education Institutions (HEIs) are collecting more data than ever before (Bichsel, 2012) which leads to an explosion of data and unprecedented challenges in making effective use of this formidable amount of data for better Student Experience Management. Whilst there is indication that HEIs that utilise Learning Analytics (LA) make better decisions regarding student experience and create competitive advantages (Kirin et al., 2012; Sclar, 2014) most HEIs are still yet to use LA to its full potential. Technology Organisation Environment (TDE) framework looks at the factors that influence technology adoption and use in HEIs (Munro-Grieve, 2006). For that reason there is currently no research on the adoption of the TDE framework and the factors that affect LA use in HEIs. This research therefore aims to close this gap by developing a better understanding of LA use on Student Experience Management. A qualitative methodology is adopted using thirty semi structured interviews with key stakeholders across UK HEIs.

**Processing of a Patient Case Among Medical Students and Residents – an eye-movement study**

**Keywords:** Comprehension of text and graphics, Higher education, Professions and applied sciences, Reasoning

**Presenting Author:** Ilona Sődörvik (née Ahopetä), University of Turku, Finland

**Co-Author:** Henna Vippu, University of Turku, Finland

**Co-Author:** Erika Osterholm, University of Turku, Finland

**Co-Author:** Mirjamaja Mikkila-Erdmann, University of Turku, Finland

The purpose of this study was to investigate how third-year medical students (n=33) and internal medicine residents (n=13) process and solve a written patient case. According to previous studies, the processing of more experienced physicians is faster and more efficient compared to novices. However, little is studied the reading of a patient case texts in processing level. The text concerning pulmonary embolus followed a patient case in cardiac center including anamnesis, status and examination results from laboratory tests and it included both task-relevant and task-relevant aspects. The processing of the text was investigated using eye-tracking method and complemented with written questions. The processing of students was compared to that of internal medicine residents. The results showed that there was variation among medical students in their diagnosing-performance, as little less than half of the students (n=15) diagnosed the case correctly. Processing of a patient case was faster among better achieving students and residents, who also seemed to be more efficient in differentiating relevant aspects from irrelevant according to written answers. Surprisingly, the hypothesis that better-achieving participants would focus more on task-relevant areas was not supported by the eye movement results. However, the illness-script-activation might be differentiated from the eye-movement data of residents, who processed the very first key sentence relatively longer compared to the students. Based on the results certain advances for medical education are discussed. We suggest that teaching of so-called illness script grammar could presumably benefit medical students learning of clinical reasoning skills.
The Impact of Stress on Well-being among Faculty Members: Moderating Role of Emotion Regulation

Keywords: Educational Psychology, Emotion and affect, Higher education, Self-regulation

Presenting Author: Aleenosh Saniyari, McGill University, Canada
Co-Author: Joost Schipperwoerd, Tilburg University, Netherlands
Co-Author: Rahel Salimzadeg, McGill University, Canada

Existing research suggests that numerous aspects of faculty career are stressful and trigger negative emotional responses. Evidence further shows that job-related stress impacts well-being and productivity amongst faculty. This study sought to investigate the moderating role of emotion regulation - a basic component of emotional intelligence - in the association between stress and well-being as indicated by emotional exhaustion, job satisfaction, and quitting intentions. Two emotion regulation strategies were included: cognitive reappraisal and expressive suppression. Questionnaire data were collected from 380 faculty members from seven Canadian research-intensive universities. Moderation analysis indicated that cognitive reappraisal buffers against the negative impact of stress on well-being whereas suppression aggravates the adverse impact of stress. Findings highlight the significance of developing stress management and emotion regulation interventions to help faculty members effectively manage stress and emotions and maintain well-being.

Keywords: Faculty members, stress, emotion, emotion regulation, well-being

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Session K 274
1 September 2017 09:30 - 10:00
Pini B - B3107
Single Paper

Developmental Aspects of Instruction, Instructional Design

Paper Presentation: Comprehension of Text and Graphics - D

Keywords: Argumentation, Comprehension of text and graphics, Developmental processes, Engineering, Experimental studies, Higher education, Instructional design, Metacognition, Multimedia learning, Reading comprehension, Reasoning

Interest group: SIG 02 - Comprehension of Text and Graphics

Chairperson: Christine Schmidt, German Institute for International Educational Research (DIPF), Germany

The influence of perceptual cues in attributing importance in argument diagrams

Keywords: Argumentation, Comprehension of text and graphics, Instructional design, Reasoning

Presenting Author: Marja van Ameloot, Tilburg University, Netherlands
Co-Author: Joost Schipperwoerd, Tilburg University, Netherlands

Argument diagrams are schematic representations of claim-reason complexes. The question these studies address is whether perceptual cues, such as the size of boxes, affects argument functions, like evaluating claims or reasons. We conducted two experiments in which we systematically varied size and number of boxes in an argument diagram. In the first experiment, we used an empty argument diagram with a box stating 'standing' on top and boxes only noting in favor and against in two columns underneath. We asked participants to imagine there were arguments in the boxes and decide whether they would choose in favor or against. Participants chose according to hypotheses: the side that had the larger boxes, the side that had more boxes, or the side that had both larger and more boxes. When size and number mismatched, they tended to choose number over size. In the second experiment, boxes were contained a read standpoint and arguments. We found that effects of perceptual cues subdued under these circumstances, indicating that the content tends to be more important than the perceptual cues. However, one side of the argument showed both more and larger boxes, people tended to choose this side.

Format on the effects of comprehension of movement from static graphics in engineering education

Keywords: Comprehension of text and graphics, Engineering, Experimental studies, Higher education

Presenting Author: Olga Kasatkina, Univ. Grenoble Alpes, France
Co-Author: Erica de Vries, Univ. Grenoble Alpes, France
Co-Author: Jean-François Boutj, Univ. Grenoble Alpes, France
Co-Author: C. Masclet, Univ. Grenoble Alpes, France

In this study, effects of Palette (black and white vs. colour) and Projection (2D vs. 3D) were tested on comprehension of movement from static kinematic schemes of simple and complex mechanisms. We recruited 132 engineering students to perform the four experimental conditions. We expected that the potential benefits of tested formats would have faded with experience. Our results showed still a benefit from both colour and 3D for these intermediate engineering students. Only colour appeared to be less helpful for comprehending movement of simple mechanisms. One explanation resides in the fact that we studied intermediate and not experts. Another explanation lies in the fact that 2D might actually hinder comprehension since 3D is mostly used in teaching nowadays. More research is needed to understand comprehension of monoscopic domain-specific graphics for novices and intermediates. These results have implications for engineering education.

Multi-Level Mental Representations of Written, Auditory, and Audiovisual Text in Children and Adults

Keywords: Comprehension of text and graphics, Developmental processes, Reading comprehension, Multimedia learning

Presenting Author: Wieken Wannagat, University of Würzburg, Germany
Co-Author: Caroline Wassenegger, University of Würzburg, Germany
Co-Author: Gerhard Nieding, University of Würzburg, Germany

In two experiments, we examined whether text comprehension differs between written, auditory, and audiovisual (auditory combined with pictures) presentations in second- and fourth-graders and adults (Experiment 1), and between auditory and audiovisual presentation in first-, fourth-, and sixth-graders (Experiment 2). To define and operationalize text comprehension, we refer to well-established multi-level theories of discourse processing (Kintsch, 1998) according to which processing and comprehension of text involve at least three levels of mental representation. We therefore measured text comprehension with a sentence recognition test that allows for assessing memory of text surface, textbase, and situation separately (Schmalten & Galvanov, 1986). All in all, results of both experiments indicate that children up to the sixth grade benefit from pictures added to verbal materials in terms of memory of situation model information, and thus text comprehension, while adults do not. This effect was found in comparison to both written (Experiment 1) and auditory text (Experiment 2) and is in line with existing research and theoretical considerations. More importantly, these experiments supplement the existing body of knowledge by offering insights on how presentation mode separately affects different levels of text processing among different audiences.

Effects of (supported) drawing on self-regulated learning

Keywords: Comprehension of text and graphics, Experimental studies, Instructional design, Metacognition

Presenting Author: Julia Kolmar, University of Freiburg, Institute of Psychology, Germany
Co-Author: Alexander Eitel, University of Freiburg, Institute of Psychology, Germany
Co-Author: Katharina Scheiter, Leibniz-Institut für Wissensmedien (IWM), Germany
Co-Author: Katrin SchianiSchol, Leibniz-Institut für Wissensmedien (IWM), Germany

Self-regulated learning, which entails monitoring one's learning progress in order to control it, is ubiquitous in modern societies. However, monitoring is often inaccurate when learning with expository text. Building on previous research we assume that monitoring accuracy can be improved when learning with expository text (containing much visual-spatial information) is accompanied by a drawing task. Specifically, we assumed that drawing tasks enhance monitoring accuracy (e.g., reduce overconfidence) especially when drawing is supported by a spatial scaffold. To test this assumption 85 participants were randomly assigned to one of three conditions. They read an expository text consisting of five paragraphs about the formation of auroras. After each paragraph one group generated free-hand drawings, one group generated drawings supported by a spatial scaffold and one did not generate drawings at all. Participants gave judgements of learning (JL) after each paragraph and selected paragraphs for resudy after studying the entire text, without the opportunity to actually resudy. Subsequently they took a test. On a learning outcome level there were no differences between the conditions. As expected the results indicate that drawing pictures, especially with scaffolds, reduced overconfidence. Hence, supporting learners draw supports monitoring. Whether this also results in more adequate resudy behavior, and hence fosters learning outcomes, is subject to further research.

Session K 275
1 September 2017 08:30 - 10:00
Vita - 100
Single Paper

Higher Education, Lifelong Learning, Motivational, Social and Affective Processes

Paper Presentation: Lifelong Learning and Out-of-School Learning

Keywords: Lifelong learning, Out-of-scholl learning, In-service teacher education, Informal learning, Lifelong learning, Motivation, Out-of-school learning, Qualitative methods, Self-regulation, Social aspects of learning and teaching, Teacher Professional Development, Workplace learning

Interest group: SIG 04 - Higher Education, SIG 14 - Learning and Professional Development

Chairperson: Laura Hirto, University of Eastern Finland, Finland

The role of social informal learning in the student/graduate entrepreneurs' entrepreneurial process

Keywords: Higher education, Informal learning, Qualitative methods, Social aspects of learning and teaching

Presenting Author: Carla Questas-Palacios, University of Leeds, United Kingdom
Co-Author: Nigel Lockett, Lancaster University, United Kingdom
Co-Author: Antonio Padilla-Mañéz, Universidad de Malaga, Spain
Co-Author: Karen Williams-Middletont, Chalmers University of Technology, Sweden
Co-Author: Sarah Jack, Lancaster University, United Kingdom

This paper aims to analyse the role of social informal learning of student/graduate entrepreneurs during their engagement in entrepreneurial processes while attending university. A qualitative methodological approach involving critical incident technique is used to map the entrepreneurial journeys of 18 students/graduates from Spain, Sweden and the United Kingdom. NiVo v10 software was used to conduct narrative analysis on collected data, focusing only on those entrepreneurial activities that occurred during university. Main findings suggest that student/graduate entrepreneurs tend to rely on mentors met in informal educational contexts in order to develop their entrepreneurial process; this person is contacted by the student/graduate entrepreneur itself with the idea of seeking their help. At an institutional-level, the study legitimates university inclusion of social networking activities into formal and non-formal entrepreneurship education, and encouragement of informal entrepreneurial learning. Moreover, the findings encourage educators to embed social networking activities within the curriculum in order to facilitate entrepreneurial learning.

**Teacher Leadership and Professional Development in Challenging Contexts**

**Keywords:** In-service teacher education, Informal learning, Teacher Professional Development, Workplace learning

**Presenting Author:** Maria A. Flores, University of Minho, Portugal

This paper reports on findings from funded research carried out over a three-year period aimed at examining conditions for teacher leadership and professional development in challenging circumstances. A mixed-method research design was devised. The project included a national survey to teachers (n=5700); interviews to 11 school principals; focus group with teachers (n=89) and with students (n=188); and development and evaluation of strategies to involve teachers in exercising leadership in their schools (5 schools and 66 teachers were involved). Findings point to the valorization of emancipatory and pedagogical motivations to participate in professional development opportunities as well as instrumental reasons (e.g. career progression). By and large, issues such as bureaucracy, intensification, the deterioration of social image of the teaching profession, unemployment amongst teachers due to the financial and economic crisis, endless reforms in Education (such as external evaluations for teachers, schools and students) are amongst the external factors that account for teachers lack of motivation and dissatisfaction with effects on their professional development. However, internal factors such as teacher collaboration, classroom work and the relationship with students were identified as factors and sources of personal and professional motivation which help teachers to remain in the teaching profession and to invest in their professional learning. Strong professional values, sense of professionalism as well as teacher resilience which is related to their identity as teachers also emerged from the data. These other issues will be explored further in the paper.

**Self-regulated professional learning in the workplace: a state of the art and future perspectives**

**Keywords:** Content analysis, Self-regulation, Workplace learning, Lifelong learning

**Presenting Author:** Katrien Cuypers, University of Antwerp, Belgium

**Co-Author:** Piet Van den Bossche, University of Antwerp, Belgium

**Co-Author:** Vincent Donche, University of Antwerp, Belgium

A great deal of what is being learned takes place in the workplace, during job-performance. Professionals are increasingly expected to respond to changes and solve complex work problems. Within organizational contexts, hands-on solutions often lack and on the job learning is required. This implies that professionals take responsibility for their own learning and by that means engage in self-regulated learning (SRL). Research on self-regulated academic learning defined SRL as an active and goal-oriented process structured as internalized phases, modulating cognition, affect, behavior and context. Nevertheless, little is known about the need for research on self-regulation of professional learning during job-performance (SRPL) focusing on how employees become masters of their own learning processes and explorations beyond common SRL grounds, existing research in this field is limited. The current study aims to systematically identify, synthesize and discuss the current state concerning conceptualization and operationalization of SRPL within the field of SRP. The particular focus of this study is on understanding how both core characteristics of SRL and professional learning have been integrated and translated conceptually and converted to the actual measurement of SRP. In total, 15 retrieved studies were analyzed using a content analysis approach. Results show that concepts with different theoretical grounds are conceptualized very similarly. Also, conceptualizations often lack regulatory and process-oriented aspects. Insights show that conceptual clarity and measurement of how SRLs actually takes place in the social context of the workplace, is needed to move the field forward.

**Exploring use of wearable technologies to study engagement, interest and learning in Makerspace**

**Keywords:** Arts, Design based research, Motivation, Out-of-school learning

**Presenting Author:** Victor Lee, Utah State University, United States

Makerspaces are considered exciting learning environments for the development of youth interest in STEM. However, whether and how interest develops and interacts with Maker activities remains unclear. This paper discusses a new approach to explore this relationship that involves the use of wearable cameras and electrodialer activity sensors with youth participating in afterschool maker programs. Through collection and analysis of these two streams of data, we are identifying which maker activities lead to higher levels of engagement, seeking to identify regularities and differences within and among individual youth. Our data suggest that there are similarities and differences in the activities that are more or less engaging to youth working in parallel in the same Makerspace. Moreover, some youth seem to be expressing and maintaining pre-existing interests rather than establishing new ones in open-ended Maker activities.

**Session X 276**

1 September 2017 08:30 - 10:00
Main Building C - C8
Single Paper
Instructional Design, Learning and Instructional Technology

**Paper Presentation:** Comprehension of Text and Graphics - E

**Keywords:** Biology, Competences, Comprehension of text and graphics, E-learning / Online learning, Instructional design, Language (Foreign and second), Learning Technologies, Literacy, Meta-analysis, Primary education, Reading comprehension, Secondary education, Writing / Literacy

**Interest group:** SIG 02 - Comprehension of Text and Graphics

**Chairperson:** Sarah Strauss, Germany

**Visual Representations in a High School Ecology Textbook: Representing Representational Abilities**

**Keywords:** Biology, Competences, Comprehension of text and graphics, Secondary education

**Presenting Author:** Billie Elam, University of Hartford, Faculty of Education, Israel

**Co-Author:** Nara Sinai, University of Haifa, Israel, Israel

Among other functions, visual representations (VRs) hold vast potential for promoting learners’ Meta-Representational Capabilities (MRC). Such capabilities are particularly needed in environmental education that deals with complex systems, abstract concepts, implicit causality, and unperceived sizes. Hence, students’ mindful and guided encounters with VRs are recommended. Typically, school environment provides the context for such encounters: instructional aids and textbooks constitute rich and accessible sources of VRs, teachers guidance is available, and learning tasks are designed to activate students mindful information processing. Yet, it seems that present students’ MRC does not catch up with the growing requirements of present visual world. This calls for a deep exploration of the potential of these aforementioned VR sources to promote students’ MRC. The present study focuses on the potential of school textbooks VRs to achieve this goal. Using a coding system, developed for this purpose and validated in previous studies, all texts and related tasks, presented in one representative high school ecology textbook, were systematically analyzed. The general findings showed that most: VRs diversity was low; they carried a decorative role; VRs failed to clarify and simplify the represented complex processes and to make implicit objects visually accessible; Moreover, interpretation of the majority of VR did not require any prior science knowledge thus, reducing relevant knowledge retrieval and its linking into coherent bodies of knowledge. Finally, only few tasks had the potential to raise awareness of representational-related issues and abilities. Hence, textbook’s VRs exhibited low potential to support MRC development. Educational implications are discussed.

**More efficacious representations? Examining the effect of diagrams in students’ written explanations**

**Keywords:** Comprehension of text and graphics, Instructional design, Language (Foreign and second), Writing / Literacy

**Presenting Author:** Emmanuel Mariano, Kyoto University, Japan

**Co-Author:** Rachel Dryer, Charles Sturt University, Australia

**Co-Author:** Ayano Tsuda, Kyoto University, Japan

This study addressed the question of how inclusion of self-generated diagrams in student explanations of what they have learned might affect quality features of those explanations. The participants were 19 undergraduate English-as-a foreign language students taking an education course taught entirely in English. At the beginning (Pre-instruction) and end (Post-instruction) of the semester, they were administered an assessment task that required reading a passage and writing an explanation of it. During the semester the students had a weekly homework task of writing a one-page explanation of what they had learned in the course. Over the weeks of the semester, they were additionally given a hint about the usefulness of including diagrams in their explanations, and workshop instruction and practice in using diagrams. Analyses of the students’ work were pre- and Post-instruction explanations revealed increases in quantity and types of diagrams they included in their explanations, indicating effectiveness of the interventions used in promoting diagram use. Analysis of Post-instruction explanations also showed that number of diagrams included in the explanations negatively correlated with both word-and-verb-counts, but positively correlated with number of key points included. Subjective ratings of the usefulness of the diagrams students used were also high, indicating that the blinded raters perceived the diagrams as appropriate and contributing to the clarity of the explanations. These findings suggest that inclusion of appropriate diagrams may enable students to construct more concise and simpler explanations of what they have learned without sacrificing important points they should include.

**Modeling online research and comprehension: What skills are critical when reading on the Internet?**

**Keywords:** Comprehension of text and graphics, E-learning / Online learning, Learning Technologies, Literacy
This study aims at clarifying elements that are critical when students read on the Internet. We base our study on Online Research and Comprehension theory (e.g., et al., 2013) that defines online reading as a process of problem-based inquiry that consists of five practices: defining important questions, locating information, evaluating information, synthesizing information, and communicating one’s learning with others. This study investigates whether there are separate elements related to online research and comprehension and how these elements compare to the theoretical model. A factor analytic approach (CFA) was used to evaluate models from four to six-factors of online research and comprehension using data from a Finnish assessment with sixth graders (n=426). Results show that the five-factor model had a better fit to the data than the four-factor model (χ² (5) = 23.43, p < .001), and the six-factor model better than the five-factor model (χ² (5) = 43.08, p < .001). The six factors were: ability to 1) locate information, 2) confirm credibility of information, 3) question information credibility, 4) identify main ideas from a single source, 5) synthesize information from multiple sources, and 6) communicate a justified position. The results suggest that it is possible to select the components of Online Research and Comprehension. However, two of the original components, evaluating and synthesizing information were both divided into two separate factors. This study highlights the complexity of reading on the Internet implying that only instruction should take into account all the above-mentioned components of online research and comprehension.

Effectiveness of reading strategy interventions in classrooms: A meta-analysis.

Keywords: Meta-analysis, Primary education, Reading comprehension, Secondary education

Presenting Author: Mariska Olkking, Hogeschool Rotterdam, Netherlands

Co-Author: Roel van Staaen, Erasmus University Rotterdam, Netherlands

Co-Author: Ams van Gelderen, University of Amsterdam/Rotterdam University of Applied Sciences, Netherlands

Co-Author: Lea Arends, Erasmus University Rotterdam, Netherlands

Co-Author: Erik van Schooten, Hogeschool Rotterdam, Netherlands

Co-Author: Peter Sleeegers, Twente University, Netherlands

Many students struggle with reading comprehension. Many studies have shown positive effects of reading strategy interventions on reading comprehension. However, it is unclear whether teaching reading strategies is as effective in regular classroom settings as in controlled experimental settings in which the experimenter is the instructor and/or in which instruction is given to small groups of students (as opposed to whole classrooms in which multiple groups of students work simultaneously). In this meta-analysis, results of studies on reading strategy instruction in regular classroom contexts were collapsed to determine whether reading strategy interventions were effective in fostering reading comprehension and strategic ability. The meta-analysis included 59 studies in grades 3-12. A small effect size on reading comprehension on reading comprehension and a medium effect size on strategic ability were obtained. For both reading comprehension and strategic ability, effects were moderated by trainer type, with a higher effect size for interventions in which the researchers delivered the treatment compared to teachers. Furthermore, effects were higher when researcher-developed tests were used compared to standardized tests. Implications for educational practice and suggestions for further research are discussed.
mixed methods approach, this current study aimed to examine student situational interest in chatbots and human partners, and the merits and/or demerits of chatbots as conversation partners. This research seeks to investigate why chatbots are not yet an important instrument for conversation practice and also provides direction for the future development of chatbots in blended language learning programs.

Preliminary investigation of the data indicates that: 1) prior interest in conversation with a human partner was the best predictor of future interest in chatbot conversations; 2) prior language fluency was more strongly linked to interest in chatbots than human conversations; 3) that the qualitative experience of having “learned more” with the chatbot was strongly connected to situational interest. In this paper session implications for using chatbots with language students and directions for future development of chatbots in blended language learning programs will be discussed.

Session K 278
1 September 2017 08:30 - 10:00
Main Building D - D11
Single Paper
Higher Education

Paper Presentation: Higher Education - J
Keywords: Achievement, Assessment methods and tools, Case studies, Citizenship education, Competencies, Developmental processes, Higher education, Quantitative methods, Student learning, Teaching / instruction, University Education
Interest group: SIG 04 - Higher Education
Chairperson: Manuel Musso, Argentina

Factors explaining learning of generic skills: A study of university students' experiences
Keywords: Competencies, Higher education, Student learning, Teaching / instruction
Presenting Author: Anne Virtanen, University of Jyväskylä, Finland
Co-Author: Päivi Tynijärvi, University of Jyväskylä, Finland

Although generic skills have received widespread attention from both policy-makers and educationalists, little is known regarding how students acquire these skills, or how they should best be taught. Hence, the aim of this study was to identify what kinds of pedagogical practices are behind the learning of eight particular generic skills. The data were collected from university students (N=163, n=123) via internet questionnaires. The findings from regression analysis showed that teaching practices involving collaboration and interaction as well as the use of constructivist learning environment and integrative pedagogy predicted learning of generic skills such as decision making skills, different forms of creativity, and problem solving skills. In contrast, the traditional forms of university teaching, such as reading, lecturing, and working alone were negatively associated to generic skills learning. Overall, this study offers detailed information about the pedagogical practices that nurture generic skills learning in university contexts.

Integrating PRME into an undergraduate curriculum – experiences from a Swiss University
Keywords: Case studies, Citizenship education, Developmental processes, Higher education
Presenting Author: Taiga Brah, University of Tübingen, Germany
Co-Author: Patricia Kuehner, University of St.Gallen, Switzerland

The integration of responsibility and sustainability into Higher Education Institutions is an ongoing challenge. While there is a growing number of initiatives, research regarding the concrete implementation processes remains scarce. This paper attempts to contribute to closing this research gap by describing three case studies from different disciplinary backgrounds. The case studies were developed as part of a bigger project aiming at implementing the so-called Principles of Management Education (PRME) into an undergraduate programme at a University in Switzerland. Research methods include interviews, document analysis and focus groups with students. Results show that the both an agreement on how responsibility and sustainability are understood in the context of Higher Education as well as the quality of the available material are crucial for the lecturers to start their own integration processes. Another important question is the fit between PRME and the subject taught by the lecturer. In sum, our case studies emphasize the broad range of possible implementation options, at the same time, also identifying different obstacles. The research provides important examples for curriculum development in Higher Education which are relevant for theory and practice. They highlight possible ways how to implement responsibility and sustainability into an undergraduate curriculum.

How successful are first-year university students? A multi-perspective approach
Keywords: Achievement, Higher education, Quantitative methods, Student learning
Presenting Author: Paulien Meier, Radboud University Nijmegen, Netherlands
Co-Author: Patrice van der Zanden, Behavioural Science Institute & Radboud Teachers Academy, Radboud University, Netherlands
Co-Author: Eddie Derenver, Behavioural Science Institute, Radboud University, Netherlands
Co-Author: Toon Cillesen, Behavioural Science Institute, Radboud University, Netherlands

Although the importance of first-year student success is widely acknowledged, a clear and consistent definition of what it means to be successful at university is lacking. This study incorporates three perspectives on first-year student success, namely students’ academic achievement, their critical thinking, and their personal adjustment to university life. Previous studies suggest that students might be more likely to become successful in a particular domain, but might experience difficulties in other domains. We aimed to gain more insight into the differences between students regarding their first-year university success, following a multi-perspective approach, analyzing different domains of success simultaneously. Data were collected by means of questionnaires from 389 first-year university students. Latent class cluster analyses revealed three patterns of success: 1) Students with average levels of academic achievement and critical thinking, and particularly high levels of personal adjustment, 2) students with high academic achievement and critical thinking scores, and average levels of personal adjustment, 3) students who scored lower on academic achievement, critical thinking, and especially lower on personal adjustment. Students in these two clusters. Follow-up ANCOVA suggested that Cluster 1 students most strongly experienced that their social life hinders their study, whereas Cluster 2 students experienced least interference from their study on their social life. Our study showed that student success is a multidimensional concept, with subgroups of first-year students showing specific patterns of success. These insights contribute to the discussion on the aims of university education and enable universities to better support students.

Training and assessment of communication skills
Keywords: Assessment methods and tools, Competencies, Higher education, Vocational education
Presenting Author: Edith Braun, University of Kassel, Germany
Co-Author: Georgios Athanasiou, University of Kassel, Greece
Co-Author: Ulrike Schwebel, University of Kassel, Germany

Non-cognitive competences are considered to be central learning outcomes of higher education. Communication skills hold a major significance among non-cognitive competences and are mentioned in almost all qualification frameworks as respective skills to be learned in the context of higher education. We use Habermas’ theory of communicative action as the theoretical starting point for the construction of role plays. Habermas differentiates between two types of social action namely strategic action and communicative action. Our question is: how can we assess these communication skills? We will present a performance based instrument for assessing communication skills. We will use role play tasks, and developed accordingly to theoretically dimensions observation form. We will present the theoretical basis, as well introduce the assessment modality, and will discuss first results.

Session K 279
1 September 2017 08:30 - 10:00
Main Building A - A2B
Single Paper
Higher Education, Instructional Design, Motivational, Social and Affective Processes

Paper Presentation: Writing
Keywords: Educational Psychology, Higher education, Instructional design, Literacy, Reasoning, Second language acquisition, Writing / Literacy
Interest group: SIG 12 - Writing
Chairperson: Merja Kusma, University of Tampere, Finland

Effects of different learning activities on different synthesis writing outcomes
Keywords: Educational Psychology, Higher education, Instructional design, Literacy, Writing / Literacy
Presenting Author: Mar Matao, Universidad Autónoma de Madrid, Spain
Co-Author: Elena Martin, Universidad Autónoma del Madrid, Spain
Co-Author: Isabel Cuevas, Autonoma University of Madrid, Spain
Co-Author: Manantia Solan, Universidad Autónoma de Madrid, Spain
Co-Author: Gert Pijlraad, University of Amsterdam, Netherlands

In this study, a comparison was made between two interventions in which students had to write two syntheses, in collaboration with a partner and with the support of written guidelines, after reading pairs of texts presenting counterposed views on controverted subjects in the field of education. In one of these interventions, the collaborative practice sessions were preceded by an explicit instruction session, in which the students were instructed in selecting informative information from the two sources and explaining. Before and after this intervention, students produced a synthesis working individually without the help of the guide. The participants were 114 undergraduate psychology students. The results from the analysis of the role played by different components of the intervention (explicit instruction and collaborative practice with the help of a guide) and their effects on a range of synthesis quality criteria (selection and integration) by means of SEM-analysis are presented. The model obtained shows that learning the selection process for arguments took place mainly through collaborative practice with a partner and the support of the guide. In contrast, for integration, the effect is due to explicit instruction. These findings highlight that when learning a complex process, such as writing a synthesis from multiple sources implying several sub-processes, not all of these are acquired necessarily in the same manner.

Effects of peer observation on strategy in synthesizing skills in teaching EFL writing
Keywords: Instructional design, Literacy, Second language acquisition, Writing / Literacy
Presenting Author: Margarita Grigor, University of Amsterdam, RU Loughborough, UK
Co-Author: Muğan Buyuktas Kara, University of Amsterdam, Turkey
Co-Author: Gert Pijlraad, University of Amsterdam, Netherlands

In the EFL program of a Turkish University, we compared the effects of explicit strategy instruction with and without peer observation for learning to write synthesis tasks after a four-hour intervention program. Participants were 155 upper intermediate level EFL learners (mean age=18), randomly assigned to three conditions. We hypothesized that strategy focused instruction conditions would have a positive effect on students’ writing quality and writing processes compared to a control condition, and that peer observation of the explicit strategy use would outperform the other conditions. Results showed that students in
the peer observation condition had better source use skills and wrote more authentic texts than students in the other conditions in Posttest 1, and in Posttest 2 they maintained their performance in source use skills. Participants in the peer observation and the explicit strategy instruction conditions also showed more effective temporal organization of writing activities.

Writing synthesis texts: Effects of think-aloud on students' short argumentation essays
Keywords: Instructional design, Literacy, Reasoning, Writing, Literacy
Presenting Author: Christian Tachi, University of Florence, Italy
When reading multiple documents presenting conflicting perspectives on a controversial topic, both sources and content of each text need to be represented and integrated by the reader. The think-aloud procedure, typically used as an assessment methodology, might have a positive effect on participants’ internal processes, and could be used as an intervention strategy. This study analysed the efficacy of think-aloud on the soundness of argumentation in University students’ short essays, after reading six multiple documents on the controversial topic of flu vaccination. Fifty-three Italian University students were randomly assigned to a control or an experimental condition. We assessed students’ prior beliefs, interest, and prior knowledge on the topic of flu vaccination. Each student was asked to read six texts on vaccination, but the experimental group students were asked to think-aloud and report what they were thinking while reading the texts. According to the ANOVA results, experimental group students wrote longer essays, and essays with a sounder argumentation than the control group did. This study confirms the efficacy of the think-aloud methodology to improve the soundness of argumentation in students’ short essay after reading six documents on flu vaccination.

Learning to write a synthesis text: Effects of Instructional method and reflection
Keywords: Higher education, Instructional design, Literacy, Writing / Literacy
Presenting Author: Janneke van der Loo, Tilburg University, Netherlands
Co-Author: Enesl Krahmer, Tilburg University, Netherlands
Co-Author: Marjine van Amelsvoort, Twburg University, Netherlands
In this paper we present results on a study on the effect of instructional method (observational learning and learning by doing) and reflection (yes or no) on text quality and self-efficacy beliefs in learning to write a synthesis text. 116 undergraduate students were assigned to either an observational learning or learning by-doing condition, with or without reflection. In the exercises participants learned how to write a synthesis text based on three summaries. They were tested on text quality, self-efficacy beliefs and satisfaction with the instructional method. Our results indicate that there are no main effects of instructional method and reflection on text quality and self-efficacy beliefs. However, participants who learned by doing were more satisfied with the method than participants who learned by observing, and participants who reflected were more satisfied than those who did not reflect. We also found that participants who learned by observation and reflected were more satisfied than those who learned by observation and did not reflect. In this study observational learning and learning by doing, with or without reflection, seem equally effective for learning how to write a synthesis text. Participants, however, seem to prefer learning by doing and reflecting.

Session K 280
1 September 2017 10:00 - 10:45
Vita - 120
Session Chair:
Co-Author: Higher Education - K
Keywords: Achievement, Emotion and affect, Higher education, Instructional design, Learning approaches, Literacy, Student learning, Teacher Professional Development, Teaching approaches
Interest group: SSG 94 - Higher Education
Chairperson: Helma Dobbeijink-Marchand, Radboud University, Netherlands
“Attune, regulate your feelings wisely!” – Students’ emotion regulation and approaches to learning
Keywords: Emotion and affect, Higher education, Learning approaches, Student learning
Presenting Author: Robert Kordts-Freudinger, Paderborn University, Germany
Co-Author: Thomas Grossen Honetrink, Paderborn University, Germany
Co-Author: Dagmar Faster, University of Paderborn, Germany
Based on studies about stress in teacher education programs and relations between emotions and approaches to learning, the study investigated the use of emotion regulation strategies during a five-month teaching internship. More specifically, we researched the development of cognitive reappraisal, an emotion regulation strategy, and of the deep approach to learning. In addition, we investigated relations between two emotion regulation strategies and approaches to learning. For Study 1, n = 89 German teacher students completed several questionnaires after their teaching internship in a cross-sectional design, including the Study Process Questionnaire (R-SPQ-2F, Biggs et al., 2001) and the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). The results indicate positive relations between the deep approach to learning and cognitive reappraisal, but not with expressive suppression. For Study 2, n = 86 teacher students completed parts of these questionnaires in a longitudinal design, before and after their teaching internship. The correlational analyses confirm the results of Study 1. In addition, data show that both reappraisal and the deep approach to learning are declining over the course of the internship. The paper discusses implications for future research on emotion regulation and learning as well as on the organization of internships in teacher education.

How do the different study profiles of first-year students predict their completion of degrees?
Keywords: Achievement, Higher education, Learning approaches, Student learning
Presenting Author: Ariane Haapala-Muuronen, The University of Helsinki, Finland
Co-Author: Miija Rauhunen, University of Helsinki, Finland
Co-Author: Anna Parpan, University of Helsinki, Finland
Co-Author: Enike Komi, University of Helsinki, Finland
Co-Author: Sari Lindblom-Ylänne, University of Helsinki, Finland
The relationship between study progress and the nature of 550 first-year law students’ study processes was investigated using a modified version of the Approaches to Learning and Studying Inventory. The students were classified into four study profiles according to their approaches to studying, indicating the nature of their study processes. The results showed that approaches to learning in the first study year predicted graduation time and the completion of the degree. Therefore, it is important to promote first-year students’ awareness of their study practices and support the progress of their studies. Individual students need tailored guidance in transitioning to university studies and identifying the demands of the study programme.

Transitions in Research Postgraduate Students’ Teaching and Learning Profiles in a Training Course
Keywords: Higher education, Learning approaches, Teacher Professional Development, Teaching approaches
Presenting Author: Alex Shum, University of Hong Kong, Hong Kong
Co-Author: Luke Fryer, The University of Hong Kong, Hong Kong
Teacher-training courses for research postgraduate students (RPgSs) in higher education provide the necessary preparation to teach effectively. Examining RPgSs’ conceptions of teaching and learning longitudinally provides insight regarding the development of their beliefs over the course and may help to describe their long-term changes. As variable-centred analysis approaches are limited to describing the mean of an entire class, a person-centred analysis offers a description of existing latent groups. A longitudinal person-centred analysis examined participants (N=137) of a short training course at an Asian-Pacific research intensive university by responding to two instruments (measuring teacher-focused and student-focused approaches to teaching, and surface and deep approaches to learning) at the beginning and end of the course. Latent Profile Transition Analysis examined the profiles of groups at both time-points and tested for movement between them, suggesting four groups at both time-points. Two groups (Teacher Focused, Student Focused) indicated an inclination towards specific teaching and learning approaches, while the other two (Low Quality, High Quality) groups were undifferentiated in approaches. Significant increases were observed in deep learning approach for Low Quality, High Quality and Student Focused groups, and in student-focused teaching approach for High Quality and Student Focused groups. These results suggest development in these adaptive conceptions occur more readily for participants who already identified with them initially. Movement between groups was limited to transitions between Low Quality and Low Quality, indicating that a short course might be insufficient to change the overall conceptions of participants. Implications for theory and practice are discussed.

Fostering University students’ evaluation of information sources: A classroom intervention study.
Keywords: Higher education, Instructional design, Literacy, Student learning
Presenting Author: Jean-Francois Rouet, Université de Poitiers, France
Co-Author: Benjamin Bordas, Université de Poitiers, France
Co-Author: Nicolas Vital, Université de Poitiers, France
The study investigated the effects of a series of classroom workshops on first-semester university students’ critical evaluation of information sources. More specifically, the workshops provided explanations and examples illustrating the constructs of author competence, author intention (benevolence) and media quality. Five hundred and fifty-five students distributed across 20 classes were included in the data analysis. The study used a cross-lagged design whereby half of the classes were trained at the beginning and half at the end of the semester. Students’ performance on various document evaluation tasks was collected at a pre-test and two post-tests. Teaching assistants were also invited to provide feedback on their experience of teaching the workshops. The data were being analyzed at the time of submission.

Session K 281
1 September 2017 10:00 - 10:45
Vita - 120
Main Building A - A32
Single Paper
Learning and Social Interaction, Teaching and Teacher Education
Paper Presentation: Teaching and Teacher Education - O
Keywords: Collaborative Learning, Communities of practice, Content analysis, Conversation / Discourse analysis, In-service teacher education, Peer interaction, Pre-service teacher education, Qualitative methods, Teacher Professional Development, Teaching / instruction
The development process of a coding protocol for understanding teacher learning in Lesson Study

Keywords: Collaborative Learning, Conversation / Discourse analysis, In-service teacher education, Teacher Professional Development

Presenting Author: Paul Warwick, University of Cambridge, United Kingdom

Co-Author: Maria Villk, University of Cambridge, United Kingdom

Co-Author: Jan Vertum, University of Cambridge, United Kingdom

Co-Author: Mariel Mercier, University of Cambridge, United Kingdom

This paper presents the iterative process of developing a coding protocol for analysing teacher peer talk and the learning that emerges from it in the context of Lesson Study (LS), a model of professional development which involves joint planning and reflection. The coding aimed to systematically identify features of videorecorded teacher discussion that contribute to teacher learning. Data are drawn from a full year of videorecordings of interdisciplinary lessons at primary and secondary schools, across London. During the project, mathematicians formed LS groups six times during the two years. At end of each phase, the analysis of their videorecorded discussions led to further refinement of the protocol and its codes. This paper presents the final and reliable version of the protocol and discusses strategies of validity and reliability that were adopted. These are also discussed in relation to the affordances of the tool and how compromises had an effect on coded features.

Peer-Coaching moves of student teachers in lesson planning dialogues – an intervention study

Keywords: Collaborative Learning, Conversation / Discourse analysis, Peer interaction, Pre-service teacher education

Presenting Author: Annelies Kreis, Teacher Professional Development, Switzerland

Co-Author: Stefanie Schnabel, University of Tübingen, Institute of Education, Germany

Practice-based teacher education offers a range of learning opportunities for teacher students(Schwille, 2008). From a socio-cultural perspective, pre- and post-lesson dialogues are particularly crucial as mediators in learning processes of student teachers. A substantial body of research gives insight into effective mentoring dialogues between student teachers and experienced mentor teachers(Hennissen, Crasborn, Brouwer, Korthagen & Bergren, 2008). A further promising approach in this field is peer coaching(Liu, 2014). However, knowledge about processes of peer mentoring dialogues, which goes beyond self-report is scarce. In a bi-national intervention study we explored what kind of coaching moves are used by peer coaches of a control group (N=55) and compare this to the practice of coaches (N=64) who where trained with content-focused peer coaches (Kreis & Staub, 2013). Participants were students of 3 Swiss and 1 German teacher education institutions, qualifying as Biology teachers for lower secondary school. The intervention involved planning dialogues of both video-recorded, transcribed, and analysed in a video-based linguistic discourse analysis for effectiveness with respect to coaching moves. Results suggest that participants of the intervention group adopted coaching moves according to the intervention model, and significantly differ from the control group. The study provides insight into ways of spontaneous vs. theoretically inspired structured peer coaching dialogues as an opportunity to foster learning processes in teacher education.

What pre-service teachers talk about in peer lesson dialogues, and how this can be influenced

Keywords: Content analysis, Peer interaction, Pre-service teacher education, Teaching / instruction

Presenting Author: Stefanie Schnabel, University of Tübingen, Institute of Education, Germany

Co-Author: Annelies Kreis, Teacher Professional Development, Switzerland

Peer coaching is a promising approach to enrich opportunities to learn for pre-service teachers. This study focuses on the content of lesson planning dialogues between student teachers. As part of an interdisciplinary, mixed-methods, bi-national project, we studied the outcomes of an intervention with Content-Focused Peer Coaching (CPC). CPC structures the interaction during societal teacher learning for co-construction with a focus on PCK. Whether, and how could the content of peer coached planning dialogues be enriched by this training? To explore this question, 119 planning dialogues were videotaped, transcribed, and analysed with a content-focused discourse analysis. Results of the quantification of the analysis show that 8 out of 25 aspects were significantly more often discussed in dialogues of the intervention group, where also significantly more time was spent to discuss issues of GPK, but not PCK. The study shows how the intervention aimed the attention for different peer coached lesson dialogues regarding the range of issues and duration of time the teacher students talk about GPK, but not PCK.

Do Purpose in Life, Social Support and Digital Use Contribute to Adolescents’ Life Satisfaction?

Keywords: Attitudes and beliefs, Educational Psychology, Educational Technology, Goal orientation, Higher education, Motivation, Quantitative methods, Secondary education, Self-efficacy

Interest group: SIG 08 - Motivation and Emotion

Chairperson: Manuela Pachot, University of Graz, Germany

This study examined the relationships between adolescents’ life satisfaction, purpose in life, meaning in life, social support, and problematic digital use. The sample included 190 participants aged 14-18 who completed self-report measures on life satisfaction and digital use in an online survey. The following factors were included: (1) other-oriented goals (n=20); (2) self-oriented goals (n=42); and (3) both other- and self-oriented goals (n=107). Adolescents with both self- and other-oriented goals had significantly higher life satisfaction, meaning in life, and social support compared to the other groups. Meaning in life and greater parent and teacher support were significantly associated with greater life satisfaction. In addition, having other-oriented goals was associated with lower life satisfaction. Finally, social support mediated the association between problematic digital use and life satisfaction. Findings are discussed in light of previous research and the theoretical and practical implications are examined.

Understanding gender differences in motivation at school: a latent-variable approach

Keywords: Educational Psychology, Motivation, Secondary education, Self-efficacy

Presenting Author: Natalie Vannini, Goethe-University, Frankfurt, Germany

Co-Author: Barbara Otto, Ludwigshberg University of Education, Germany

Co-Author: Tanja Kohnen, Goethe University Frankfurt, Institute of Psychology, Germany

Many empirical studies reveal gender differences in students’ motivation to learn. Generally, girls tend to show a more favorable motivational pattern in reading and language arts whereas boys do so in mathematics and sciences. However, only a few studies examined motivation on a latent variable level. Thus, it is still unclear whether measurement invariance between girls and boys holds, which is a fundamental assumption behind group mean comparisons. In addition, measurement error can result in an underestimation of the true effect size.We addressed this issue within the domain of language arts (German). Further, we illustrated potential consequences and strategies for intervention.

Potential and Limits of Online Self-Assessments: Effects on Study Choice Certainty and Self-Efficacy

Keywords: Educational Technology, Higher education, Motivation, Self-efficacy

Interest group: SIG 08 - Motivation and Emotion

Chairperson: Manuela Pachot, University of Graz, Germany

The aims of the study are to describe how students’ epistemic beliefs and achievement goals develop over grades 5-11, to describe the correlations between epistemic beliefs and achievement goals, and how these correlations develop over grades 5-11. Furthermore, we will explore the data for indications of causal relationships between students’ goals and epistemic beliefs, and the directionality of these relationships. The analyses build on data from a cross-sectional survey distributed to all students in grades 5-11 in two municipalities in Sweden in 2014. Confirmatory factor analysis (CFA) of students’ response revealed four valid constructs concerning students’ epistemic beliefs. Relations between Mastery approach goals and Performance goals (including both approach and avoidance goals). Students’ factor scores on the constructs were used for calculating zero order Spearman correlations between constructs. Epistemic beliefs were stable across the grades, while performance goals increased at the instructional beliefs were primary and secondary school. Mastery goals showed a mainly decreasing trend over the grades. Development and Justification of knowledge showed positive significant correlations with Mastery goals over grades 5-11, while naive beliefs about Certainty and Source of knowledge were moderately and positively correlated with Performance goals in grades 5-7, weakly correlated in grade 8-9, and insignificant in grades 10 and 11.

For the conference, results will be complemented with longitudinal data, focusing on causal relations between epistemic beliefs and achievement goals.
Session K 283
1 September 2017 08:30 - 10:00
Pinni B - B4115
Single Paper
Cognitive Science

Paper Presentation: Argumentation and Reasoning

Keywords: Argumentation, Attitudes and beliefs, Comprehension of text and graphics, Conceptual change, Informal learning, Metacognition, Misconceptions, Peer interaction, Qualitative methods, Reasoning, Science education, Teaching / instruction
Interest group: SIG 03 - Conceptual Change
Chairperson: Steffen Schmidt, Leibniz-Institut für Wissenschaftsmedien (IfW), Germany

Using refutational text for the remediation of an incorrect intuition
Keywords: Comprehension of text and graphics, Conceptual change, Misconceptions, Reasoning
Presenting Author: Stephanie Lein, KU Leuven, Belgium
Co-Author: Patrick Onghena, KU LEUVEN, Belgium
Co-Author: Lieven Verschaffel, KU LEUVEN, Belgium
Co-Author: Wim Van Dooren, KU LEUVEN, Belgium

Refutational text has successfully been used to remediate a variety of misconceptions (Tippett, 2010). Refutational text explicitly states and refutes a misconception. Our study tested to what extent refutational text can also be used to remediate an incorrect intuition, i.e. the intuitive misinterpretation of the area of box plots. We used an experimental design to test the effect of refutational text on intuitive reasoning.

One hundred and two adult volunteers were randomly assigned to either a control condition or a refutational text condition. In the control condition participants were asked to read an explanation about box plots, while in the refutational text condition the participants read the same explanation but with several refutational elements added. After the intervention an intuitive reasoning test, aimed to test the occurrence of the area intuition, was administered, logging accuracy and reaction times. Both reaction time and accuracy rate patterns showed that participants in the refutation condition scored significantly better than participants in the control condition, although the area intuition was not completely eradicated. On top of that, there were more participants with (near) perfect performance in the refutation than in the control condition. We conclude that refutational text can help in remediating erroneous answers attributable to the area intuition, although it does not completely eradicate this incorrect intuition.

How the ethical stances of source and recipient affect laypeople’s evaluation of scientific claims
Keywords: Argumentation, Attitudes and beliefs, Informal learning, Science education
Presenting Author: Marc Stadler, University of Muenster, Germany
Co-Author: Lisa Scharner, University of Muenster, Germany
Co-Author: Rainer Bromme, University of Muenster, Germany

The present study investigated how laypeople who inform themselves about a scientific topic with ethical implications evaluate scientific claims and their sources. 110 participants who held a strong stance about an ethical issue read a text in which the source, who also held a clear ethical stance, proposed a topic-related scientific claim. The source’s ethical stance either matched or opposed the participant’s ethical stance; in addition, the source provided a scientific claim that either did or did not support their own ethical stance. After reading, participants evaluated the scientific claim as well as the source’s credibility. The results show that laypeople seem to consider the possibility that the source may be driven by an ethical bias that colors their scientific message. However, this vigilance is only applied if the source holds an opposing ethical stance. Laypeople are less skeptical about a potential source bias if the source’s ethical stance matches their own.

How does teachers’ epistemic thinking relate to their inquiry-based teaching practices?
Keywords: Metacognition, Reasoning, Science education, Teaching / instruction
Presenting Author: Tessa van Schijndel, Leiden University, Netherlands
Co-Author: Nadja Saao, Leiden University, Netherlands
Co-Author: Amanda Berry, RMIT University, Australia
Co-Author: Jan van Dreil, University of Melbourne, Australia

The last decades, policymakers have been arguing for the use of inquiry-based learning and teaching in science education. More recently, the inquiry-based approach has also found its way to other educational domains. Epistemic thinking is considered to be at the core of the inquiry-based approach. In order for teachers to improve students’ levels of epistemic thinking, they need to show advanced levels themselves. In the present study, we therefore examine the epistemic thinking of secondary teachers from different educational domains, and the way they epistemic thinking relates to their inquiry-based teaching practices. The study is set in the context of international schools, as the International Baccalaureate (IB) curriculum that is frequently used at international schools, has a strong emphasis on inquiry-based teaching. Teachers’ (N=147) epistemic thinking is measured by using the scenario-based approach of Barzilai and Weinstock (2015) that is based on the theoretical perspective of Kuhn and Weinstock’s (2002, in Kuhn et al., 2008). In this perspective, the development of epistemic thinking is defined in terms of the coordination between the objective and subjective dimensions of knowing. Both teachers’ epistemic thinking and their inquiry-based teaching practices are assessed with a digital questionnaire. The study’s results (are momentarily being analyzed, and) will bear relevance to the educational context by providing a possible explanation for the difficulties in implementing inquiry-based approaches, as well as by providing suggestions for teacher training in the area of inquiry-based teaching.

Children’s minds at work in argumentative activity
Keywords: Argumentation, Peer interaction, Qualitative methods, Reasoning
Presenting Author: Josephine Convertnit, Institut de Psychologie et Education, Switzerland
Co-Author: Anne-Naïly Perret-Clermont, Institut Psychologie et Education, Université de Neuchâtel, Switzerland
Co-Author: Antonio Iannaccone, Institut de Psychologie et Education, Switzerland

As suggested by Nenon (1996), argumentation is better considered not as a monological performance of making explicit predetermined standpoints backed up by arguments, but as a process of co- construction regarding diverse issues, notions and meanings, as well as creating opportunities for the development of the child’s thinking and self-regulation. Our study aims at describing these processes. It is based on the observation of play activities of various kinds (e.g., exploration of physical phenomena, problem-solving, etc.) in which trials of 4 to 6 year old children interact. The sessions are recorded and transcribed (Jefferson, 2004) and then analysed qualitatively. A first step consists of identifying moments of critical discussion and/or moments of conflict between the different perspectives of the children. These are further transcribed in order to include gestures, gaze, positions of the objects, etc. Then a second by-second analysis of the communication allows to identify the laissez-faire, the inference or deductive moves and to reconstruct the ongoing argumentation and its motives. In this way, in certain cases, we can manage to recover the implicit premises of the children but also of the adult. The findings highlight the richness of young children’s work in argumentative activities. The understanding of this complexity can have long-term consequences in the field of education, by supporting teachers with resources to welcome and optimize children’s efforts, often underestimatated by adults.
Teachers making sense of educational change: Perezhivanie in a temporal perspective

Keywords: Cultural psychology, Qualitative methods, Teacher Professional Development, Workplace learning

Paper Presentation: Ari Eksi, Bursa Cumhuriyet University, Turkey

In this paper, we investigate teachers’ sensemaking of educational change in two Finnish schools during the uptake of a new digital learning environment, called the FUSE Studio (FUSE). Finnish schools represent an interesting site for researching the uptake of FUSE due to the unique nature of the Finnish educational policy. Our study asked: How do Finnish teachers make sense of FUSE? How do their varied interpretations mediate their intended uptake of FUSE? Drawing upon cultural historical theorizing, we approach the teachers’ sensemaking with the notion of perezhivanie (Vygotsky, 1994). We propose and test a temporal framework for investigating teachers’ sensemaking of educational change, accounting for three dimensions of teachers’ changing temporal orientations. The data comprise 23 teachers’ semi-structured interviews after a two-day in-service FUSE training program, analyzed using qualitative content analysis. Our study found four distinct orientations that illuminate the teachers’ perezhivanie of the educational change efforts. Firstly, the practice-evaluative orientation emphasized the contextualization of FUSE in the practical details of the teachers’ work. Secondly, the transformative orientation conceptualized change efforts within a habitual pedagogical framework that considered how existing pedagogical practices could be implemented in the new arrangement. Thirdly, the critical-reflective orientation emphasized the teachers’ future orientation. In sum, our study evidence the usefulness of the notion of perezhivanie for unpacking the complexity of teachers’ sensemaking of educational change. Our study makes a conceptual contribution in proposing and testing a temporal framework for investigating teachers’ perezhivanie of educational change.

Visualisation as a method to represent perezhivanie as a unity of emotional experience-in-place

Keywords: Cultural psychology, Emotion and affect, Qualitative methods, Social aspects of learning and teaching

Paper Presentation: Pater David Renshaw, The University of Queensland, Australia

In this paper, we elaborate the visual method Vygotsky explored in the Psychology of Art (1925) to consider how perezhivanie might be represented and mapped as a unity of emotional experience in place. We illustrate the method with regard to children’s lived and relived emotional experiences recorded during an environmental education excursion. The visualisation method foregrounds the dynamic relationship between children’s emotional experiences and the specific places where such experiences were embodied. The method also foregrounds time by mapping experience-in-place as remembered (anakips) or having occurred (prokipsim) within an ongoing narrative. The visualisation method is an attempt to bring together three related aspects of perezhivanie, namely emotional experience, place, and time, into a unified analytical approach.

Reading dramatically: Affect and generalization in primary school from the lenses of perezhivanie

Keywords: Cultural psychology, Emotion and affect, Qualitative methods, Video analysis

Paper Presentation: Alfredo Jorner Gill, University of Oslo, Norway

Perezhivanie is an everyday Russian term that acquires a special signification when seen as a concept within a larger theory of human learning and development. Sometimes translated ashaismic experience, perezhivanie’s relation to drama, and the implications that such a relation may have for learning and instruction, have been explored only to a limited extent. Yet, L. S. Vygotsky first formulated the concept of perezhivanie in a stage of his career in which drama had become fundamentally a focus of psychological study. In this study, I explore the relations between drama and the concept of perezhivanie in the context of drama education in an arts-based elementary school. Drawing from interaction analyses, I examine the work that teachers and students jointly perform in moving from storybook reading to scripted performing. This allows me identifying aspects unique to dramatization, but also the everyday competences that are involved. Findings show how achieving a dramatic performance testifies upon the learners’ development of a sensitive competence to coordinate orchestrated actions with others first, and to do so with regard to an emerging semantic field altogether. Perezhivanie, a concept that denotes unity of person and environment, and of intellect and affect, emerges as a useful concept to characterize the transition from these two moments of classroom development.

Session K 285

1 September 2017 08:30 - 10:00
Main Building C - C6
Single Paper
Higher Education, Teaching and Teacher Education

Paper Presentation: Teaching and Teacher Education - R

Keywords: Cognitive development, Lifelong learning, Literacy, Pre-service teacher education, Primary education, Reasoning, Science education, Student learning, Synergies between learning - teaching and research, Teacher Professional Development, Teaching / instruction

Interest group: SIG 11 - Teaching and Teacher Education

Chairperson: Marit Annelise Lindner, Lehman Institute for Science and Mathematics Education (IPN), Germany

Embedding Literacy in Initial Teacher Education

Keywords: Literacy, Pre-service teacher education, Synergies between learning - teaching and research, Teacher Professional Development

Paper Presentation: Kirsten Hutchinson, Deakin University, Australia

Despite evidence that integration of theoretical and practical knowledge is essential to effective Initial Teacher Education (ITE), ‘business as usual’ in ITE continues to reinforce a theory-practice divide, with disciplinary studies predominantly located in universities and professional experience of teaching located in schools. The presentation addresses this crucial issue by exploring potentials and challenges of school-based ITE in literacy education and collaborative inquiry into literacy teaching and research between academics, teachers and Pre Service Teachers (PSTs). In Australia, preparation for literacy teaching has been identified as a particular concern by some stakeholders (National Inquiry into the Teaching of Literacy, 2005). As a relatively new area of research, evidence about the effectiveness of various ITE teaching practices is limited, with concerns regarding graduate teachers’ capacities to design and implement research informed practices. With notions of effective literacy education changing to encompass traditional print and formal literacies required for schooling, together with understandings of the literacies entailed in digital cultures for increasingly diverse learners, this is a complex area. This project reports on research into renewed notions of literacy curriculum and pedagogy through innovative school based approaches to teacher education that align ITE with areas of school improvement and practitioner research.

Designing and evaluating content of physics instruction: Conceptual groundings of electric field

Keywords: Cognitive development, Pre-service teacher education, Science education, Teaching / instruction

Paper Presentation: Terhi Mäntylä, University of Tampere, Finland

Electric field is an abstract and complex scientific concept, which is important to understand in the university physics. However, research has shown that the field concept is problematic and difficult to learn. In this study, we first introduce three conceptual groundings called force, energy and source grounding concerning electric field concept for purposes of gaining more coherent and organized view of the electric field concept. Then, the learning effects of pre-service teachers’ understanding of the conceptual development of electric field concept are discussed. The results are based on the content analysis of nodes and links of the pre-service teachers’ concept networks presenting the development of electric field concept within and between the three groundings. Further, the connectivities of the pre-service teachers’ concept networks was calculated based on the content analysis categories. The results show that students are most familiar with the force grounding and it forms a basis of introducing other grounding. However, the force grounding conceptual grounding seems the most structured structure in learning the various aspects and complexity of the electric field concept.

Mentor teacher’s Interventions during student teacher’s lessons: Can we predict these?

Keywords: Pre-service teacher education, Primary education, Reasoning, Teacher Professional Development

Paper Presentation: Frans Prins, Utrecht University, Netherlands

Mentor teacher’s interventions during student teacher’s lessons may appear random and unpredictable. Yet, they can be considered as teaching activities that are specifically designed to influence student teacher’s learning. We argue that they can be predicted using the ‘Theory of Expected Learning Trajectories’ (TELT) by researchers at Utrecht University. We will show in the presentation that the TELT is well suited for predicting mentor teacher’s interventions during student teacher’s lessons with an example from the field of physics teaching and learning.

Abstract
Recent studies showed that during student teachers’ (STs’) lessons, mentor teachers (MTs) intervene quite frequently, mainly by guiding the pupils. Fenstermaker’s practical argument, consisting of situational, value, and empirical premises, and an intended or actual action (1996), was used to describe mentor teachers’ reasoning process for their intervening. In the present study we examined the impact of the situational, value and empirical premises on MTs’ intensity and target of intervening during student teachers’ lessons.

A total of 159 MTs participated in our study. MTs indicated for 12 vignettes, describing ST’s teaching MT’s pupils and in which the ordinary course of events is interrupted, their intention to intervene (or not). MTs’ value and empirical premises were measured with a questionnaire. We analyzed the impact of situational premises (STs’ study year, trigger type and trigger degree), value and empirical premises on MTs’ intensity and target (pupil or ST) to intervene.

Results showed that ST’s years of study, as well as the type and degree of the trigger impacted MTs’ intensity and target to intervene. Additionally, MTs’ values and empirical premises influenced MTs’ intensity to intervene, but not the target.

We conclude that MTs’ intentions to intervene and the reasons for doing so might be explained by their ingrained habit as teacher of intervening to pupils, and by MTs’ unawareness of their mentor role and STs’ learning. When MTs become aware of their mentor role and of STs’ learning, their ST guidance might improve, which might be beneficial to STs’ development.

Pre-service students’ reading trajectories
Keywords: Literacy, Pre-service teacher education, Student learning, Lifelong learning
Presenting Author: Anna-Karin Svensson, Malmö University, Sweden

Pre-service students reading trajectories
Anna-Karin Svensson
Malmö University, Sweden

Abstract
The present work is an in-depth study of four pre-service teachers own experience of reading in different contexts for different reasons. The aim is to analyze what the students express as significant on reading in a life history perspective by the use of narratives. The following questions were asked:

What aspects are expressed as significant in the students’ narratives in a life perspective, from early reading to the encounter with reading in teacher education?

What aspects are expressed as significant in the narratives of the students’ reading during their reading in teacher education?

Initial pre-service students’ narratives are analyzed in this study. A social-cultural perspective on reading is used in the narrative analysis. The analysis resulted in a description of the students’ reading trajectories. As an over-arching result, the students’ narratives revealed that reading is a relational process regardless of context and stage of life. In every context in a life perspective reading occurs with significant others. Significant others seems important in every literacy context from new readers in primary school to pre-service teachers’ reading in teacher education.

Keywords: narratives, pre-service teachers, reading contexts, reading trajectories, significant others

Session K 206
1 September 2017 08:30 - 10:00
Main Building A - A2A
Single Paper
Learning and Social Interaction, Teaching and Teacher Education
Paper Presentation: Learning and Professional Development - D
Keywords: Action research, Case studies, Communities of practice, Cooperative / collaborative learning, In-service teacher education, Mathematics, Primary education, Problem-based learning, Reflection, Survey Research, Teacher Professional Development, Workplace learning
Interest group: SSS 14 - Learning and Professional Development
Chairperson: Roger Sjöbl, Göteborg University, Sweden
Towards Student-Centred Pedagogy: Action Research with Ethiopian Village School Teachers
Keywords: Action research, Cooperative / collaborative learning, In-service teacher education, Teacher Professional Development
Presenting Author: Kati Keski-Mäenpää, University of Jyväskylä, Finland
This participatory action research was conducted between 2011 and 2015 in one Ethiopian village school with 23 primary and secondary school teachers. The aim of the doctoral research was to develop student-centred teaching methods instead of traditional lecturing and rote learning. The purpose of this conference paper is to describe

a) the action research process
b) the professional development of participating teachers
c) practice architectures that enable or constrain using student-centred learning

Action research process followed the cycle of planning, acting, observing and reflecting. The goal of the action and steps of the four cycles were planned by teachers. The research data consist of field notes, group discussions, videos and interviews. Data has been analysed thematically by atlas.ti-programme and through theory of practice architectures (Kemmis & Hølkenen 2012).

Findings show that action research provided teachers a good tool to create contextual and culturally suitable teaching methods. It also supported teachers in their professional development. The action research process increased communication and co-working among teachers. Findings also show that the existing structure at schools with detailed curriculum, large groups and annual tests do not support the usage of child-centred teaching methods in Ethiopia.

Five Years of a National Mentoring Program for Novice Principals: Benefits and Weaknesses
Keywords: In-service teacher education, Survey Research, Teacher Professional Development, Workplace learning
Presenting Author: Frauke Meyer, University of Auckland, New Zealand
Co-Author: Viviane M.J. Robinson, University of Auckland, New Zealand
Co-Author: Jacqueline Patuwa, University of Auckland, New Zealand

Mentors can play an important part in helping principals lift their confidence, improve their management skills, and establish themselves as instructional leaders.Darling-Hammond, LaPointe, Meyerson, & Orr, 2007). This study reports on the evaluation of the mentoring strand of the New Zealand national principal induction program. It gives an overview of the program design and reports the experiences of principals in the 2010-2014 program cohorts. The study draws on quantitative and qualitative data collected through evaluation surveys sent to principals on program completion. The findings indicate that it was a valuable model for the support and professional development of novice principals.While program satisfaction was mainly predicted by the personal benefits gained, satisfaction with the mentors was predicted by mentor qualities. It offered personalised, needs-based and flexible support by trained mentors. The data highlight the relational nature of mentoring and the importance of mentors being trained in interpersonal skills and values. Weaknesses were seen in the length of the program, and, for a small number of principals, in the difficulties that persisted in matching principals with mentors who were situated in close distance, had expertise from similar school contexts and were currently leading a school. A more detailed program overview and the evaluation findings will offer insights for those interested in program design, policy and the professional development of principals. The study further adds to the literature base on mentoring novice principals and effective program design.

Student teachers’ explanatory voices on theory-practice interaction
Keywords: Mathematics, Primary education, Teacher Professional Development, Problem-based learning
Presenting Author: Sinikka Kaartinne, University of Jyväskylä, Finland
Co-Author: Kristina Kumpulainen, University of Helsinki, Finland
This study investigates student teachers' explanatory voices on theory-practice interaction in the context of primary mathematics teaching. The study is situated in a Finnish teacher education course that dealt with mathematics teaching from the viewpoint of sociocultural theories. We applied narrative data analysis to student teachers' written course accounts to unravel how these explained theory-practice interaction. The results of the study show the multi-voicedness of the student teachers' sense-making mediated by a change voice, conditional voice and normative voice. The study reveals personal, relational and institutional conditions by which the student teachers confer sense to theory-practice interaction. The paper concludes by stressing the centrality of sense making in professional learning, and the need to enrich mathematics teacher education with more idiographic approaches that can shed light to the complex dynamics involved in student teachers' sense making for theory in and for the teaching of primary mathematics.

**Identity Work and Meaning-making during Organizational Storytelling**

**Keywords:** Case studies, Communities of practice, Reflection, Workplace learning

**Presenting Author:** Satu Hakanurmi, University of Turku, Finland

This study provides new insights into organizational storytelling, narrative learning and identity work in a socio-cultural context. The research investigates the meaning-making process during the storytelling, what the single participant felt and learnt and how the social aspect influenced the individual one. The theoretical position of the research is rooted in narrative theory and socio-cultural theory. A case study approach was used to capture the complexities of the phenomenon. Narratives varied from open to closed narratives and promoted learning differently. Discussion around stories was future-oriented even though the stories were dealing past experiences. Communication allowed the co-authoring of narratives, collaborative meaning making and negotiation of identities. There is evidence that storytelling has potential in promoting the sense of coherence and renewal of identities. Telling stories about work at work works.

**Session K 287**

1 September 2017 08:30 - 10:00
Main Building C - C5
Single Paper
Learning and Social Interaction, Motivational, Social and Affective Processes, Teaching and Teacher Education

**Paper Presentation: Inquiry Learning - B**

**Keywords:** Case studies, Inquiry learning, Mixed-method research, Model-based reasoning, Motivation, Out-of-school learning, Reasoning, Science education, Teaching / instruction

**Interest group:** SIG 25 - Inquiry Learning

**Chairperson:** Simoni Syömiö, University of Cyprus, Cyprus

**Pre-service teachers’ guidance and dialogic inquiry-based science teaching with simulations**

**Keywords:** Case studies, Inquiry learning, Science education, Teaching / instruction

**Presenting Author:** Antti Lehtinen, University of Jyväskylä, Finland

**Co-Author:** Jaoni Villi, University of Jyväskylä, Finland

Research on guidance for inquiry-based learning with simulations has concentrated on guidance provided by simulations and their learning effects. Guidance provided by teachers and its effect on teaching is in need of research. Our study investigates closely one inquiry-based science lesson where simulations were used for investigations. Pre-service teachers’ practices are analyzed through the communicative approaches they applied and the forms of guidance that they provided. These two approaches for teacher-student interaction lenses deal with teacher’s role in balancing between promoting learners’ active role in learning and guiding them in their learning activities. Our research question is: How are the communicative approaches used by the pre-service teachers and forms of guidance provided by them linked in the lesson under study? Data was collected from a lesson taught by a group of 5 pre-service teachers for 6th graders on the topic of static electricity. The data consisted of two video recordings of the lesson and screen recording videos. The analysis combined three temporal levels of analysis: micro-, meso- and macro-levels. Reliability was ensured through having a second coder code part of the data. In episodes containing an authoritative communicative approach the pre-service teachers used more specific forms of guidance in contrast with episodes containing a dialogic communicative approach. In those episodes the provided forms of guidance were more non-specific e.g. prompts. The results implicate the important role of guidance for inquiry-based learning not just for learning outcomes but also for the communication in the classroom.

**Middle-school students engage in pre-instruction model revision task**

**Keywords:** Inquiry learning, Reasoning, Science education, Model-based reasoning

**Presenting Author:** Brandon Maustar-Augustin, Rutgers University, United States

**Co-Author:** Veronica Caver, Rutgers University, United States

**Co-Author:** Ravli Galan Duncan, Rutgers University, United States

**Co-Author:** Clark Chinn, Rutgers University, United States

Previous research has identified both accurate and inaccurate conceptions students have about the practice of scientific modeling and the standards that should be set to determine model goodness (Authors, 2011). In this present study, we examined if students could indeed use their understanding of criteria for good models on a practical modeling task, specifically model revision. Would students suggest revisions to models that reflect appeals to epistemic criteria for good models? To investigate students’ first exposure to modeling and model revisions we gave 303 students assessments that required them to evaluate and revise scientific models. We found that students’ proposed model revisions were largely consistent with normative standards for model goodness. In fact, they were able to employ multiple criteria that could improve the coherence and accuracy of models (e.g. causal mechanisms and fit with evidence) and criteria that affect the representation and communicative elements of models (e.g. having visuals and having good quality visuals). Despite the assessment being students’ first exposure to modeling practices, students were able to recognize specific aspects of the causal mechanism that would benefit from further elaboration to more fully explain the biological phenomenon in question. These results contribute to a much more complete picture of students’ abilities to engage in modeling and to use modeling epistemic criteria and their modeling practices.

**Use of Teaching Strategies to Promote Dialogic Discourse in a Design-Based Science Classroom**

**Keywords:** Inquiry learning, Mixed-method research, Science education, Teaching / instruction

**Presenting Author:** Dana Gnesidlow, University of Wisconsin - Madison, United States

**Co-Author:** Sadhana Punambeekar, University of Wisconsin, United States

**Co-Author:** Natsannah Fathema, University of Wisconsin Madison, United States

In this study, we examined how an inquiry-based biology curriculum was enacted by two seventh grade teachers and how their enactments may have been influenced their students’ learning. We found significant differences in students’ learning based on the teacher they had. Teacher 2’s students performed significantly better than Teacher 1’s students on a biology content test. To explore how each teacher’s enactment may have affected students’ learning, we developed a coding scheme to capture the type of strategies the teachers used when facilitating their classrooms. Using this coding scheme, we analyzed classroom video data and found significant differences in teachers’ use of instructional strategies. We found that Teacher 1’s talk was mostly focused on asking questions to help students to reveal and extend their scientific thinking and addressing procedural aspects of the classroom. Alternatively, Teacher 2 used more of a balanced approach, using several important strategies like summarizing ideas, asking questions, making connections between concepts and giving metacognitive prompts to help students learn how to think through difficult science concepts or practices. The significance and implications of the study and the future directions are discussed in this paper.

**Studying interest and learning in an out of school workshop**

**Keywords:** Mixed-method research, Motivation, Out-of-school learning, Science education

**Presenting Author:** K. Ann Rening, Swarthmore College, United States

**Co-Author:** Fatema Javaajee, Swarthmore College, United States

**Co-Author:** Ashley McQuillar, Swarthmore College, United States

In this paper, we address session questions by drawing on an ongoing set of mixed method studies of economically challenged, urban, middle-school age, African American youth and their participation in out-of-school, inquiry-oriented science workshops. In these studies we are assessing change in the workshop participants’ science interest and learning. Consideration of each study in relation to the others has allowed us to explore the use of the ICAN Intervention to boost science interest and learning. The ICAN Intervention consists of probes for writing responses to probes addressing daily science activity (e.g., I CAN write some examples about how an animal can use its senses to find things out about its environment). We describe use of different methods to assess and confirm the identification of participants’ science interest and of their science learning (as theory, practice, and logical reasoning; and science practices) in the out of school inquiry workshops. We also report more specifically on findings from current work in which the ICAN probes received by participants were tailored to help them focus attention on key elements of the workshop’s science inquiry activities. Findings indicate that the science interest and learning of all participants benefit when they are provided with tailored ICAN probes.

**Session K 288**

1 September 2017 08:30 - 10:00
Pinni B - B4116
Single Paper
Assessment and Evaluation, Developmental Aspects of Instruction, Learning and Special Education

**Paper Presentation: Educational Attainment and School Effectiveness**

**Keywords:** At-risk students, Educational attainment, Educational policy, Experimental studies, Mathematics, Meta-cognition, Primary education, Quantitative methods, School effectiveness, Teacher Effectiveness, Teaching / instruction

**Interest group:** SIG 18 - Educational Effectiveness

**Chairperson:** Marias ter Beek, Rijksuniversiteit Groningen, Dept of Education and GION, Netherlands
Individual and Organizational Predictors of Behavioral and Emotional Risk in Schools

Keywords: At-risk students, Educational policy, Quantitative methods, School effectiveness

Presenting Author: Bridget Dever, Lehigh University, United States

Co-Author: Kevin Dowdy, University of California, Santa Barbara, United States

In the United States as well as globally, a significant number of young people are negatively affected by behavioral and emotional problems. From a prevention standpoint it is important to identify students who are at risk for behavioral and emotional disorders prior to the point of diagnosis, as even students who are exhibiting early signs of behavioral and emotional risk experience difficulties in school. The present study sought to determine whether individual-level demographic characteristics and school-level organizational variables served as predictors of behavioral and emotional risk in a high-needs school district in the United States. Hierarchical Modeling analysis of 612 students within 25 schools determined that males and younger students reported more behavioral and emotional risk. In addition, larger schools, larger average class sizes, and higher average teacher salaries predicted higher levels of risk. Implications are discussed from a systems perspective.

A Two-year Study of Textbook Effects on German Primary School Students’ Mathematical Competence

Keywords: Mathematics, Primary education, Quantitative methods, Teaching / instruction

Presenting Author: Ann-Katrin van den Ham, Leibniz Institute for Science Education (IPN), Germany

Co-Author: Volker Niederle, Leibniz Institute for Science and Mathematics Education (IPN), Germany

Though empirical findings show that mathematics textbooks have an influence on teachers’ instruction, research on textbook effects on students’ achievement is rare. Mostly, textbook effects are considered in studies of curriculum effects which means that different textbooks correspond to different curricula. Hence, it is unclear whether the effects are caused by the curricula or by the textbooks. Only a few studies avoid this problem but yield contradicting results on the influence of textbooks. Moreover, there are hardly longitudinal studies on textbook effects on students’ achievement. We report findings from a re-analysis of a study with 912 primary school classes of the sample used one of four different mathematics textbook series which followed the same curriculum prescribed by the federal state government. Mathematics achievement was measured by two interlinked arithmetic tests at the end of grade 1 and grade 2. As control variables data for numerical, language and general cognitive abilities at school entrance as well as teacher qualification and school characteristics were included. Results of multilevel analyses show substantial textbook effects at the end of grade 1 and of grade 2. In particular, those textbooks which used a main idea-based text structure and promoted student learning outcomes more than schools of the control group. To measure the impact of DAS on promoting education, we are searching for the extent to which the impact of SIE on student achievement has been reduced. Thus, the results of the international study presented here may provide support for the use of DAS for promoting education. Implications of findings for educational effectiveness research are, therefore, drawn and suggestions for further research are provided.

Exploring the effects of teaching factors on promoting students’ cognitive and metacognitive skills

Keywords: Educational attainment, Metacognition, Quantitative methods, Teacher Effectiveness

Presenting Author: Maria Anthimou, University of Cyprus, Cyprus

Co-Author: Leonidas Kyriakides, University of Cyprus, Cyprus

The dynamic model of educational effectiveness takes into account the new goals of education and related to this their implications for teaching and learning. It is based on traditional views on instruction such as direct learning and teaching which emphasize not only the role of the teacher as an instructor for providing knowledge and skills but also the specific behaviors he/she should apply. The model also takes into account the interaction between the teaching strategy and the learning process associated with constructivism which give emphasis to independent learning. An integrated approach in defining quality of teaching is therefore adopted. Five longitudinal studies and a meta-analysis of teaching effectiveness studies revealed that teaching factors included in the dynamic model are associated with student achievement gains. However, none of these studies were conducted with metacognitive learning outcomes. Thus, the study reported here investigated the impact of teacher factors on students’ cognitive (i.e., mathematics) and metacognitive (i.e., prediction and evaluation) skills. Written tests in mathematics and the “Metacognitive Skills and Knowledge Assessment” tool were administered to all grade 4 and 5 students (n=924) of 15 primary schools at the beginning and at the end of the school year 2013-2014. Students completed a questionnaire measuring teachers’ classroom behavior. Multilevel SEM analysis revealed a reciprocal relationship between cognitive and metacognitive skills. Furthermore, it was found that teacher factors were associated with students’ metacognitive skills. Implications of findings are drawn.

Session K 289
1 September 2017 08:30 - 10:00
Main Building A - A05
Single Room
Learning and Instructional Technology, Learning and Social Interaction, Teaching and Learning Education Paper: Presentation: Learning and Teaching in Culturally Diverse Settings - 8

Keywords: Action research, Bilingual education, Citizenship education, Computer-assisted learning, Cultural diversity in school, History, In-service teacher education, Learning Technologies, Mixed-method research, Pedagogy, Primary education, Qualitative methods, Quantitative methods, Qualitative research, Quasi-experimental research, Social aspects of learning and teaching, Social interaction

Interest group: SIG 21 - Learning and Teaching in Culturally Diverse Settings

Chairperson: Tom Rosman, ZPDP - Leibniz Institute for Psychology Information, Luxembourg

Process and peer of the past: A cross-cultural study of teaching sensitive historical issues

Keywords: Citizenship education, History, Quantitative methods, Social aspects of learning and teaching

Presenting Author: Tsashi Goldberg, University of Haifa, Israel

Sensitive historical issues call growing attention in the last two decades. These include coping with victimization or collective trauma as well engagement with immoral actions of the nation raising collective guilt. Meeting the challenge of such issues is assumed to foster collective healing, intergroup empathy and reconciliation. However, teaching such issues may arouse strong emotional and ideational reactions from learners, peers, superiors and the community. Our study set out to map what issues are considered sensitive, how often teachers attempt to teach them, and what motivates and impedes such teachers.

In a collaborative research spanning 10 countries across Europe and its neighbours we collected over 500 teachers’ perspectives on the teaching of sensitive historical topics. Finding show that respondents appeared committed to the teaching of sensitive issues as sensitivity and frequency of teaching were correlated. Most teachers reported minor obstacles and opposition and little anxiety of peer or superior sanctions. Atomic minority teachers and teachers in conflict zones showed more awareness of opposition and reasons for evading the teaching of sensitive issues. Teachers outlined frequent methods and gave concrete examples of best practice in teaching sensitive issues. The study offers insight into the challenges facing the expansion of teaching sensitive issues. It draws the profiles of sensitive issues teachers, and outlines their current needs and strengths.

Mobile Learning in elementary Science Education

Keywords: Computer-assisted learning, Learning Technologies, Mixed-method research, Primary education

Presenting Author: Charles Max, University of Luxembourg, Luxembourg

The contribution discusses the use of tablets in elementary school education, i.e. to what extent do these technologies impact on learning processes in the sense of promoting self-regulated student activities and the comprehension of scientific phenomena.

High-performing mobile devices are currently entering school environments following local or governmental digitalisation initiatives. Their mobile access to the web allows to use web-based learning resources without space restrictions within the school environment. Their impressive range of digital features allows to capture, collect, treat and visualize multimodal data related to self-regulated inquiries. Specific apps enable an interaction with the devices as digital interfaces and to share their multimodal creations with the school community.

The contribution draws on evidence gathered during a four-year long research project. Through a mixed-methods approach different sets of data were collected by a) students (e.g. multimodal classroom productions, self-recordings about their learning activities), b) the research team (video data from lessons, video-stimulated recall interviews, interviews with teachers).

The results reveals that students clearly understand the potential of these devices for gathering information, (re-)evaluating own explanations, communicating inquiry results or reflecting on their learning. This led to evidence based explanations and explicit justification of own interpretations. Moreover, we evidenced an increase of self-directed and interest-driven learning processes as tablets stimulate students’ engagement and aesthetic self-expression. The interactive technologies also trigger new forms of group exchange and feedback in relation to student-generated quality criteria for own achievements.

Self-reported reasons for acceptance or rejection of bilingual interaction during peer-learning

Keywords: Bilingual education, Classroom interaction, Qualitative methods, Research methodology

Presenting Author: Martin Schastek, German Institute of International Educational Research (DIPF); IDEA Research Center, Germany

Co-Author: Valentina Reitenbach, German Institute for International Educational Research (DIPF); DfA Research Center, Germany

This study analyses why Turkish-German bilingual primary school students choose to accept or reject the offer of bilingual interactions within the context of a peer-learning intervention focusing on basic reading or arithmetic strategies. Bilingual German-English elicited feedback offered the use of Turkish-German bilingual interactions and provided opportunities to communicate bilingually using bilingual input, materials and
games. Data of 37 bilingual speakers of Turkish and German, attending grades three and four were analysed. Students answered during and at the end of a six week peer-learning intervention, whether they used Turkish during the sessions and why (not). The self-reported acceptance or rejection of the language offer was analysed descriptively and students' reasons for their language choice were analysed using content-analysis by Mayring (2015). At both measurement points, students reported more often an acceptance rather than a rejection of the language offer. The acceptance or rejection of the bilingual interaction offer did not differ between the interventions' topics (reading and arithmetic strategies). Students' reasons for their language choice mostly referred to the individual itself (e.g., their language competences, task solving competencies, and emotions and attitudes). Neither the peer nor the trainer played a crucial role in justifying the students' language choice. The context (intervention study) was only an argument for the acceptance but not for the rejection of bilingual interactions. Finally, practical implications for bilingual language offers in peer-learning are discussed.

Teachers’ Beliefs and Educational Practice Concerning Cultural Diversity

Keywords: Action research, Cultural diversity in school, In-service teacher education, Multicultural education

Presenting Author: Luca Agostinetti, Università degli Studi di Padova (University of Padua), Italy
Co-Author: Lisa Bugno, Università degli Studi di Padova (University of Padua), Italy

TEACHERS’ BELIEFS AND EDUCATIONAL PRACTICE CONCERNING CULTURAL DIVERSITY.

This study aspires to investigate the relation between the teachers’ beliefs about diversity, and their teaching activities. Moreover, the purpose of the research is studying the meaning of the belief in the education context and in reference to the diversity content. Therefore, the aim of the research is investigating both the theoretical and the empirical levels. Referring to the first, the purpose is to systematize the meanings found in literature, in order to propose an accurate pedagogical consideration.

For what concerns the empirical level, the relation between theory, beliefs, and the teaching activities on diversity is being examined in detail using integrated analysis tools, and involving 3 groups of 10 in-service teachers. Research instruments work towards three crucial perspectives: teachers’ semi-structured interviews, participant observations and focus group. The emerging results indicate a rhetoric lack of coherence between what teachers affirm and what they do. It can be expected that the focus group experience will allow the reconceptualization of teachers’ beliefs about diversity, improving teaching actions and producing a positive effect on educational practices.

Potentially, this research could be the first step to achieve a program that can better support in naturalistic settings and new teachers dealing with cultural diversity.

Session S 290

1 September 2017: 10:00 - 10:20
Pinn A - Flavio Kali
Single Paper
Teaching and Teacher Education

Paper Presentation: Teaching and Teacher Education - T

Keywords: Cognitive skills, Collaborative Learning, Competencies, Conceptual change, Cooperative / collaborative learning, Educational Technology, Lifelong learning, Motivation, Pre-service teacher education, Qualitative methods, Self-efficacy, Teacher Professional Development, Vocational education

Interest group: 191 - Teaching and Teacher Education

Chairperson: Debra Myhill, University of Exeter, United Kingdom

Trainee teachers’ conceptions of their own learning: does context make a difference?

Keywords: Conceptual change, Self-efficacy, Teacher Professional Development

Presenting Author: Peter Davies, University of Birmingham, United Kingdom
Co-Author: Rachel Loffthouse, University of Newcastle, UK, United Kingdom
Co-Author: Celia Greenway, University of Birmingham, United Kingdom
Co-Author: Dan Davies, Cardiff Metropolitan University, United Kingdom

This study examined change in trainee teachers’ conceptions of their own learning during initial teacher education. The sample comprised 36 trainee on university-led and school-led routes into teaching associated with four Higher Education Institutions (HEIs) in England and Wales. Each trainee was interviewed after their first school experience and then towards the end of their one year of training or, in the case of trainees on undergraduate programmes, roughly ten months later. The study identified (i) qualitative differences between trainee teachers’ conceptions of their learning to become a teacher in terms of the focus of reflection; degree of self-determination; gestation of learning; beliefs about knowledge for teaching; context for learning (who else was involved in the trainee’s learning); and mode of learning (the role the trainee adopted in their learning). The research also distinguished between trainees who described their learning in the same way in both interviews; trainees whose description in the second interview was less expansive than in the first, becoming compliant to expectations in the schools in which they had gained experience; and trainees who had developed a more expansive way of learning in which they were more proactive. We discuss the indications in these data of some relationships between these conceptions and the contexts in which trainee teachers are working.

Vocational teachers’ perceptions in mobile-supported boundary-crossing settings

Keywords: Educational Technology, Qualitative methods, Teacher Professional Development, Vocational education

Presenting Author: Elisa Motta, Swiss Federal Institute for Vocational Education and Training (SVET), Switzerland
Co-Author: Alberto Cattaneo, Swiss Federal Institute for Vocational Education and Training (SVET), Switzerland
Co-Author: Rajai Hamalainen, University of Jyväskylä, Finland

In Vocational Education and Training (VET) systems, apprentices live heterogeneous experiences in different contexts (in Switzerland the system is mainly work-based, in Finland it is school-based). As apprentices usually perceive a gap among learning locations, the recall to promote a closer integration between vocational institutions and workplaces is argued. In such framework, technologies may provide support by enabling better integration of activities lived on the boundaries of working life and school contexts. Teachers, who have the role to assist apprentices to move backward and forward between the boundaries of institutionalized and everyday learning practices, also need to develop teaching practices based on technology integration and innovation. Against this background, the present study – involving teachers through semi-structured interviews (n=3 in the Swiss context, plus an additional focus-group; n=4 in Finland) – aimed at investigating technology-enhanced teaching practices in vocational education, specifically with respect to their potential to foster boundary-crossing, also looking at peculiarities of school-based and work-based systems. This study illustrated how teachers described different opportunities when considering the role of technology especially in narrowing the gap between schools and authentic work contexts. The main emerging trends described by vocational teachers are the following: 1. An interest for technologies in the professional experience cannot be avoided by teachers nowadays; 2. Mobile devices can facilitate learning locations connection; 3. Visualization is the most exploited option (smartphones and action cameras); 4. The role teachers play changes, in favour of a more learner-centred instructional approach.

Pre-service Teachers’ Perceptions of Their Strategic Learning Skills and Collaboration Dispositions

Keywords: Cognitive skills, Collaborative Learning, Competencies, Pre-service teacher education

Presenting Author: Päivi Häkkänen, University of Jyväskylä, Finland
Co-Author: Anne Virtanen, University of Jyväskylä, Finland
Co-Author: Johanna Pöysti Tarhonen, University of Jyväskylä, Finland
Co-Author: Mikko Nilio Rämä, University of Jyväskylä, Finland
Co-Author: Pia Nällö, University of Oulu, Finland
Co-Author: Sanna Jarvelä, University of Oulu, Finland

To support the development of students’ 21st century skills, such as strategic learning skills and collaboration skills, teachers themselves must also be competent in them (Voogt, et al., 2012)There is a fair amount of research addressing strategic learning skills and collaboration skills, and their role in enhancing academic achievement in higher education contexts, including teacher education (Zimmerman & Schunk, 2011). Productive self-regulated learning means setting high-quality goals, selecting appropriate tactics to achieve those goals, monitoring progress and adapting as necessary during their academic work (Winne & Hadwin, 2008). Previous studies in the teacher education context have shown that actively regulating pre-service teachers use a large variety of activities to regulate their learning (Vermunt & Eerdewijn, 2011). In addition to individual learning skills, also social construction of knowledge and collaboration are important prerequisites for today’s learner. There is also evidence showing that working collaboratively can have a positive impact on cognitive performance and knowledge construction (D’Osualdi & Hmelo-Silver, 2013). In our study, by collaboration dispositions we refer to a set of individuals’ general attitudes that are related to the emergence of high-quality collaboration and teamwork (PIASA 2015 framework, based on Wang et al., 2009).

Motivation for professional development: A subjective perspective from teachers

Keywords: Motivation, Qualitative methods, Teacher Professional Development, Lifelong learning

Presenting Author: Claudia Krüle, Goethe-Universität Frankfurt, Germany

Teacher professional development (PD) is seen as a crucial part of the teacher profession and to positively influence students’ learning and performance. However, there is only little known about training motivation within teacher PD and the few existing studies focus on rather general motivational constructs. In addition, the addressed studies usually use questionnaires – mainly with close-ended questions –working with presumed motivation factors. To get a deeper insight on how teachers decide whether they participate in PD and in which training programme, the study aims to investigate what teachers believe motivates them to participate in teacher PD. In addition, since especially studies on teacher PD are to participate in field of vocational education, this study will focus on teachers from business and economic education. In the main study it is aimed to interview N=40 teachers. Results from the pilot study confirmed existing research but also helped to gain a deeper view on reasons to participate in training programmes (e.g., opportunity to learn something new or stay up-dated, to exchange and collaborate with colleagues, interest in a certain topic) or not to participate (lesson cancellation for students, lack of interesting or relevant training programmes, spending leisure time for PD, lack of relevance for school or classes). At the conference, results of the main study will be presented and will be the basis to develop a questionnaire that can be applied to a greater teacher sample to provide a basis to derive recommendations for example for schools or training providers.
Paper Presentation: Writing, Literacy and Language

Keywords: Assessment methods and tools, Bilingual education, Cognitive skills, Computer-assisted learning, Content analysis, Experimental studies, Language (Foreign and second), Language (L1/Standard Language), Mixed-method research, Peer interaction, Quantitative methods, Reasoning, Social aspects of learning and teaching, Writing / Literacy

Interest group: SIG 12 - Writing

Chairperson: Ellen Usher, University of Kentucky, United States

The use of generic language in pedagogical and non-pedagogical contexts in a diglossic environment

Keywords: Bilingual education, Language (L1/Standard Language), Reasoning, Social aspects of learning and teaching

Presenting Author: Ursina Markwaller, ETH Zürich, Switzerland

Co-Author: Hanneli Rehnström, Research Methods and Instruction, Switzerland

How do native language speakers perceive a new genre of language in pedagogical and non-pedagogical contexts? The findings indicate that Swiss German (L1) speakers show different perceptions of diglossic environments compared to Swiss French (L1) speakers. The study suggests that native language use is influenced by interaction context, presenting more significant differences than interlocutor relationship.

Introduction

Research has shown that assessors differ in the aspects they value within texts, mostly explained by their expertise. The current study examined how assessors' attention is divided between the quality and content of L1/Standard Language and L2 texts.

Intervention studies with school-aged children have shown that exposure to both languages promotes better writing skills. However, the effectiveness of these interventions varies depending on the context and the quality of the assessment.

Intervention studies with school-aged children have shown that exposure to both languages promotes better writing skills. However, the effectiveness of these interventions varies depending on the context and the quality of the assessment.

Modelling the effectiveness of peer review comments

Keywords: Computer-assisted learning, Language (Foreign and second), Peer interaction, Writing / Literacy

Presenting Author: Teresa Limp, University of Porto, Portugal

Co-Author: Rui Alexandre Aves, University of Porto, Portugal

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Intervention studies with school-aged children have shown that exposure to both languages promotes better writing skills. However, the effectiveness of these interventions varies depending on the context and the quality of the assessment.

Learning technologies have advanced the application of peer feedback in the L2 writing context more accessible. Web-based tools such as blogs, wikis, and web-based peer review systems, such as MyReviews, are more frequently used in writing classrooms. The main aim of these applications is to engage students in peer review activities. As web-based peer review systems systematically collect student generated data, new research methods are needed to analyze the data systematically. These methods should specifically focus on the development of taxonomies measuring different aspects of the writing process that can be replicated on different sets of data using methods such as NLP and machine learning (Crossley, 2013). This study applies machine learning as a novel method on a large set of web-based generated data of L2 writers using peer feedback using a web-based peer review system (SWiRD) to support the development of their text over a number of drafts to better understand how L2 writers conduct peer feedback activities by looking at the types and the traits of the feedback they provide and how these may influence revisions made in subsequent drafts.

Combining heuristic worked examples and collaboration scripts might be a promising approach to foster mathematical argumentation skills (MAS). However, little is known about the role of the sequence of introducing both scaffolds and the fading of the primarily introduced scaffold when collaboration scripts are used together with heuristic worked examples. Furthermore, the influence of some potential moderators such as working memory capacity has not been neglected as far. Our study investigated the effects of the sequence of introducing scaffolds (heuristic worked example first vs. collaboration script first) and the fading of the primarily introduced scaffold (fading out vs. no fading out) on the dialogue and dialectical component of MAS. In addition, we explored how different learning prerequisites (e.g., prior knowledge; working memory capacity) affect the results. Overall, N = 115 participants worked in dyads on mathematical proof tasks in four treatment sessions. Results showed a positive main effect for the fading of scaffolds on the dialectical component of MAS. With respect to the dialectical component of MAS, we found that learners with lower working memory capacity benefited the most when the script was primarily introduced, but then faded. Results suggest how learning environments can be designed with different scaffolding approaches, in particular for students with differences in their working memory capacity.

Session K 293

1 September 2017 08:30 - 10:00
Pinni B - B1100
Symposium
Cognitive Science

Adaptive expertise in elementary arithmetic

Keywords: Cognitive skills, Educational Psychology, Mathematics, Primary education

Interest group: SIG 03 - Conceptual Change

Discussant: Marian Hickenorff, Leiden University, Netherlands
Flexibility in Mental Arithmetic and Reasoning Patterns

Presenting Author: Elisabeth Rathgeb-Schreier, University of Kassel; Institute of Mathematics, Germany
Co-Author: Michael Green, University of North Carolina Charlotte, United States

This study focuses on flexibility in mental arithmetic in second and fourth grade students from USA (North Carolina and Germany) (Baden-Württemberg). It bases on a theoretical interpretation of flexibility in mental arithmetic and emphasizes the recognition of problem characteristics, number patterns and numerical relations as crucial prerequisites. Therefore, we are interested in students’ reasoning patterns when sorting addition and subtraction problems. To reveal these patterns a problem oriented, guideline-based interview incorporating 12 two-digit addition and subtraction problems was conducted with 19 students. All interviews were transcribed in their original language and coded by a system that was developed based on theory and student data. The coded data was analyzed qualitatively and quantitatively. Qualitative analyses aimed to reveal patterns in sorting and reasoning as well as varieties and profiles. Quantitative analyses intended comparisons between classrooms and countries. The presentation gives an introduction in the theoretical background and the design of the study. Furthermore, qualitative and quantitative results are described and discussed.

Efficient and flexible use of subtraction by addition in multi-digit subtraction

Presenting Author: Joli Torbeys, KU Leuven, Belgium
Co-Author: Bert De Smedt, KU Leuven - University of Leuven, Belgium
Co-Author: Leon Verschaffel, KU LEUVEN, Belgium

We investigated 4th and 6th graders’ use of direct subtraction (DS) versus subtraction by addition (SBA) when mentally solving subtractions up to 1000. In terms of the four parameters of the model of strategy change (Lemaire & Siegler, 1995) and relying on the choice/no-choice method (Siegler & Lemaire, 1997). Participants were 32 4th and 33 6th graders who had received extensive instruction in the mastery of DS, but no instruction in SBA, for mentally solving multi-digit subtractions. All participants solved multi-digit subtractions up to 1000 in one choice condition (choice between DS or SBA on each item) and two no-choice conditions (obligatory use of either DS or SBA on all items). We distinguished between two types of subtractions, i.e., subtractions with a small (e.g., 504-476), versus very large difference (e.g., 616-287) between the minuend and the subtrahend. Although mathematics instruction focused on the mastery of only DS, most 4th- and 6th-grade reported SBA to solve the items in the choice condition. In both age groups, SBA use was more accurate and faster in the no-choice conditions than DS, particularly on small-difference problems. Furthermore, 4th- and 6th graders flexibly fitted their strategy choices to both numerical item characteristic and individual strategy characteristics. These findings add to our theoretical understanding of children's acquisition of explicitly taught versus self-invented mental computation strategies in view of developing adaptive expertise and challenge current mathematics instruction practices focusing heavily on DS.

Two different subtraction algorithms: conceptual understanding and error rates

Presenting Author: Hedwig Gastager, Olomouc University, Mathematical Institute, Germany

Written subtraction can be carried out in different ways: The difference between minuend and subtrahend can be determined by subtracting or by indirectly adding, and crossing the tens boundary can be done by regrouping or by equal addition of 10 ones at the ones place of the minuend and one ten at the tens place of the subtrahend. In Germany, teaching indirect addition was compulsory for many decades. Now, teachers are allowed to decide which algorithm they teach. In mathematics education, there is a broad discussion to deliberate out which algorithm offers more advantages, and subtracting with regrouping is often preferred. It is assumed that students gain a better conceptual understanding for this algorithm. By now, there is little evidence on which subtraction algorithm is most comprehensible and most effective, and if the type of algorithm influences children’s adaptive expertise – in terms of choosing the best way to solve a task. There are studies which investigated the effectiveness of different written subtraction algorithms (e.g., according to the instructions), but the conceptual understanding of the students are rarely examined in these studies up to today’s mathematics lessons. In an explorative, comparative study we examined fourth-graders’ conceptual understanding and additionally types and frequency of errors relating to the two in Germany most written subtraction algorithms. Results provide preliminary indications that both algorithms provoke different kinds of errors and that students who used subtracting with regrouping have a better understanding of the algorithm.

The Development of Number Line Estimation Strategies

Presenting Author: Koen Louw, KU Leuven, Belgium
Co-Author: Dominique Peeters, KU LEUVEN, Belgium
Co-Author: Leon Verschaffel, KU LEUVEN, Belgium

The present study investigated whether the provision of benchmarks would affect children's strategy use when making number line estimations (NLE) and whether this would differ as a function of children's familiarity with a particular number range. Third and fourth graders were given three sets of numbers on a 0-1000 number line in one of three conditions: a) a control condition involving a 'classical' empty number line, b) a midpoint condition with a benchmark at 50% of the number line, and c) a quadrile condition with benchmarks at 25%, 50%, and 75% of the number line. Trial-by-trial verbal strategy reports were gathered. Results indicate that benchmarks have a significant effect on children's strategy variability, their frequency of using benchmark-based strategies, and their overall NLE performance. Moreover, both grades showed remarkable flexibility in their strategy choices. The effect of the benchmarks was in general larger in third than in fourth graders. Presumably, this was due to fifth graders’ greater familiarity with the NLE task repertoire and their more developed mathematical knowledge and skills (e.g., proportional reasoning, addition and subtraction skills) necessary to benefit maximally from these benchmarks. The present study extends previous findings by showing that children's NLE strategy use develops from creating a benchmark at the midpoint towards generating benchmarks at the quantities of the number line and that the provision of additional support can accelerate this development by affecting different parameters of children's strategy use.

Session K 294

1 September 2017 08:30 - 10:00
Pinni B - B10936
Symposium
Teaching and Teacher Education
Professional teacher agency

Keywords: Doctoral education, Mixed-method research, Pre-service teacher education, Primary education, Quantitative methods, Secondary education, Student learning, Survey Research, Teacher Professional development.

Interest group: SIG 14 - Learning and Professional Development

Exploring relational teacher agency for social justice

Presenting Author: Natasha Paric, University of Edinburgh, United Kingdom

This paper presents an exploratory study of a specific form of relational teacher agency for social justice. Participatory methodology was used to involve teachers and other stakeholders in the development of a community-based, mixed-method action research model for teacher education. The model consists of teachers: 1) sense of purpose; beliefs about their role and social justice; 2) competence; in inclusive pedagogical approaches; 3) autonomy: context-embedded interactions with others; and 4) reflexivity: about practices and contexts. The model and tools including questionnaire, interviews, observation and reflexive logs have been trialed and adjusted with teachers in a primary school in Scotland. The data collected by the different tools was triangulated to establish aspects of teacher agency that can be meaningfully captured by the questionnaire, and those for which complementary qualitative data is needed to enable comprehensive cross-contrasts analyses. Implications for teacher education and future research are discussed.

Perceptions of Teachers as Change agents in Primary Education

Presenting Author: Monique van der Heijden, University of Professional Teacher Education 'De Kempen' - Eindhoven University of Technology, Netherlands
Co-Author: Jeanette Geldens, University of Professional Teacher Education 'De Kempen', Netherlands
Co-Author: Herman Poppeus, University for Professional Teacher Education 'De Kempen', Netherlands
Co-Author: Douwe Bijlard, Eindhoven University of Technology, Netherlands

This study reports on a large-scale survey on Dutch primary school teachers’ perceptions of being change agents and the extent to which these perceptions are related to personality and contextual factors. A principal component analysis and confirmatory factor analysis revealed nine characteristics of teachers as change agents:Personality and contextual factors positively affected teacher perceptions. Four teacher profiles were distinguished according to varying degrees of perceiving themselves to be far below or far above mean-change agent characteristic levels. The teachers in one profile in particular were labeled as change agents. This study adds to further understanding of teachers as change agents, and their characteristics and how these characteristics are related to personality and contextual factors.

Professional agency in the university context: Academic freedom of chains?

Presenting Author: Ari Rauhala, University of Jyväskylä, Finland
Co-Author: Susanna Palonen, University of Jyväskylä, Finland
Co-Author: Eija Räikkönen, University of Jyväskylä, Finland
Co-Author: Päivi Hilttä, University of Jyväskylä, Finland

This study investigated the professional agency of academics (i.e. researchers and teachers) in a Finnish university context. We adopted the definition of professional agency as the notion that teachers influence, make decisions and negotiate regarding their work and professional identity (including their professional goals and interests). Our research questions were as follows: (1) How is professional agency manifested among academics? (2) How do the manifestations of professional agency differ across academics with different backgrounds? We applied a mixed-method approach to collect the data utilising thematic interviews and quantitative questionnaire data. The data were analysed by means of statistical modelling and qualitative thematic analysis. The findings revealed the manifestation of academics’ professional agency through three components: exercising influence at work, developing work practices, and negotiating professional identity. Overall, these components were manifested rather similarly in the academics’ work, but the participants mostly reported opportunities for negotiating professional identity. Furthermore, those academics who were in a superior position reported more possibilities of influence at work, developing work practices, and negotiating professional identity. The other academics reported different factors that motivated the participants to work. However, there was no specific mode of motivation that motivated the participants to work. The findings revealed that professional agency was manifested through the self with the aim to continue and develop their own research and teaching, and with the hope to provide a stimulating learning environment. The findings also raise important questions for researchers and policymakers regarding the potential for professional agency in universities.

Trajectories of Subject Teacher Students' Professional Agency in the Classroom

Presenting Author: Patricia Prieto, University of Oxford, United Kingdom
Co-Author: Janne Pietarinen, University of Eastern Finland, Finland
Co-Author: Kaisa Haverinen, University of Eastern Finland, Finland
Co-Author: Tinja Soini, University of Tampere, Finland

Subject teacher students are expected to learn professional agency during teacher education in order to be able to facilitate pupil learning, use innovative teaching methods and promote school development when working as teachers. Intentional and active student teacher learning requires three complementary components simultaneously: student teacher’s motivation to learn, efficacy beliefs about learning, and skills to learn that constitute professional agency. This study investigates the development of secondary student teachers’ (N=546) professional agency during teacher education by exploring the subject
teacher students' professional agency profiles and profile trajectories with longitudinal design. The analysis allowed defining two different professional agency profiles in terms of the measured components of professional agency as well as identifying changes occurring in the profiles. Among student teachers with strong sense of professional agency profile statistically significant increase was detected in collaborative learning environment and in perceived competence. Among student teachers with moderate sense of professional agency profile, statistically significant decrease was detected in the reflection in the classroom over time. The results show that there exist differences in subject teacher students' professional agency profiles, and student teachers' sense of professional agency in the classroom changes during teacher education. The findings suggest that student teacher learning of professional agency is shaping continuously, and thus, could be regulated during teacher education to support meaningful learning for the profession.

Session K 295
1 September 2017 10:30 - 10:00
Main Building A - A4 Symposium
Teaching and Teacher Education

Influences on Teachers' Judgment Accuracy concerning student achievement and educational transitions
Keywords: Assessment methods and tools, Cultural diversity in school, Language (Foreign and second), Learning disabilities, Literacy, Primary education, Quasi-experimental research, Reading comprehension, Teacher Professional Development, Teaching / instruction, Writing / Literacy
Interest group: SIG 01 - Assessment and Evaluation, SIG 11 - Teaching and Teacher Education
Discussant: Janneke van de Pol, Utrecht University, Netherlands

How accurately do teachers judge their students' reading abilities? Results of a Multilevel Analysis
Presenting Author: Barbara Gastgeber-Klepera, University of Graz, Austria
Co-Author: Lisa Paleczek, University of Graz, Austria
Co-Author: Susanne Seifter, University of Graz, Graz

The present study aims at examining variables (at individual and class level) that influence the accuracy of teacher judgments of 2nd and 5th graders’ reading abilities (decoding and reading comprehension). We posed two research questions: (i) How accurately do teachers judge their students’ reading abilities (decoding and reading comprehension)? (ii) Due to previous studies we hypothesized that the teachers’ judgment and the students’ actual achievement correlate about 60% (Hoge & Coladon, 1989; Södham et al., 2012). Which variables at individual level (student’s first language, gender, level of the student’s respective reading ability, SEN status) and at class level (class size, percentage of L2 students in class, Grade 2 vs. 3, beginning vs. end of the academic year) predict the accuracy of teacher judgments on the reading abilities (decoding and reading comprehension)?

Data of 1,465 students and 85 teachers were collected. Due to the nested structure of the data, multilevel regression analyses were applied. Results revealed about 5% of the variance in judgment accuracy at the students’ as well as the class level. The model explained 19% of the variance at student level and 18% of the variance at class level. It could be shown that the teachers’ judgment accuracy is only slightly influenced by the respective reading ability of the student. Gender, SEN status, and beginning vs. end of the academic year have a statistically significant influence on the accuracy of the judgments. The range of influences on the accuracy of the judgments is comparatively small. Very interesting is the influence of gender, as being male is associated with better accuracy in judgments of reading abilities. The findings suggest that the accuracy of teacher judgments on decoding and reading comprehension can be predicted by the respective reading ability of the students.

Are teachers able to predict students’ reading development? A perspective on teacher’s professional development
Presenting Author: Alfred Schlabmann, University of Cologne, Germany
Co-Author: Barbara Maria Schmidt, Universität zu Köln University of Cologne, Germany
Co-Author: Igor Cipov, Universität zu Köln University of Cologne, Germany
Co-Author: Alfred Schlabmann, University of Cologne, Germany

We assessed the diagnostic validity of teacher ratings about their students’ future reading development. Descriptive ratings of their teachers were collected for a sample of N=171 students in the middle of grade one. At the same time as well as at the end of grade one, standardized reading tests were administered. In order to find out, which student characteristics influenced the ratings over and above reading skills, data about possible behavior problems, working behavior, as well as mathematical competence (as a proxy for additional learning problems) were gathered. Results show, that the sensitivity of teachers’ ratings is very low. Out of students with severe reading problems at the end of grade one, only approximately one third was categorized correctly by the teachers. Furthermore, on both pathways, that lead teachers to the perception of reading problems, working behavior, were found: (a) low test-score in reading, (b) problematic (hyperactive) behavior, and (b) average/high reading scores. The findings suggest as well as additional learning problems hamper the correct identification of risk children.

Teachers’ expertise in assessing written composition
Presenting Author: Ann-Kathrin Hennes, University of Cologne, Unknown
Co-Author: Barbara Maria Schmidt, Universität zu Köln University of Cologne, Germany
Co-Author: Igor Cipov, Universität zu Köln University of Cologne, Germany
Co-Author: Alfred Schlabmann, University of Cologne, Germany

The purpose of the current study was to evaluate teachers’ expertise in assessing written compositions. Teachers’ ratings of texts were compared to the ratings of orous with more or less expertise in measuring test quality. We expected that teachers’ ratings would show a considerable variance due to use of irrelevant criteria. Other concepts like lectors/authors would show a higher consistency within their ratings and use essential criteria more often.

Method: In this study we use a new approach. We rely on the expert-novice paradigm. Different groups of raters with different amount of expertise rated the same 20 texts as a whole and according to a set of assessment criteria. The inter-rater reliability (IRR) was calculated. Our hypothesized the following ranking: IRR experts > IRR teachers > IRR novices. Furthermore we supposed that Novices use less relevant criteria.

Results: According to our hypothesis, teachers’ IRR was between experts’ and novices’ IRR. However, both analysis of IRR and the criteria used show that teachers and novices use weak criteria frequently.

Conclusion: The current study has confirmed the “natural” assumption that teachers are experts in judging students’ written compositions - at least in parts. Our findings lead to the practical implication that there is an urgent demand of improvement in teacher education. Teachers should be qualified in using suitable and definite criteria to judge written composition.

Changes in the accuracy of teachers’ transition decisions following instruction and training
Presenting Author: Ineke Phil-Cate, University of Luxembourg, Luxembourg
Co-Author: Sabine Kneidl-Schwerdt, University of Luxembourg, Luxembourg
Co-Author: Thomas Hoeisternan, University of Luxembourg, Luxembourg
Co-Author: Sabine Gluck, University of Wuppertal, Germany

This paper focuses on intervention modules to improve teachers’ diagnostic competence, especially in regards to decisions on students’ transition from primary to secondary education. Although these transition decisions should be based on academic achievement, research has shown non-academic variables to influence decisions, leading to disadvantages for specific groups of students. Using an experimental pre-post design, we investigated the short and long term effects of accountability, theoretical knowledge and the application of prediction rules on teachers’ judgment accuracy, respectively. Pre-intervention data showed that although teachers’ decision accuracy was of high standard, decision accuracy for ethnic minority students was significantly higher than for ethnic minority students. Increased accountability resulted in increased decision accuracy, especially in regards to decisions for ethnic minority students. Similarly, the introduction of theoretical models of decision making and judgment formation and the application of prediction rules resulted in an improvement of transition decisions only for ethnic minority students. From these studies we can conclude that all three intervention modules can improve the diagnostic competence, that is the accuracy of teachers’ transition decisions. In line with the intention of the interventions, the disproportionately high rate of decision errors for ethnic minority students observed pre-intervention was eliminated post-intervention and in line with error rates for ethnic majority students.

Session L 296
1 September 2017 10:15 - 11:45
Pinni B - 84117 Symposium
Developmental Aspects of Instruction

Learning to read across languages and writing systems: Implications for education
Keywords: Bilingual education, Language (Foreign and second), Language (Standard Language), Literacy, Primary education
Interest group: SIG 05 - Literacy and Development in Early Childhood
Discussant: Charles Petrelli, University of Pittsburgh, United States

Learning to read Dutch as a transparent orthography
Presenting Author: Ludo Verhoeven, Radboud Universiteit Nijmegen, Netherlands

The present longitudinal study investigated the growth of word reading fluency in Dutch as a transparent orthography as a function of meaning (words vs pseudowords) and orthographic complexity throughout the elementary school years. For a representative sample of 511 Dutch children, decoding abilities for both words and pseudowords were assessed at four different orthographic complexity levels: (1) regular consonant-vowel-consonant (CVC), (2) complex monosyllabic with consonant clusters in prevocalic and postvocalic position, (3) bivocalic, and (4) polysyllabic on two occasions in each school year (Grades 1-6). Besides, every year children’s abilities in phonemic awareness (phoneme segmentation, phoneme deletion), phonological memory (pseudoword repetition), and rapid naming (picture, letters) were also assessed. The growth of decoding skills was found to be largely a matter of increased speed. Growth curve analyses showed a gradual curvilinear model to be superior to a step-model for all word decoding skills but not for pseudoword decoding skills for which a linear model better applied. Furthermore, the eight decoding measures showed strong longitudinal stability. In the early grades, the decoding measures
showed a single underlying factor. However, over the years unique variance for words and pseudowords and orthographic complexity level also appeared. Overall, word reading fluency could be predicted from phonemic awareness, phonological memory, and rapid naming. It is concluded that the development of word reading fluency is fueled by phonological abilities, that it requires the learning of orthographic complexities, and that it is enhanced by context-based associations with meaning representations of words in the mental lexicon.

Learning to read and spell Finnish as a symmetrically transparent orthography
Presenting Author: Mikko Ara, University of Jyväskylä, Finland
The aim of the paper is to explore the features of the Finnish language and orthography and to examine early reading and spelling acquisition in Finnish, accordingly. The presented summary of the Finnish language focuses on Finnish phonology, morphology, and orthography. Finnish has a complex inflectional, agglutinative morphology, but the orthography is based on strict phonemic principle. On the morphemic level, Finnish orthography is transparent on the level of single letters. The basic decoding and spelling accuracy develop rapidly, and individual variation in reading skill after the early stages is reflected mostly as problems in reading rate. The development of reading and spelling accuracy are closely associated, and there are no signs of dissociation between word and pseudoword reading at the early stages of development. It can be concluded that the symmetrical transparency of the orthography facilitates the acquisition of both decoding and spelling skills. From the instructional perspective, the advanced literacy levels of many children already at school entry requires attention to differentiation of early literacy instruction. The knowledge concerning the fluency development is still scarce and remains a challenge for future research in the Finnish context.

The impact of Diglossia on Voweled and Unvoweled Word Reading in Arabic
Presenting Author: Charles Perfetti, University of Pittsburgh, United States
Co-Author: Elinor Saeigh-Haddad, Bar Ilan University, Israel
The talk discusses the role of two factors on reading in Arabic orthography. The first is the orthographic structure of Arabic, specifically vowelization and the use of diairics to map phonological information with the resultant regular relationship between the word's spelling and sound. The second is diglossia, specifically the lexical and lexicophono-orthographical distance between the word's phonological form in the spoken language used in everyday speech and its form in Standard Arabic, the language of reading and writing. The paper reviews published research as well as research conducted by the author in order to evaluate the importance of these two sources of influence on word reading in Arabic. The research supports the implication of phonological processes in reading in voweled and unvoweled Arabic. At the same time, it shows that whereas vowelization, or the use of diairics to map phonological information contributes to high rates of reading accuracy in voweled Arabic, it impedes the development of reading fluency, especially as vowelization is only used in the early grades and as the phonological information represented by diairics may be recovered from the morphological structure of the word. The results also show that diglossia has a clear and consistent effect on reading accuracy and fluency across all the school grades and in both voweled and unvoweled Arabic. The results provide direct evidence of the effect of diglossia on word reading in Arabic. They also show that vowelization impedes rather than facilitates the development of reading efficiency.

Learning to read Chinese as a logographic orthography
Presenting Author: Xi Chen, OISE/University of Toronto, Canada
This paper has two purposes. First, it provides a detailed description of the Chinese language and orthography, including the linguistic system (phonology, morphology), the writing system, and literacy and schooling. Second, it discusses the contributions of phonological awareness, morphological awareness, and lexical-semantic knowledge to word reading and reading comprehension. Therefore, a comprehensive review was conducted to provide systematic evidence in the abovementioned areas. It is shown that the Chinese language and writing system have many unique features, which shape the development of metalinguistic awareness and reading skills in Chinese children. Moreover, phonological awareness, morphological awareness, and lexical-semantic knowledge are important for learning to read Chinese. Compared to alphabetic languages, morphological knowledge may play a larger role in Chinese reading. The same metalinguistic skills, together with lexical-semantic knowledge, are important for text comprehension in Chinese children. It is concluded that learning to read in Chinese shares many similarities to that in alphabetic languages. On the other hand, there are many unique features determined by the characteristics of the Chinese language and orthography.

Session I, 297
1 September 2017 10:15 - 11:45
Main Building C - CB
Symposium
Cognitive Science
Mathematical flexibility in three countries: Comparative Results
Keywords: Cognitive skills, Comparative studies, Mathematics, Problem solving, Student learning
Interest group: SIG 03 - Conceptual Change
Discussant: Mike Altschi, Germany
Potential flexibility and practical flexibility in equation solving
Presenting Author: Jon Star, Harvard University, United States
Co-Author: Le Xu, Beijing Normal University, China
Co-Author: Ru-De Liu, Beijing Normal University, China
Co-Author: Jia Wang, Beijing Normal University, China
Co-Author: Ying Liu, Beijing Normal University, China
Co-Author: Rui Zhen, Beijing Normal University, China
Researchers interested in mathematical proficiency have recently begun to explore the development of strategy flexibility, where flexibility is defined as knowledge of multiple strategies for solving a problem and the ability to select the optimal strategy for a given problem solving circumstance. However, anecdotal findings from this literature indicate that students do not consistently use the optimal strategy for solving a given problem, even when these same students demonstrate knowledge of the optimal strategy. This distinction, sometimes framed in the psychological literature as competence versus performance – has not been previously studied for flexibility. In order to explore the competence-performance distinction in flexibility, we develop and validate measures for potential flexibility (e.g., competence, or knowledge of strategies) and practical flexibility (e.g., performance on efficient strategies). 158 middle school students were asked to generate and evaluate multiple strategies for solving equations. Measures were found to have high reliability and validity; potential and practical flexibility were found to have distinct structures. Furthermore, results indicate that potential flexibility positively predicted practical flexibility.

Flexibility in linear equation solving by Spanish secondary students
Presenting Author: Nuria Joglar-Prieto, Universidad Complutense de Madrid, Spain
Co-Author: Miguel Abadades, Universidad Rey Juan Carlos, Spain
For middle school students, solving linear equations in one variable is their first contact with abstract algebraic problems. Solving equations is not only essential for subsequent math courses but also to comprehend the nature of mathematics. Mathematical flexibility is understood as the ability to produce different strategies to solve a problem and to be able to distinguish the most effective. Equation solving, where multiple ways to solve an equation are often available, is a topic especially suitable for the study of flexibility. We present initial results of a study on the mathematical flexibility showed by 246 Spanish students solving linear equations in one variable. A total of 164 eighth graders and 82 eleventh graders were asked to solve 12 equations in multiple ways and to mark the solution that they considered to be the most effective. This allowed us to assess students' knowledge of different strategies, as well as their ability to implement these strategies. Results indicated that students of both grades, despite significant differences in procedural skills, showed surprisingly similar low frequencies of use of innovative strategies as first solutions. Most students, regardless of age, followed the standard strategy (expand the parentheses and then combine terms) when they were asked to solve the equations for the first time. However, significant differences between the two age groups were found in the number of innovative solutions provided by the students when asked to find different solving strategies.

Flexibility among Finnish students
Presenting Author: Rikka Palkki, University of Oulu, Finland
Co-Author: Anna-Helena Hetamäki, University of Oulu, Finland
Co-Author: Peter Häätö, University of Oulu, Finland
For middle school students, solving linear equations in one variable is their first contact with abstract algebraic problems. Solving equations is not only essential for subsequent math courses but also to comprehend the nature of mathematics. Mathematical flexibility is understood as the ability to produce different strategies to solve a problem and to be able to distinguish the most effective. Equation solving, where multiple ways to solve an equation are often available, is a topic especially suitable for the study of flexibility. We present initial results of a study on the mathematical flexibility showed by 246 Spanish students solving linear equations in one variable. A total of 164 eighth graders and 82 eleventh graders were asked to solve 12 equations in multiple ways and to mark the solution that they considered to be the most effective. This allowed us to assess students' knowledge of different strategies, as well as their ability to implement these strategies. Results indicated that students of both grades, despite significant differences in procedural skills, showed surprisingly similar low frequencies of use of innovative strategies as first solutions. Most students, regardless of age, followed the standard strategy (expand the parentheses and then combine terms) when they were asked to solve the equations for the first time. However, significant differences between the two age groups were found in the number of innovative solutions provided by the students when asked to find different solving strategies.
A total of 258 Finnish students (93 8th graders and 165 11th graders) participated in an equation solving test on practical and potential flexibility. Of the 165 11th graders, 104 were in an advanced track while 61 were in a more basic track in mathematics. We studied whether students produced innovative solutions when instructed to solve the equations (practical flexibility) and when instructed to produce as many solutions as possible (potential flexibility). The results show that 11th-grade advanced mathematics students were able to produce innovative strategies not only having been explicitly taught such techniques, yet these innovative solutions generally were given only when students were prompted to solve equations in as many ways as possible. Most of the 8th graders and 11th-grade students in basic mathematics were only able to use standard algorithms, even when prompted to solve problems in multiple ways. 

**Turning Potential Flexibility Into Flexible Performance**

**Presenting Author:** Jon Star, Harvard University, United States  
**Co-Author:** Le Xu, Beijing Normal University, China  
**Co-Author:** Ru-Da Liu, Beijing Normal University, China  
**Co-Author:** Jia Wang, Beijing Normal University, China  
**Co-Author:** Rui Zhen, Beijing Normal University, China

This study examined the relationship between two types of mathematical flexibility – potential flexibility, which indicates individuals’ capacities to generate and use multiple strategies, and practical flexibility, which refers to individuals’ flexible performances when solving math problems. Both types of flexibility were assessed in the domain of linear equation solving. Furthermore, two types of beliefs – self-efficacy and use of flexible cognition – were investigated as potential mediators between potential and practical flexibility. 123 7th-grade students from China took part in this study. Results indicate that both potential flexibility and self-efficacy positively predicted practical flexibility. Additionally, self-efficacy and use of flexible cognition moderated the relationship between these two types of flexibility, suggesting that potential flexibility may lead to different degrees of practical flexibility depending on different levels of beliefs. Implications of these findings for research on mathematical flexibility and for educational practice are discussed.

**Session L 298**

1 September 2017 10:15 - 11:45  
**Main Building E - E301**  
**Symposium**  
**Teaching and Teacher Education**

**Teacher Gaze and Teacher-Student Interactions in Different Cultural Contexts**

**Keywords:** Educational Psychology, Teacher Effectiveness, Teacher Professional Development, Teaching / instruction, Teaching approaches  
**Interest group:** SIS 11 - Teaching and Teacher Education  
**Organiser:** Iirene Skulabala, New York University Abu Dhabi, United States  
**Discussant:** Matthias Nüchters, University of Freiburg, Germany

**Through Teachers’ Lenses: Gaze Behavior in United Arab Emirates Classrooms**

**Presenting Author:** Iirene Skulabala, New York University Abu Dhabi, United States  
**Co-Author:** Antje von Suchdoltetz, New York University Abu Dhabi, United Arab Emirates

In day-to-day classroom routines and instructional activities teachers have to monitor students’ progress and behaviors to be able to provide individualized feedback and instructions. Such monitoring is transferred into teachers’ gaze behavior. Therefore, vision may be a way to capture individual differences in teachers’ ability to provide high-quality instruction and, thus, can be indicative of professional expertise level. We applied mobile eye-tracking glasses to explore the visual attention allocation of 31 pre-Kindergarten teachers during natural teaching. In our study, we focused on teachers in United Arab Emirates (UAE). Findings show that teachers pay more attention to children than to materials and manage to distribute their visual attention more equally among children when classes are large. In contrast to previous research, our preliminary results indicate that level of expertise is not reflected in gaze behavior. We discuss the necessity of data triangulation, i.e., combination of various data sources, to interpret eye movement data and the possibility of applying eye-tracking methodology in teacher professional development.

**Teacher Gaze in Relation to Teacher-Child Interactions and Efficacy Beliefs in Finnish Kindergarten**

**Presenting Author:** Mari-Kristina Leinikainen, University of Jyväskylä, Finland  
**Co-Author:** Elja Pakarinen, University of Jyväskylä, Finland  
**Co-Author:** Hei Mäkynen, University of Jyväskylä, Finland

The present study aimed to investigate the associations between teacher allocation of visual attention and teacher-child interactions, teaching practices and teacher self-perceived efficacy in classrooms. The sample comprised 11 Finnish kindergarten classrooms. The quality of teacher-child interactions and teaching practices were observed using the CLASS and ECCOM. At the same time, teachers’ gaze behavior was recorded during a 20-minute pre-academic activity using mobile eye-tracking glasses. The results showed first that teachers allocated their attention equally on children and materials. The correlational analyses showed that classroom organization of a high quality was related to a high number of areas of teacher’s interest, i.e., children and materials. Teachers who were rated as deploying child-centered practices, were shown to have tendentially more attentional shifts between children whereas teachers deploying teacher-directed practices allocated their attention on a few children in classroom. Teachers who reported a high efficacy related to instruction and engagement, had a higher number of attentional shifts. Higher efficacy beliefs on management were negatively linked to time allocated on materials. The results can increase our understanding of the behavioral mechanisms underlying teacher-child interactions and teacher focus of attention in classroom, and to better understand the role of positive and nurturing teacher-child relationship. The present research will have implications for further research by providing eye-tracking tool for collecting observational data from classroom, and further develop professional development programs for pre-service and in-service teachers with a focus on improving supportive educational processes in classroom.

**Expert Teacher Interpersonal Gaze in Chinese Classrooms Settings**

**Presenting Author:** Nora McIntyre, University of Sheffield, United Kingdom  
**Co-Author:** Hatsha Maria Jarodka, Open University, Netherlands  
**Co-Author:** Robert Klassen, University of York, United Kingdom

Gaze patterns can be expected to contribute to the overall perception students have of their teacher. Not only do teachers reveal the direction of information that they are conveying (i.e., perceiving vs signalling gaze), but teachers also build a picture of themselves for students to relate to. While a little research has been conducting on Western teachers’ interpersonal gaze (Cortina et al., 2015), none has been conducted on Chinese interpersonal gaze. Therefore, the present study aimed to identify teacher gaze patterns that contribute to student ratings of teacher interpersonal style. Twenty Hong Kong Chinese teachers wore eye-tracking glasses in the real-world during teacher-centred instruction before students completed the Questionnaire on Teacher Interaction (QTI, Wubbel et al., 2012). In particular, we analysed gaze teachers’ attentional (i.e., information-seeking) and communicative (i.e., information-giving) gaze. We explored the ability of various teacher gaze measures to predict teacher agency, affiliation and interpersonal style (agency x affiliation). Communicative teacher gaze is more important to teacher interpersonal style than attentional teacher gaze. But aspects of attentional teacher gaze can predict teacher affiliation.

**The Relations Between Teacher’s Vision and Children’s Cognitive, Social and Academic Performance**

**Presenting Author:** Film Uka, University of Freiburg, Germany  
**Co-Author:** Antje von Suchdoltetz, New York University Abu Dhabi, United Arab Emirates

Teachers’ visual expertise is an important professional skill, particularly the ability to simultaneously perceive and interpret classroom situations (Woff et al., 2016). Since many events involving various actors take place at the same time, visual expertise helps teachers to manage the classroom (Doyle 2006). To date, less is known about the ways how precisely teachers use visual information to manage the classroom and whether teachers’ visual attention allocation differs dependent on children’s characteristics. The study used mobile eye-tracking glasses to investigate whether the teachers’ distribution of the visual attention among the children is related to children’s academic and social performance. A sample of 9 kindergarten teachers (all females) was recruited from 3 schools in Kosovo $M_{25}^1 = 37.1$ years, SD $= 10.2$). Gaze behavior was recorded during a 20 minute regular class (SMI ETG2, SenserMotric Instruments). The fixation time allocated to each child in the class was used for analyses. Teachers rated academic and social performance of all children in their class. Results showed a positive moderate correlation between teachers’ visual attention and literacy readiness ($r = .19, p < .05$) and between teachers’ visual attention and numeracy readiness ($r = .24, p < .01$). The findings suggest that teachers focus their visual attention longer on children with good academic performance. The results add to the literature on the strategies that teachers use to manage the classroom. Implications for teacher training will be discussed.

**Session L 299**

1 September 2017 10:15 - 11:45  
**Penthouse - B - 83116**  
**Symposium**  
**Developmental Aspects of Instruction, Teaching and Teacher Education**  
**Why Is It So Hard? Teachers’ Growth in Scaffolding Collaborative Dialogue**
Teachers play a crucial role in fostering the interactions during collaborative learning that are beneficial for student learning. At the same time, providing adequate guidance is a demanding task for teachers. Teachers thus need to be properly prepared for implementing collaborative learning. Research investigating teacher guidance strategies during collaborative learning, as well as how teacher training influences teacher ability to effectively guide collaborative learning, show considerable variation concerning research questions and research methodology. The present review study therefore aimed to provide an overview of these two research areas. A mixed methods review approach was used. The search query led to 98 relevant studies, which were split into summary phrases and each assigned a weight by judging the study's quality. The results show that several aspects of teacher behavior in particular show a positive influence on student collaboration, for example focusing on the content space at meta level or at the relational space, prompting or questioning students, and providing control to students. Furthermore, providing teachers with training generally leads to increased skills to support collaborative learning. However, for a number of aspects of teacher behavior the amount of evidence concerning teacher training is very low. Especially training that stimulates teachers to focus on particular student activities is scarce, which at the same time are effective guidance strategies. The results of this review study may be used to formulate best practices for teachers for guiding collaborative learning, as well as future directions for research and development of teacher training programs.

Teachers' Transition from Rationale to Collaborative Reasoning

Presenting Author: Jingjing Sun, University of Montana, United States
Co-Author: Jie Zhang, University of Houston, United States
Co-Author: Hong Li, Beijing Normal University, China
Co-Author: Matt Jackson, University of Montana, United States

Chinese teachers are constantly under the pressure of preparing children to perform well on the high-stake tests. Little do we know whether and how teachers can successfully transition from the paradigm of "teaching for testing" to the paradigm of "teaching for thinking": There is a critical need for a comprehensive understanding of how to support teachers' transitions from recitation to alternative instructional methods that promote students' thinking and authentic collaboration. The focus of this study is to address this need by examining two Chinese teachers' transition from recitation to an intellectually stimulating and personally engaging discussion method called Collaborative Reasoning. Preliminary findings from microgenetic analysis of two baseline lessons and 62 CR discussion transcripts showed that, both teachers significantly decreased their speaking turns from recitation to Collaborative Reasoning. The two teachers varied in their use of different types of scaffolding moves, with one primarily used prompting and the other used management moves. Findings suggested that factors such as teacher motivation, and students' immediate and delayed responses may contribute to teachers' variation in scaffolding collaborative discussions.

Towards the Development of Students' Capacity for Mathematical Discussion

Presenting Author: Hee-jong Kim, Hongik University, Korea, Republic of Korea

This study investigates how a middle school mathematics teacher supports students' ability of mathematical communication, specifically her efforts in fostering a mathematics discourse community. Data collection included a year-long observation of a seventh grade teacher’s mathematics classrooms as well as teacher interviews. The teacher adapted three sets of research-based curriculum support materials over the school year. The observations involved instruction of these materials and regular instruction. Prior research has shown changes in teacher discourse and practice, therefore, preliminary analysis of this current study focuses on students' development of mathematical discourse and how the teacher supports this process. Methodological challenges and implications, including how to better scaffold students' ability of mathematical discourse and how to better support teachers' competence in scaffolding, will also be discussed during the session.

The Process of Change: Professional Growth in Dialogic Teaching in High School Science

Presenting Author: Scherioe Cline, University of California San Diego, United States
Co-Author: Lauren B. Resnick, University of Pittsburgh, United States

In this paper, we report a case study (Mr. Nelson) of professional growth in dialogic science teaching. Over course of three years of observation, Mr. Nelson underwent a pedagogical metamorphosis, substantively transforming the way he used dialogue in his instruction to support student learning. We use microgenetic discourse analysis to examine the process of change in the way Mr. Nelson uses talk to support student learning over the three years. The findings show an inverse relationship between knowledge and reasoning in class discussion. The findings suggest that as Mr. Nelson shifted the way he positioned knowledge in class discussions, he increasingly shifted the nature of class discussion towards collaborative reasoning, and dialogic.

Session L 300
1 September 2017 10:15 - 11:45
Linné - K108
Symposium
Learning and Special Education
Tools for Examining Individual Differences in Learning: Latent variable mixture models

Keywords: Cognitive development, Conceptual change, Higher education, Mathematics, Numeracy, Problem solving, Quantitative methods, Student learning
Interest group: SIG 03 - Conceptual Change, SIG 05 - Learning and Development in Early Childhood, SIG 17 - Methods in Learning Research
Organizer: Mariann Hickendorff, Leiden University, Netherlands
Discussant: Jade McKillen, University of Turku, Finland

Conceptual Change in Higher Education Learning: A Latent Transition Analysis

Presenting Author: Maja Flåg, University of Trier, Germany
Co-Author: Bianca Simonseuw, University of Trier, Germany
Co-Author: Anne-Kathrin Mayer, ZPID - Leibniz Institute for Psychology Information, Germany
Co-Author: Tim Rosman, ZPID - Leibniz Institute for Psychology Information, Germany
Co-Author: Michael Schneider, University of Trier, Germany

An understanding of scientific concepts is a central learning goal of higher education. Research inside and outside higher education has shown that learners often do not only lack knowledge but also hold deeply entrenched misconceptions that exacerbate learning. Thus, conceptual change, that is, restructuring of prior knowledge is necessary in order to acquire academic concepts. Whereas the sources and dynamics of conceptual change are well investigated in school children, almost nothing is known about the relevance and processes of conceptual change in higher education. Therefore, we tracked the development of N = 137 undergraduate psychology students' concepts of human memory longitudinally over the course of two academic years. In a latent transition model with four measurement points we found four knowledge profiles that differed significantly in terms of misconceptions, everyday conceptions, and scientific concepts of human memory. A small number of well-ordered developmental paths captured the participants’ transitions between these profiles over time. The paths indicate a general developmental trend towards more scientifically correct and integrated knowledge structures. The validity of the model results is supported by systematic associations of the profiles with an alternative test of memory understanding as well as with students’ grade point average. The findings demonstrate that conceptual change is still a relevant learning process in higher education. Subsequent studies will have to test the generalizability of typical findings from conceptual change research with children to higher education. Our findings also highlight the usefulness of latent transition analyses for modeling longitudinal changes in multidimensional knowledge structures.

Using Latent Transition Analysis to Identify Patterns of Change in Math Strategies

Presenting Author: Kathy Treszcz, University of Melbourne, Australia
Co-Author: Robert Reeve, University of Melbourne, United Kingdom

Single digit addition (SDA) strategy sophistication is regarded as an index of math problem solving ability. The acquisition of SDA strategies tends to be well ordered: children initially use procedural counting-based strategies and later employ more conceptual-based strategies (e.g., decomposition) (Siegler, 2006). SDA strategy acquisition is usually analysed in terms of age; however, within-age strategy profiles tend to be variable. Paul and Reeve (2016) used latent class analysis to show that different patterns of SDA strategy could be identified, independent of age; and, moreover, these patterns had empirical and theoretical utility. These findings raise the issue whether different patterns of SDA strategy are stable or change over time, and whether these patterns are related to math problem solving abilities. To investigate this issue, we classified the SDA strategies (count-all, count-on, retrieval) of 215 children at 6, 7, 8, and 9 years. We used a latent transition analytic model (LTA) to analyse the relative proportion of the four strategies used on each test occasion. We used a step-three procedure to examine how strategy pathways predicted multiplication abilities at Age 10. The findings show that SDA developmental trajectories predict later math ability. In sum, the research reveals the importance of identifying patterns of early learning and what it tells us about education outcomes.

Learning to Solve Analogies: The Paths Children Take

Presenting Author: Marian Hickendorff, Leiden University, Netherlands
The impact of different authentic instructional material on students' writing skills.

Presenting Author: Nicola Brauch, University of Bochum, Germany
Co-Author: Marcel Merwald, Ruhr University Bochum, Germany
Co-Author: Thomas Lehmann, University of Bremen, Germany

In history education, authentic materials such as primary sources (e.g., letters or diary entries) are considered as a possibility to foster students’ historical reasoning and argument writing skills. This study aims to explore the impact of instructional materials with different degrees of authenticity on students’ argument writing in history. We conducted a quasi-experimental study in a Reach out Lab to check the hypothesis that authentic materials promote the quality of students’ written historical arguments compared to less authentic material. Students (N = 160) 11th graders from secondary schools worked with instructional material, representing different grades of historical authenticity, in three experimental conditions (authentic sources, non-authentic textbook, non-authentic narrated). They were further instructed to answer a central historical question in an argument writing task at the end of the intervention by using the material at hand. Students then worked with primary sources and historical accounts in original text format, printed text format and audio material format spoken by actors (both non-authentic). Additionally, we assessed interest, epistemological beliefs, and prior knowledge and used them as covariates. First results indicate that students in the authentic condition wrote essays of medium structural quality. The domain-specific quality of their essays, however, was significantly below a medium level. We will discuss this study in more detail and domain-specific quality of essays with data from the other treatment groups to evaluate the authenticity of students’ argument writing. Finally, we will discuss some considerations on how to promote students’ argument writing skills with instructional material of different authenticity.

Domain-specific writing instruction in history: effects on products and processes

Presenting Author: Jannet van Drie, University of Amsterdam, Netherlands
Co-Author: Daphne van Weijen, Research Institute of Child Development and Education, Netherlands

Writing in history places high demands on students, but not enough is known about how this can be taught effectively. Therefore, the effects of writing instruction in history on text quality, writing processes, and students’ development of writing were investigated in this experimental study. This instruction was designed by a history teacher for use in his own classes, as part of a professional development program on improving writing across the domains. The teacher designed a lesson unit (5 lessons) in which writing instruction was combined with historical reasoning instruction. The lessons were based on several principles of effective writing instruction, including strategy instruction, modeling, prewriting, and peer-interaction. Ninety-six 11th grade students, in two cohorts, participated in the study. Outcomes of the first cohort are promising. Students in the experimental condition wrote better quality texts and their knowledge of writing increased. Furthermore, their writing processes included more pauses, which suggests that they planned more during writing. Based on these findings, we concluded that teachers appear able to integrate writing instruction in their history lessons, which can result in both better quality writing in history classes and more knowledge of writing.

Causal (re-)writing in history; working on (too) many levels?

Presenting Author: Gerard Stoel, RICDE / University of Amsterdam, Netherlands
Co-Author: Jannet van Drie, University of Amsterdam, Netherlands
Co-Author: Carla Van Bostel, University of Amsterdam, Netherlands

This qualitative study investigates which (second-order) concepts and strategies related to causal historical reasoning students integrate into their written explanations on the outbreak of the First World War after receiving a lesson-unit that focused on causal historical reasoning. The aim of the study is to better understand the relationship between (causal) historical reasoning and historical literacy and the demands made on students when engaging this reasoning. Teaching. Furthermore, we want to draw pedagogical implications for practice. Through a process of open and axial coding, we compared essay-revisions of 20 11th grade pre-university students with their original essays. Preliminary results indicate that, after the lesson-unit, students included more causal connections and elaborated their causal chains. Furthermore, students integrated more pre-understanding, although this was done in a somewhat mechanistic way, without providing arguments for their characterizations. Although students made more causal-claims, these were seldom supported by evidence. Results also showed that the amount and type of causality of Breugel was related to how students structured their text. Essays organized in a more abstract, non-linear way integrated more analytical second-order concepts and included more argumentative moves, indicating some awareness of the constructed nature of historical causality. These results suggest that in order to write arguments about historical explanations, students must not only develop concepts and strategies related to causal historical reasoning, but also acquire knowledge of causal ‘historical’ gis, as well as an epistemological understanding of historical knowledge as interpretation, in order to realize the need for argument and evidence.

Session L 303

1 September 2017 10:15 - 11:45
Pinn B - B4116
Session

Eye tracking as a method in learning and testing with different representations

Keywords: Assessment methods and tools, Comprehension of text and graphics, Computer-assisted learning, Instructional design, Learning Technologies, Mathematics, Mixed-method research, Multimedia learning, Problem solving, Reading comprehension
Interest group:
Discussant: Andreas Gegenfurtner, Germany

The value of multiple and gaze-likelihood analyses in eye-tracking studies: A multimedia example

Presenting Author: Marli Annalene Ulnoer, Leibniz Institute for Science and Mathematics Education (IPN), Germany
Co-Author: Alexander Eitel, University of Freiburg, Institute of Psychology, Germany
Co-Author: Benjamin Strobel, IPN-Leibniz-Institut für die Pädagogik der Naturwissenschaften und Mathematik, Germany
Co-Author: Iulia Kreutz, Leibniz Institute for Science and Mathematics Education, Germany

Our multimedia experiment investigated how adding a representational picture (R) that visualizes text stem information in multiple-choice science items affects schoolchildren’s item-solving behavior in educational testing (i.e., text-picture compared to parallel-text only items). Twenty-four items (twelve text-only and twelve text-picture items) were solved by each of the sixty-two participating students in a randomized within-subject design. By presenting this study, we aimed to (1) the potential of multimedia analyses to conduct inferential tests that take the complex hierarchical structure of eye-tracking data into account and (2) the potential of detailed gaze-likelihood analyses across processing time to trace how students’ attend to different areas of interest (A0is) in the course of item solving. The multilevel analyses show that the time students spent fixating the added R in text-picture items was compensated for by saving substantial reading time of the corresponding text and by spending less time on incorrect answers. However, students still spent more time on studying the item stem as a whole (text + picture) in text-picture items, which probably enhanced their understanding, suggested by better performances in text-picture items (i.e., multimedia effect in testing). The gaze likelihood analyses further revealed that the RPs received particular attention right after item onset and in the later phase of item solving, which might reflect a compensatory mental load that supported students’ comprehension but also their decision making. We discuss our findings with a focus on the implemented methods and their valuable potential for multimedia eye-tracking research.

Attention distribution when solving mathematical-textual tasks. An eye tracking experimental study

Presenting Author: Krzysztof Krejz, SWPS University of Social Sciences and Humanities, Poland
Co-Author: Andrzej D. Duchowski, Clemson University, United States
Co-Author: Macin Kasprzak, Education Research Institute, Poland
Co-Author: Mariusz Wawrzyniak, Education Research Institute, Poland
Co-Author: Ceayzy Biele, National Information Processing Institute, Poland
Co-Author: Izabela Kreutz, Leibniz Institute for Science and Mathematics Education, Germany

An extensive addition added to mathematical problems is popular pedagogical strategy to make them more engaging and attractive to students. However, primary school students’ reading abilities can be a serious limitation to such tasks’ comprehension. In the present study we used eye tracking method to gain insight into the attentional mechanism underlying solving mathematical-textual problems in relation to mathematical and reading abilities. Recordings of eye movement patterns during reading matched with traditional accuracy measures allowed us to explore the role of attention distribution while solving mathematical tasks accompanied by either short or long narratives. Children from primary schools (N = 442, 8 - 10 years old) participated in the eye tracking experiment. Their reading and mathematical skills were assessed before they solved mathematical tasks while their eye movements were monitored. Eye movements analyses revealed that mathematical skills yield better selection of relevant information from the long textual narration regardless of reading competencies while reading fluency may decrease the chance of such tasks’ solving accuracy. Results are discussed in the context of children’s cognitive functioning and the role of visual attention during mental modeling of mathematical problems. Finally, we provide some recommendations for teaching practitioners.

The effectiveness of compositional animation design: Evidence from eye tracking

Presenting Author: Jean-Michel Boucheux, University of Dijon, LEAD-CNRS, France
Co-Author: Tom Curtis, University, Austria

Learners have difficulty in decomposing conventionally designed animations to obtain raw material suitable for building high quality mental models. A composition approach to designing animations based on the Animation Processing Model was developed as a principled alternative to prevailing approaches. It provides learners with pre-decomposed material that is structured and sequenced to facilitate the relation building required for effective mental model construction. Study of a compositional animation that presented material in a contiguous fashion resulted in higher quality mental models of a plane mechanics (translation) problem compared to a control (conventional) with eye movements data analysis: a relational index measure was devised and used to assess mental model construction. This relational index showed that the compositional animation led to superior mental models because it particularly fostered relational processing.

Expertise reversal of the signaling effect: Evidence from eye tracking

Presenting Author: Juliane Richter, Leibniz-Institut für Wissensmedien, Germany
Co-Author: Katharina Scheiter, Leibniz-Institut für Wissensmedien, Germany

Multimedia integration signals highlight correspondences between text and pictures, which is supposed to support text-picture integration and thus multimedia learning. A recent meta-analysis revealed that learners’ prior knowledge moderates the signaling effect in that only learners with low prior knowledge benefited from the expertise reversal effect. We conducted an eye tracking study with students in middle school. They learned with a digital multimedia textbook in one of the two versions: (a) a basic version with mainly text signals (B), and (b) an extended version with additional multimedia integration signals that support text-picture integration (e.g., color coding). Results of a moderated mediation analysis revealed that eye tracking measures did not explain the expertise reversal of the signaling effect revealed in the current study. However, LPK learners fixated pictures longer, tended to make more text-picture transitions, and tended to have an overall lower cognitive load, as indicated by the pupil diameter when learning with the extended version compared to the basic version. High prior knowledge (HPK) learners did not differ with respect to these measures although descriptively the pattern of results was reversed in comparison to the LPK group. Moreover, the more transitions learners performed in general the less influence prior knowledge had on recall performance. These results might be relevant for the design of multimedia material and the usage of individualized instructions in digital learning environments.

Session L 304

1 September 2017 10:15 - 11:45
Pinn B - B8110
Learning from Lessons: Studying the structure and construction of teacher knowledge
Presenting Author: Philanthropist Catherine O'Donnell, Australia
Co-Author: Man Chin Esther Chan, The University of Melbourne, Australia
Co-Author: David Clarke, University of Melbourne, Australia
Co-Author: Anne Roche, Australian Catholic University, Australia

A central premise of this project is that teachers learn from the act of teaching a lesson and that this learning is evident in the planning and teaching of a subsequent lesson. In this project, the knowledge obtained from these lessons was examined using techniques during lesson planning, classroom interactions and reflection. Our goal is a refined understanding of classroom events that create opportunities for teacher learning. Findings from a pilot project are presented to illustrate the viability of the research design and the theoretical model. The analysis of the teacher interviews revealed important themes of how teachers can be in control of the teachers' attention and the teachers' consequent learning. Teacher learning is evidenced through teacher epistemic claims elicited in a sequence of structured interviews and through observed actions and teacher statements relating to adaptive practice. Documented forms of teacher learning included teacher statements regarding mathematical content and curriculum, new instructional strategies, the prior knowledge of the students, and the significance of particular elements of lesson structure. The research design creates conditions where teacher statements and actions reveal both those objects and events to which the teacher selectsively and the meanings the teacher associates with those objects and events. The effectiveness of the research design in catalysing teacher reflection has significant potential for future adaptation to professional learning contexts.

Using head-mounted video to investigate the attentional focus of primary mathematics teachers
Presenting Author: Carmel Meister, University of Melbourne, Australia
Co-Author: Dan Jazby, The University of Melbourne, Australia
Co-Author: David Clarke, University of Melbourne, Australia

Understanding what skilled practitioners attend to has been argued to be vital in understanding what makes skilled performance possible. In education, teacher attention has not been a major focus of research. This study employs a head-mounted camera technique of data collection developed in research relating to firefighters. The attentional foci of an experienced and inexperienced teacher were investigated, to ascertain whether each teacher varied in its use of the phenomena that they attended to mid-lesson. While the experienced teacher focused their attention on student body language cues, the inexperienced teacher focused on student mathematical representations – particularly representations which were anomalous. Further investigation of skilled teachers' attentional foci is argued to be of benefit, as it may enable the development of training methods that could reduce the time it takes for novice teachers to develop expertise.

Focusing teacher attention through the framing of salience: The structured stimulation of practice
Presenting Author: Hisay Hollingsworth, Australian Council for Educational Research (ACER), Australia

Video provides a unique opportunity to capture some of the complexity of classroom practice. opening up possibilities for teacher professional learning through observations and analyses of practice. However, simply viewing video does not ensure teacher learning, and as Gauthier and Chaillet (2015) report, ‘...an important issue concerns how to facilitate substantive analysis of teaching practice with video so that it becomes a productive learning tool for teachers’. (p.59). This presentation will report a promising process for facilitating such substantive analysis, one that involves the explicit focusing of teacher attention.

Distinguishing features of The Structured Stimulation of Teacher Reflectionprocess, include: the use of negotiated observational foci located within a theoretically and empirically grounded observation framework that is designed to promote the development of a reflective practice; and the explicit and sustained focus on selected foci of practice that is relevant to any lesson; and, the use of video to focus teacher self-reflection and support and provoke teacher learning. It is suggested that one outcome of the structured stimulation of reflection process, through its juxtaposition of an observation foci is that meaning attached to the salience of the... is that is the process explicitly focuses teacher attention on those personally salient outcomes to which they attach value providing opportunity for maximising consequent learning.

Focusing Teacher Attention and Learning through Culturally Embedded Lesson Study in the Philippines
Presenting Author: David Clarke, University of Melbourne, Australia
Co-Author: Marion Elaeguin, University of the Philippines Diliman, Philippines

Lesson Study has captured the attention of many international educators with its promise of improved student learning and sustained teacher learning. Lesson Study, however, has cultural underpinnings that a simple transference model overlooks. A culturally embedded approach attends to the existing cultural orientations and teacher values of host schools. Factoring in the school's cultural orientations (hierarchy, collectivism, long-term orientation, etc.) and what the teachers pay attention to is designing a good mathematics lesson (researching curriculum materials, anticipating student responses, etc.), this culturally embedded approach enabled the researcher to build on the teachers' existing cultural and value orientations and to focus their learnings on aspects of teaching and lesson planning that would help build up their professional learning story more meaningfully. This paper reports on the author's implementation of Lesson Study in two Philippine public secondary schools and the learnings teachers experienced as a result of their participation.

Session L 305
1 September 2017 10:15 - 11:45
1. LS L 305 - KY 1110
Symposium: Learning and Social Interaction
Frontiers in Understanding the Social Nature of Learning

Keywords: Conversation / Discourse analysis, Mixed-method research, Social aspects of learning and teaching, Social interaction, Student Learning, Video analysis
Interest group: SIG 10 - Social Interaction in Learning and Instruction
Discussant: Roger Säljö, Göteborgs University, Sweden

Enuffled Modes of Social Interaction in Student Collaborative Problem Solving in Mathematics
Presenting Authors: Marcin Estreicher, The University of Melbourne, Australia
Co-Author: David Clarke, University of Melbourne, Australia

The Social Unit of Learning project aims to examine individual, dyadic, small group (four to six students) and whole class problem solving and learning in mathematics and the associated/consequent learning. The first phase of this study is an initial 10 ‘gold’ video cameras and up to 30 audio channels. In this study 7 classes were recruited with their usual teacher in order to explore the student-student and teacher-student-student interactions norms. The project collected multiple forms of data, including student written products and high definition video and audio recording of every student and the teacher involved in the classroom. This provides a complex data source affording multiple comparative options and giving methodological recognition to the authentic complexity of the social setting that is the classroom. Utilising multiple forms of data, our goal was to study the social development of student mathematical and mathematical reasoning. This work was associated with learning products that included both whole written solutions and spoken forms of mathematical argumentation. Our analysis suggests that meaning negotiation in mathematics classrooms can be usefully distinguished as social, socio-mathematical, and mathematical. Use of the laboratory classroom allowed the detailed documentation of student engagement in each of these three negotiated foci in pairs and in small groups. Our analysis documents the ways in which all three modes co-exist in an entangled form in the negative interactions documented in the mathematics classroom, each with its own lexicon. We envisage all three as constitutive of learning.

What kinds of teacher-student interactions promote learning and cognitive development?
Presenting Author: Neil Mercer, University of Cambridge, United Kingdom

For education to function effectively at the classroom level, what are the most productive forms of teacher-student interaction need to take place; identifying what those are has been a focus of educational research for some years – but what are the links? This paper will re-examine what classroom-based research has provided to inform us about which types of interaction are most effective for promoting children's classroom learning, the development of their understanding and the development of their ability to reason. It will draw upon the findings of research by the author and colleagues and by other researchers in the field to identify findings which will be discussed which are related to (a) teacher-student interaction in whole class sessions; (b) teacher-student interaction with smaller groups of students (c) the mediation by teachers of students working independently in groups; and (d) teachers' interaction with individual students. It will also discuss the methods used in such research, including the consideration of whether randomized control trials do in fact represent the 'gold standard' for studies of the effectiveness of pedagogical interventions in the classroom, as has been commonly claimed in recent years.

Investigating the development of pedagogical understanding in response to cultural diversity
Presenting Author: Josephine Moote, University of Jyväskylä, Finland

This paper uses a diadogical approach to investigate the development of pedagogical understanding in response to an intensive programme (IP) addressing cultural diversity in education. The 10 day IP involved 32 student participants and 10 mentors of staff from 8 European universities hosted by the University of Jyväskylä, Finland. The participants were introduced to a range of different pedagogical approaches to designing education for diversity and language education, educational theory and the history of education as well as cultural visits and activities. The data for this paper is based on the written accounts from the participants as they revisited their understanding of outsiderdness and insiderness at the end of the IP and seeks to better understand the way in which the participants drew upon their experiences at the IP and beyond the IP, educational theory and practice to negotiate their pedagogical understanding.

A person perspective in interest research: tracing multiple interests in multiple contexts over time
Presenting Author: Sanne Akkerman, Leiden University, Netherlands
Co-Author: Arthur Bakker, Utrecht University, Netherlands

Interest seems one of the most basic catalysts for learning and development. Yet interest research has been limited by focusing on single and predefined social contexts, typically a classroom context (e.g., mathematics classroom) determining the targeted object of interest (mathematics) to be developed in students under influence of this environment. Although insightful, such research has it has unintendedly portrayed the development of interest as a relative linear process, neglecting personal social dynamics resulting from emergence of multiple interests pursued in and across multiple social contexts. This paper reports upon on experiences of interest in and outside formal education. Results indicate that interest development is much more complex and fluid than currently theorized, leading to various questions and hypotheses deserving more substantial research.

Session L 306
1 September 2017 10:15 - 11:45
Main Building E - E221
Symposium: Motivational, Social and Affective Processes

Homework: Parental assistance and children’s academic outcomes

Keywords: Achievement, Motivation, Motivation and emotion, Parental involvement in learning, Primary education, Self-efficacy
Interest group: SIG 08 - Motivation and Emotion
In this paper, we discuss parental involvement in 4th graders' homework in Greece and Finland, examining parental self-efficacy (PSE), parents' feelings during homework, parental involvement in homework, parents' views on their child's difficulties at school, and child's performance level at school. Possible relations to parents' education and child's gender are also examined. The main aim is to compare parental involvement in Finland and Greece, and to offer insights into factors impacting parental involvement in homework. This is important, as type and quality of involvement, as well as child's characteristics, are acknowledged to be influential in whether parental involvement in homework is beneficial for the child or not. Data consists of 239 (Greece) and 284 (Finland) fourth graders, and their parents. Analyses were completed using SEM models. Results indicated that in Greece the time parents spent assisting their children in homework was significantly higher than in Finland, and children were also assessed to be less independent in doing their homework. Neither parents' education nor PSE were directly related to parental involvement in either of the countries, but preliminary analyses imply that these influences may be mediated by other variables, such as parents' feelings during homework. In both countries, the feelings during homework were related to PSE; strong PSE leading to feelings of satisfaction, whereas low PSE to worry and anger. This study is expected to provide deeper understanding on the preconditions, as well as amount of parental involvement in homework in two different countries.

Parental homework assistance and children's motivational behavior
Presenting Author: Rikka Hinovens, University of Jyväskylä, Finland
Co-Author: Anna Viljanen, University of Eastern Finland, Finland
Co-Author: Kati Eklund, University of Jyväskylä, Finland
Co-Author: Aija Pakarinen, University of Jyväskylä, Finland
Co-Author: Marija Kristina Liekkanen, University of Jyväskylä, Finland
Co-Author: Jari-Erik Nurmi, University of Jyväskylä, Finland

One type of parental involvement in children's schooling is homework assistance, such as help, monitoring and autonomy granting. Previous literature has mainly focused on the relationships between parental homework assistance and academic achievement and less attention has been given to children's motivation as an outcome of homework assistance. In this presentation, 363 Finnish children and their mothers participated in a study that examined the relations between parental homework assistance and children’s motivational behavior, that is, task-avoidant behavior from Grade 2 to Grade 4. The results showed, in general, that the more autonomy granting mothers reported, the less task-avoidant behavior children showed; and the less task-avoidant behavior children showed, the more autonomy granting their mothers provided later on. In addition, the more mothers helped and monitored the child, the more task-avoidative behavior was reported; and the more task-avoidant behavior children exhibited, the more mothers tried to help and monitor their child later on. Children's skill level in math and reading did not affect these associations. Altogether, the results indicate that not all homework involvement leads to positive outcomes. In addition, the relationship between homework assistance and motivational behavior is reciprocal over time: it is not only mothers’ assistance that has an effect on children’s motivation but also children's motivation affects how mothers act in homework situations. As a conclusion, it would be important to help parents find appropriate ways to individually support their children who all might have different needs for parental involvement in their schooling.

Perceived parental involvement in homework and children's math performance and motivation
Presenting Author: Anna-Lisa Jogi, Tallinn University, Estonia
Co-Author: Eve Kiikas, Tallinn University, Estonia
Co-Author: Siimutas Silikas, University of Jyväskylä, Finland

The present study examined the longitudinal associations between child perceived parental involvement in homework (i.e., control and support) and children's math performance and motivation (task-persistent homework behavior and math self-concept). Also, gender differences in these associations were investigated. Estonian children (249 boys, 263 girls) completed math performance tests and evaluated their self-concept in math in Grade 3 and Grade 6. Mothers (n = 420) evaluated children's task persistence during homework in Grade 3 and Grade 6. Children reported their perceptions concerning parental homework help and maternal education were controlled for. The results showed, first, that low self-concept in math predicted increased perceived parental control, which, in turn, predicted low math performance, low task persistence in homework situations, and low math self-concept. Second, perceived parental support was related to increased children's motivation (i.e., task persistence during homework) in Grade 6. Finally, child gender moderated associations between perceived parental control and motivation, suggesting that parental control was detrimental for boys’ task persistence and math self-concept.

The present study is one of the few studies that relate child-perceived parental involvement not only to children's performance but also to children’s motivation, after accounting for children's general ability and maternal education. The results of the present study suggest that motivational and gender-related aspects should be emphasized when encouraging parents to get involved with their children’s homework.

The need to distinguish between the quantity and quality of parental involvement
Presenting Author: Haima Dumont, German Institute for International Educational Research, Germany
Co-Author: Sandra Moroni, University of Bern, Switzerland

In research on parental homework involvement, studies analyzing its effects on students’ achievement often come to mixed findings. In the present paper, the authors argue for the need to distinguish between the quantity and the quality of parental homework involvement. On the basis of longitudinal questionnaire data from 1,685 Swiss students in Grades 5 and 6, the research shows that completely different conclusions about the effectiveness of parental homework involvement were reached depending on which aspect was looked at: How often parents helped with homework was negatively associated with the development of achievement, whereas homework help that was perceived as supportive had positive predictive effects, and homework help perceived as intrusive had negative effects. Moreover, the results showed that effects sizes would have been overestimated if students' prior achievement and family background were not controlled.

Session L 307
1 September 2017 10:15 - 11:45
Main Building D - D11 Symposium
Cognitive Science

The role of feedback and standards in the self-regulation of students’ confidence and performance
Keywords: Assessment methods and tools, Cognitive development, Higher education, Metacognition, Primary education, Quantitative methods, Self-regulation
Interest groups: SIG 16 - Metacognition
Discussant: Stephanie Pieschl, University of Newcastle, Germany

Have Measures of Relative Accuracy been Reliable Enough? A Quantitative Analysis
Presenting Author: Daniel Dinsmore, University of North Florida, United States
Co-Author: Meghan Parkinson, Jacksonville Public Library, United States

Past research on calibration has indicated that students’ confidence and performance are not highly related, with most students demonstrating an overconfidence-underperformance effect. However, prior research on calibration has not taken into account the role of standard setting during this process. This study examined the complex relation between confidence, standards, and performance by measuring these three constructs at four timepoints—prior to and after a midterm and final examination. Participants were 94 students from a large university in western Canada from a larger study on student performance. Students were asked their confidence in the exam and what grade (A, B, C, or D) they would need to earn to do well on the exam. Multivariate analyses indicated that students adjusted their confidence and standards over these four timepoints, and additionally, that standards were highly related to performance whereas confidence was not. This evidence calls into question whether students are “mis-calibrated”, and raises the question of what/when judgments they may be using to calibrate their performance (i.e., standards rather than confidence).

Standards in calibration: Students’ perceptions of conditions for creating performance standards
Presenting Author: Allyson Hadwin, University of Victoria, Canada
Co-Author: Lindsay McCandie, University of Ottawa, Canada

Models of self-regulated learning suggest that learners base metacognitive evaluations on personal standards. Calibration research typically focuses on alignment between confidence judgments and performance. However, standards by which students make confidence judgments have not been considered. The present study examined (a) self-reported confidence standards used to evaluate performance for a midterm and final exam, and (b) changes in these conditions from midterm to final. Participants (n = 195) completed a reflection after each exam in a course on self-regulated learning. They reported (a) which they considered a determining a grade standard of doing “well” on each exam. Responses were coded inductively drawing flexibly on a priori categories. Findings indicated three main type of conditions informing student standards: (a) performance standards, (b) time and effort prearranged, and (c) knowledge and understanding. Conditions were more course-specific at the final than at the midterm. Findings suggest confidence and standards have a reciprocal relation and that learners update conditions based on past experiences.

Beyond Hypercorrection: Remembering Corrective Feedback for Low-Confidence Responses
Presenting Author: Alex Rose, University of the Arts College, United Kingdom
Co-Author: Philip Higham, University of Southampton, United Kingdom

Correcting errors based on corrective feedback is essential to successful learning. Previous studies have found that corrections to high-confidence errors are better remembered than low-confidence errors (the hypercorrection effect). The aim of this study was to investigate whether corrections to low-confidence errors also be selectively retained in some cases. Participants completed an initial multiple-choice test consisting of control, trick, and easy general knowledge questions, rated their confidence after answering each question, and then received immediate corrective feedback. After a short delay, they were given a cue recall test consisting of the same questions. In two experiments, we found high-confidence errors to control questions were better corrected on the second test compared to low-confidence errors – perceived in doing. However, low-confidence errors to trick questions were just as likely to be pointed out. Most surprisingly, we found that memory for the feedback and original responses, not confidence or surprise, were significant predictors of error correction. We conclude that for some types of material, there is an effortful process of elaboration and problem solving prior to making low-confidence errors that facilitates memory of corrective feedback.

Feedback Supports Children’s Ability to Accurately Self-Regulate Concept Learning
Presenting Author: Mariette van Loon, University of Bern, Switzerland
Co-Author: Claudia Roebens, University of Bern, Switzerland
Elementary school learners are typically highly confident for their incorrect (commission errors) and incomplete (partially correct) test responses, and do not allocate further study time to improve understanding of these items. Therefore, inaccurate self-evaluations are harmful for self-regulation and performance. Feedback has been shown to improve accuracy of adults' and adolescents' self-evaluations and self-regulation, however, little is known about whether feedback has beneficial effects on self-evaluations in elementary school. We investigated effects of fine-grained feedback standards, which showed the ideas that learners should have mentioned in their test response, on self-evaluations and restudy selections. Elementary school children (4th and 6th graders) studied difficult concepts, took an open-ended test, and then self-scored test responses and selected items for restudy first before, and then after receiving feedback standards. Results show that feedback standards strongly improved children's self-evaluations, but only for 4th and 6th graders. However, although children seem to be able to detect incorrect and incomplete responses with use of feedback, these items are most often not restudied. Although feedback improved restudy selections for the commission errors and partially correct responses, it was still unlikely that these would be corrected through future study. Findings imply that feedback standards are suitable for elementary school learners to support accurate self-scoring of their performance. Future research should investigate how children can be supported to more effectively regulate learning for commission errors and items that are only partially learned.

Session I 308
1 September 2017 10:15 - 11:45
Main Building A - A4
Symposium Cognitive Science
Scientific Reasoning: Domain-Specific or Domain General?

Keywords: Argumentation, Cognitive skills, Competencies, Intelligence, Reasoning, Science education
Interest group: SIG 26 - Argumentation, Dialogue and Reasoning
Discussant: Manfred Prenzel, Technische Universität München, Germany

What is the Value of General Knowledge of Scientific Reasoning?

Presenting Author: Clark Chinn, Rutgers University, United States
Co-Author: Goetzel Duscan, GSE-Rutgers University, United States

Many psychologists, educators, and philosophers have argued that reasoning is tightly intertwined with disciplinary knowledge (DuShay & Grandy, 2008). Others have argued that scientific reasoning and argumentation has domain-general as well as domain-specific components (Fischer et al., 2014). In this theoretical analysis, we present arguments that general knowledge of reasoning (even if it exists) lacks value in that it fails to enable people to make causal epistemic judgments about real problems in the absence of domain specific knowledge. Our core argument is that assessments used to assess transfer of reasoning in educational and psychological research almost always short fail of assessment on tasks representative of problem solving in the real world. We discuss five specific dimensions along which even the best assessments differ from real problems. These differences mean that successful application of a learned reasoning strategy on a simpler task will not carry over to a more complex task. Epistemic decision making ‘in the wild’ lacks the friendly constraints (and sometimes even scaffolds) that facilitate successful transfer on assessments used in educational and psychological research. Thus, the value of general knowledge that enables such transfer is limited. It can indeed promote markedly better performance on lower-authenticity tasks requiring moderate knowledge, but this does not necessarily improve such performance on real tasks. However, we argue that general knowledge of reasoning has a different value: It allows learners to come to appreciate why communities that use these reasoning practices can be trusted.

Scientific Reasoning and Argumentation as Cross-Domain Competence

Presenting Author: Frank Fischer, Ludwig Maximilians-Universität (LMU), Germany
Co-Author: Andreas Hatmanek, Technical University of Munich, Germany
Co-Author: Katharina Engelmann, Technical University of Munich, Germany

This paper develops a conceptualization of scientific reasoning and argumentation (SRA) as cross-domain competence. In the first part we advance the theoretical claim that sees SRA as a network of script components on different levels of abstraction that are partly applicable cross-domain. Then, we present evidence from empirical primary studies and meta-analytic research. This provides evidence that cross-domain SRA explains variance in argumentation tasks beyond intelligence and specific content knowledge, can be measured fairly across domains, can be fostered across a variation of content domains, and can be separated from content knowledge. On these theoretical and empirical grounds, we conclude the paper with the sketch of a cyclical process model specifying the interplay of more general and more specific script components in solving particular SRA tasks as well as development of expertise in SRA. So far, empirical research does not cover these phenomena of interplay and development of script components on different levels of abstraction. Future research might fill this gap.

Scientific Reasoning: A product not a process?

Presenting Author: Jonathan Osborne, Stanford University, United States

What we teach about scientific reasoning has been bedeviled by a lack of clarity about the construct. Drawing on the insights emerging from a cognitive history of science, which looks at the products rather than the process of scientific reasoning, we will argue that a conception of scientific reasoning based on six ‘styles of scientific reasoning’ offers better insights into what should be taught about science and scientific reasoning. Each ‘style’ requires its own specific ontological and procedural entities, and invokes its own epistemic values and constructs. Hence, scientific reasoning is domain-dependent. Previous attempts to develop a coherent account of scientific reasoning have neglected the significance of either procedural knowledge, epistemic knowledge or both and overemphasized the role of experiment and hypothetico-deduction focusing on attempts to define the nature of such reasoning itself. In contrast, ‘styles of reasoning’ and its focus on the products of reasoning recognizes the need for all three elements of domain- specific knowledge, the complexity and situated nature of scientific practice, and the variety of scientific thought. Thus, the construct of ‘styles of reasoning’ offers a more coherent conceptual schema for the construct of scientific reasoning – one of the major goals of any education in the sciences – and something which domain-general accounts have notably failed to do.

Primary domain-general v. secondary domain-specific knowledge: Is there a link between the two?

Presenting Author: André Tricolt, University of Toulouse, CLLE, France
Co-Author: Florence Lespiau, CLLE-LTC, University of Toulouse, France
Co-Author: Jean-Francois Bonnfon, Toulouse School of Economics, University of Toulouse, France

Secondary-domain specific knowledge is the kind of knowledge taught at schools. Effort, motivation and time are needed when learning this kind of knowledge. Its acquisition is challenging when compared to domain-general, primary knowledge which is acquired easily, effortlessly and quickly. Our general hypothesis is that primary knowledge could be used as a ‘precursor’ to enhance secondary knowledge learning. We conducted seven experiments to investigate the best way to introduce logical reasoning (conditional rules, syllogisms) to learners in order to enhance their performance and motivation. We varied the type of knowledge for each problem (primary or secondary) and the presentation order (primary or secondary knowledge presented first). Our findings showed that primary knowledge enhanced performance and motivation as well as the confidence in given responses while secondary knowledge undermined motivation and generated a feeling of conflict. Moreover, when primary knowledge was presented first, the deleterious effects of secondary knowledge decreased. The results seemed to suggest that primary knowledge should be taken into account in learning situations and not considered irrelevant as something which has been "already learned".

Session I 309
1 September 2017 10:15 - 11:45
Vita A - 112
Symposium Cognitive Science
Physical fitness, motor skills and academic performance in early and middle childhood

Keywords: Achievement, Cognitive development, Early childhood education, Neuroscience
Interest group: Discussant: Esther Hartman, Netherlands

Motor and Cognitive Skills: Structure and Early Links in Young Mexican Children

Presenting Author: Fabiola Figueuoa Esquivel, University of Groningen, Netherlands
Co-Author: Mayra Mascareño, University of Groningen, Netherlands
Co-Author: Esther Hartman, Center for Human Movement Sciences, University Medical Center Groningen/University of Groningen, Netherlands
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The early childhood education (ECE) years are associated with rapid brain development and represent an important period in the acquisition of motor skills and cognitive skills, such as executive functions (EF) and pre-academic skills (Kostol et al., 2012; Willems et al., 2013). This study aimed to examine the measurement of these constructs throughout the preschool period (ages 3 to 6) on a Mexican sample and to explore their relations in this early stage. Configural invariance was found for the measures of executive functions (inhibitory control and working memory) and academic skills across the three grades of preschool. For motor skills, an exploratory factor analysis revealed a different structure than the one commonly found in standardized tests; after modeling this structure, configural invariance was also achieved. Preliminary results showed positive but marginally significant relations between pre-academic skills and the three domains of motor skills identified: fine motor skills, motor accuracy and dynamic motor skills. Executive functions and academic skills were also moderately and positively related. From the motor domains, only fine motor skills were significantly related to executive functions. These results support the presence of early relations between motor and cognitive domains on Mexican young children. Importantly, a different factorial structure of motor skills was observed in this particular sample. Future analysis will focus on exploring the longitudinal relations between these constructs.

Motor Skills, Executive Functions, and Basic Numerical Skills predict later mathematics achievement

Presenting Author: Venera Gažarić, Institut für Psychologie, Switzerland
Co-Author: Fred Mast, University of Bern, Switzerland
Recent research has shown close links between motor skills, executive functions and mathematical skills. Therefore, this study examined the interrelations between fine motor skills, executive functions, and basic numerical skills in kindergarten as well as their predictive value for mathematics achievement in second grade in a normative sample of 136 children. The results indicate that each of the predictors has a significant value for later mathematics achievement, however, when simultaneously estimated basic numerical skills are the most important predictor when considering the relative predictive power. This are the best predictor suggests that domain-specific factors seem to have a greater impact than domain-general factors.

Motor coordination and executive functions: Relative contributions to early academic achievement
Presenting Author: Claudia Roobers, University of Bern, Switzerland
Co-Author: Nicole Oberer, University of Bern, Switzerland

The idea that motor skills and cognitive development, as indexed for example, through school achievement are closely linked, is not new to the field but goes back to Piaget’s theory assuming a biological base for both, motor and cognitive development. Recent research trying to uncover the underlying mechanisms responsible for this relation relatively consistently support a neuropsychological explanation. According to this, executive functions, a set of higher-order cognitive processes including shifting, updating and inhibition mediate the link between motor coordinative skills and school achievement. It is unclear, however, which of these executive function subcomponents are more important than others. In the to-be-presented large-scale longitudinal study, kindergarteners’ motor coordination and executive functions will be used to predict second grade’s school achievement in terms of both mathematics and reading. Thereby, the specific focus will be laid on the single subcomponents of executive functions (updating, inhibition and switching) and their relative predictive power for predicting children’s academic achievement, over and above motor skills. Results of the conducted path analyses suggest that as expected – motor skills significantly contribute to the prediction of early school achievement. More precisely, motor skills were found to be more important for mathematics than for reading. And, of the three executive function subcomponents, updating was found to be the most important aspect for the prediction of academic performance. This pattern generalized to both, mathematics and reading. Findings will be discussed in terms of the underlying mechanisms and their relevance for tailoring early education programs.

Sedentary time and academic achievement in schoolchildren
Presenting Author: Luis Lopes, Research Centre in Physical Activity, Health and Leisure (CAFEEL), Faculty of Sport, University of Porto, Portugal

This study aimed to examine the relationship between objectively measured sedentary time and direct and objective indicators academic achievement (AA) in Portuguese children aged 9 and 10 years, accounting for accelerometer wear time, age, gender, body mass index, socio-economic status, mother education level, cardiorespiratory fitness, moderate-to-vigorous physical activity and motor competence. The sample comprised of 213 children's (51.6% girls) aged 9.46±0.43 years, from the north of Portugal. Sedentary time measured with accelerometer and AA was assessed using the Portuguese Language and Mathematics National Exams results. Multilevel Linear Regression models were fitted to assess regression coefficients predicting AA. Results showed that objectively measured total sedentary time was not associated with AA, after adjusting for potential confounders. Although, motor competence was significantly associated with AA.

Session L 310
1 September 2017 10:15 - 11:45
Main Building E - E222
Symposium

Scientific Reasoning from Childhood to University: New Assessment Approaches for New Insights
Keywords: Argumentation, Assessment methods and tools, Cognitive development, Cognitive skills, Conceptual change, Quantitative methods, Reasoning, Science education

Interest group: Discussants: James Pellegrino, University of Illinois at Chicago, United States

Misconceptions of observation about experiment in primary school children
Presenting Author: Sonja Peteranderl, ETH Zurich - Research on Learning and Instruction, Switzerland
Co-Author: Anne-Diegmyr, Swiss Federal Institute of Technology, Zurich, Switzerland
Co-Author: Elisabeth Stern, ETH Zurich - Research on Learning and Instruction, Switzerland
Co-Author: Raphael Edelbrunner, ETH Zurich, Switzerland
Co-Author: Ralph Schumacher, ETH Zurich, Switzerland

A core component of scientific reasoning is the ability to design conclusive, un-contaminated experiments, and to interpret and evaluate the obtained data, summarized as experimentation skills. This research focuses on the assessment of misconceptions about experimentation in primary school students. Our focus is on the "control of variables" strategy (CVS), a core skill in planning, conducting, and evaluating scientific experiments for testing causal hypotheses. A paper-based test for children in primary school (5th and 6th grade) was developed to assess students’ understanding of CVS, and particularly their misconceptions as represented in incorrect experimentation strategies. Our assessment of N = 180 students (M age = 12 years, SD = 0.5) during an experimentation skills training shows that the different types of test items are reliable. The results from the assessment provide detailed information about development in students’ misconceptions from before to after the training. For example, we find that while the number of students who incorrectly vary no or all variables decreases after the training, the number of students who vary the wrong variable slightly increases. Our results inform about students’ learning during an experimentation skills training and we discuss implications for training design in order to support students’ overcoming of misconceptions about experimentation. The study indicates that going into detailed discussions offers valuable information about students’ learning about experimentation.

The development of domain-general reasoning skills and their dependency on domain-specific knowledge
Presenting Author: Martin Schwilchow, PH Freiburg, Germany

The control of variables strategy (CVS) incorporates the important domain-general scientific reasoning skills of designing and interpreting controlled experiments. Therefore, CVS is a prominent concept in numerous science standards. It consists of the four sub-skills: understanding the indeterminacy of uncontrolled experiments, (b) planning, (c) identifying, and (d) interpreting controlled experiments. However, studies on the development of CVS skills are restricted to one or two CVS sub-skills and content from everyday life. This intends that CVS is a domain-specific reasoning strategy but ignores that students' reasoning skills depend on the content of the reasoning tasks. The cross-sectional study with N = 1013 German high school students investigates the development of the whole CVS construct from 5th to 10th grade (ages 9 to 16). We focus on its dependency on domain-specific content knowledge. The raw data from a CVS and a physics knowledge online test were transformed into person ability measures by utilizing the Rasch model before they were analyzed by structure-equation modeling (SEM). Results of the SEM show that students’ CVS skills depend on their domain-specific knowledge about the content of the experiments but not on their grade, as there is only a direct effect of grade on physics knowledge. This is surprising, as no CVS item requires any physics knowledge. An explanation for this finding is that the development of domain-general scientific reasoning skills and domain-specific knowledge “bootstraps” one another. Implications of this finding for science teaching are discussed.

Argumentation about the Control of Variables-Strategy: A large-scale Study in Primary School
Presenting Author: Peter Edelbrunner, ETH Zurich, Switzerland
Co-Author: Anne-Diegmyr, Swiss Federal Institute of Technology, Zurich, Switzerland

The development and training of the control of variables (CVS) strategy have been examined using qualitative assessments, often interview-based, and using quantitative assessments, mostly multiple-choice-based. We aimed at the alignment of the strategies by both approaches. The results of the whole large-scale cross-sectional basis primary school students’ argumentative understanding of CVS. An=2018 first to sixth grade students (mean age=6.11, SD=±1.48) received five multiple-choice questions and also five open questions in which they had to provide short written explanations for their judgments of the quality of experimental designs. Applying Rasch analysis to students’ multiple-choice answers and on their coded open answers, we found three answer patterns. The frequency of a class in which students were not able to answer any questions correctly decreased across grades (grade 1: 87% of students, grade 6: 17%). The frequency of students able to answer the multiple-choice-items correctly but not the open items increased slightly across grades (grade 1: 12%, grade 6: 25%). The frequency of students who could answer all questions correctly increased strongly, from 1% in the first grade to 58% in the sixth grade. These results provide a cross-sectional overview, showing that in sixth grade more than half of students possess understanding of the principles underlying control-of-variables strategy and also the ability to express their understanding in short written explanations. The results also show that multiple-choice assessments do not differentiate between the more understanding and explicit proficiencies in CVS, which represents an imperative skill in collaborative inquiry.

How to know whether two variables are related? Modelling reasoners’ strategies in data interpretation
Presenting Author: Christopher Osterha, University of Munich, Germany
Co-Author: Jackie Magee, University of Wisconsin-Madison, United States
Co-Author: Martha Alibali, University of Wisconsin-Madison, United States
Co-Author: Andrea Saffran, LMU Munich, Germany
Co-Author: Beate Sodian, Ludwig Maximilians-Universität (LMU), Germany

People often have difficulty interpreting data presented in contingency tables. A study involving 199 college students investigated which strategies people use when making judgments about this type of data. To describe reasoners’ strategies, we used two distinct approaches, the analysis of self-report and a latent class approach. The latent class analysis revealed three distinct strategies: (1) compute conditional probabilities (40%); (2) compare two cells (23%); and (3) anchor and compare (37%), which is a suboptimal, heuristic four-cell strategy in which reasoners try to hold constant two cells and they base their final judgment on the other two cells. The analysis of self-report revealed, in accordance with the results of the latent class analysis, a large heterogeneity in the self-reported strategies. Whereas 35% and 11% of all participants respectively reported the conditional probabilities or the two-cell strategy, respectively, the majority of reasoners (54%) either used none of the strategies in a consistent manner or they reported the use of alternative strategies. Interestingly, the results of the latent class approach and the analysis of self-report did not converge: Participants who consistently reported the use of the conditional probabilities strategy accounted on average, only 54% of the items correctly, and the latent class analysis classified merely a third of them as users of this most adequate strategy, which should result in perfect performance. We discuss these findings with respect to differences between strategy report and strategy use, and we suggest several factors that may bring about the differences between these two aspects of performance.

Session L 311
1 September 2017 10:15 - 11:45
Pinni B - B1036
Symposium
Instructional Design, Learning and Social Interaction, Teaching and Teacher Education

Critical Thinking in Higher Education: A Closer Look at Teachers and Students
Keywords: Attitudes and beliefs, Citizenship education, higher education, Instructional design, Metacognition, Peer interaction, Reasoning, Reflective society, Science education, Teaching / instruction
Organisers: Keynote and Task Group 08 - Instructional Design, SIG 11 - Teaching and Teacher Education, SIG 28 - Argumentation, Dialogue and Reasoning
Organiser: Lara van Peppen, Erasmus University Rotterdam, Netherlands
Organiser: Eva Janssen, Utrecht University, Netherlands
Discussant: Jan Elen, KU LEUVEN, Belgium

Effects of Self-explaining on Learning and Transfer of Critical Thinking Skills
Presenting Author: Lara van Peppen, Erasmus University Rotterdam, Netherlands
Co-Author: Peter Verkooran, Erasmus University Rotterdam, Netherlands
Co-Author: Anita Hieltjes, Avans Hogeschool, University of Applied Sciences, Netherlands
Co-Author: Denise Koopmans, Utrecht University, Netherlands
Co-Author: Tamara Van Gog, Utrecht University, Netherlands

Fostering students' critical thinking (CT) skills is an important objective of higher education. However, little is known about effective teaching methods, especially regarding one important aspect of CT: avoiding biased reasoning. Recent research on learning to avoid reasoning biases has shown that explicit instructions combined with practice are effective for learning but not for transfer. Because self-explaining (i.e., explaining one's reasoning process) during practice has proven promising for promoting transfer in other tasks, we investigate whether it also fosters learning and transfer on 'heuristics and biases'. Savvy-nine first year students of a Dutch University of Applied Sciences completed a pretest with eight 'heuristics and biases' reasoning tasks across four categories (base-rate, conjunction, Wason selection, and syllogistic reasoning tasks). After the pretest they instructed participants on two of the four task categories (base-rate and Wason and conjunction and syllogism), this was counterbalanced between participants. They then presented the tasks either with (self-explaining condition) or without (no self-explaining condition) self-explanation prompts that asked them to motivate their answers. This was followed by an immediate and delayed (two weeks later) posttest on all four task categories, to measure effects on learning (performance on practiced tasks) and transfer (performance on non-practiced tasks).

Results showed that instruction and practice had a positive effect on learning and transfer as measured by multiple-choice performance (i.e. pretest to posttest increase). Surprisingly, self-explaining had a negative effect on learning tasks (but not on transfer tasks) on the posttest considering the full (i.e., motivated) answers.

Personal or Social Responsibility? Challenging Social Ideas as a Component of Critical Thinking
Presenting Author: Maria Pilar Jimenez-Aleixandre, Universidade de Santiago de Compostela, Spain
Co-Author: Blanca Puig, University of Santiago de Compostela, Spain
Co-Author: Pablo Brocos, University of Santiago de Compostela, Spain

There is consensus in acknowledging critical thinking (CT) as an important goal in education, but there are different views about its meaning, components, and how to promote it. Authors (2012) proposed a characterization of the components of CT, including: 1) the use of epistemic criteria in evidence evaluation; 2) the disposition to seek reasons and to evaluate the reliability of sources; 3) the capacity to develop independent opinions and to challenge socially established ideas; and 4) the capacity to analyze and criticize discourses that justify inequalities and asymmetries, being these last two components related to critical theory. This paper focuses on component 3: the capacity to develop independent opinions, and in particular to challenge social or peers ideas. The research objective is to examine their own perception of personal responsibility and its relation with their capacity to make independent decisions on a socio-scientific issue by pre-service teachers (N=85). First we discuss this component in connection with Facio’s (1999) conceptual definition of CT as purposeful, self-regulatory judgment, and with the skills identified in that panel, in particular evaluation. Studies documenting the need for peer group approval, especially in adolescence, and the difficulties experienced for challenging or overcoming socially established ideas, are revised. Second, we analyse participants' written and oral arguments about sustainable and new economic model (a hybrid model versus meat), in terms of the self-reported social influence in their opinions and decisions. The results point to a substantial weight of socially established ideas and to a shifting of responsibility about sustainability onto society.

Critical Thinking in Medical Diagnosis: Structured Reflection Remedies Error and Fosters Learning
Presenting Author: Tamara Van Gog, Utrecht University, Netherlands
Co-Author: Joseph Kuhn, Erasmus MC, Netherlands
Co-Author: Sylvia Marredo, Erasmus MC, Netherlands
Co-Author: Peter van den Berg, Erasmus MC, Netherlands

The first part of this talk consists of a review of the effects of structured reflection on medical diagnosis. We will highlight some key empirical studies that have shown that structured reflection is not only an effective tool for remedying diagnostic error in physicians, but also for fostering diagnostic competence in medical students. An open question, however, is whether students or residents cannot only learn more about diagnosis by improving their own diagnostic reflection, but can also learn the method itself and apply it in diagnosing future, unrelated cases. We are currently conducting an empirical study that addresses this question, which will be presented in the second part of the talk. In this experiment, 120 general practice residents are randomly assigned to one of three conditions in the learning phase: (1) no reflection (control); (2) engaging in structured reflection; (3) studying modeling examples of structured reflection. It is hypothesized that studying examples will require less mental effort during the learning phase, and will foster diagnostic (less errors) and reflective competence compared to the other conditions, and that engaging in structured reflection will be more effective than not doing so (i.e. control), structured reflection < modeled structured reflection). The results of this study will contribute to the development of guidelines for fostering critical thinking in medical education, which may be applicable in other professional domains as well.

Teachers' Critical Thinking Skills, Dispositions, and Attitudes towards Teaching in Higher Education
Presenting Author: Eva Janssen, Utrecht University, Netherlands
Co-Author: Tim Mainhard, Utrecht University, Netherlands
Co-Author: Anita Hieltjes, Avans Hogeschool, University of Applied Sciences, Netherlands
Co-Author: Lara van Peppen, Erasmus University Rotterdam, Netherlands
Co-Author: Wiete Meulendijks, Utrecht University, Netherlands
Co-Author: Tamara Van Gog, Utrecht University, Netherlands

Fostering students' critical thinking (CT) skills is one of the major ambitions of higher education. Not only because CT-skills positively relate to learning outcomes, but also because a lack of CT-skills is required in many areas of daily life and in highly complex professional domains. Effective CT instruction places great demands on teachers educating it. They need to possess CT-skills themselves and also feel confident teaching CT. Aim of the present study was to gain more insight into the relationships between teachers CT-skills, dispositions, and attitudes towards teaching CT (i.e., perceived importance and own perceived competence). A total of 242 higher education teachers completed an online questionnaire, which addressed these variables. Teachers were classed into two groups based on their willingness and ability to explore, change, and reflect on their skills, dispositions, and attitudes. Results indicated that teachers, who felt more open to explore and change their skills, dispositions, and attitudes, were more willing and able to reflect on their teaching skills in the technology domain performed best on the CT-task, followed by teachers in the domain of economics, and teachers in the domain of health, respectively. Teachers' CT-dispositions partly predicted performance on the CT-task. The results did not reveal an interaction between domain teaching, dispositions, and performance on the CT-task. Teachers attitudes toward teaching CT did not differ across teaching domains, but were positively related to their CT dispositions. The implications of this findings and directions for future research will be discussed.

Session L 312
1 September 2017 10:15 - 11:45
Lirna - Värdin Lirna (K104)
Symposium
Instructional Design
Effects of explicit and implicit guidance on external and self-regulation through conflict awareness
Keywords: Argumentation, Collaborative Learning, Computer-supported collaborative learning, Instructional design, Knowledge creation, Reflection, Self-regulation, Student learning, Video analysis
Interest group: SIG 06 - Instructional Design
Organiser: Ondrej Tratovskii, Saarland University, Germany
Organiser: Daniel Bodemer, University of Duisburg-Essen, Germany
Organiser: Melanie Erken, University of Duisburg-Essen, Germany
Organiser: Sven Heimbuch, University of Duisburg-Essen, Germany
Organiser: Thomas Puhl, Saarland University, Germany
Organiser: Caroline Zech, University of Duisburg-Essen, Germany
Organiser: Armir Weinberger, Saarland University, Germany
Discussant: Christa Arterhan, Hebrew University of Jerusalem, Israel

Implicit guidance by fostering conflict awareness in collaborative learning scenarios
Presenting Author: Lenka Schnaubert, University of Duisburg-Essen, Germany
Co-Author: Melanie Erken, University of Duisburg-Essen, Germany
Co-Author: Sven Heimbuch, University of Duisburg-Essen, Germany
Co-Author: Daniel Bodemer, University of Duisburg-Essen, Germany

Implicit guidance within collaborative learning provides information on conditions of learning learners may utilise and thus heavily builds on individual skills. It does not explicitly specify activities appropriate under given circumstances. One important reason of learning within collaborative settings is the individual awareness of inter- or intra-personal conflicts. To investigate how group awareness information fosters conflict-related regulation processes, we conducted a series of experiments in different contexts. In a four-group randomised experiment (N = 130 dyads) we visualised intra- and interpersonal conflict information and found that dyads relied on the visualised information when deciding what material needed further attention. However, we did not find effects on learning outcomes. Another two-group randomised experiment (N = 54) in which we extracted knowledge from text further revealed that the support of it in which conflicts influence communication behaviour and increases knowledge. In another three-group randomised experiment (N = 81) we investigated how observed controversy awareness visualisations on discussions heavily influenced selection behaviour, reading intensity and contribution behaviour. Although we did not find direct effects on the learning outcome, we found positive influences on the contribution quality. In conclusion, implicit guidance through visualisations seems to support various forms of inter- and intra-personal conflict awareness. However, effects on learning outcomes vary. While implicit guidance seems to support learners in identifying a need for action, more explicit forms of guidance might be needed to support appropriate handling of conflicts for learners without sufficient self-regulatory skills.

Promoting Socially Shared Regulation in collaboration: Implicit guidance of strategic planning
Presenting Author: Rebecca Edwards, University of Victoria, Canada
Co-Author: Manel Miller, University of Victoria, Canada
Shared planning is a critical, but challenging, aspect of successfully regulating collaboration. Although explicit guidance can support planning, effects may not extend to performance. As such, this study examined the effect of different types of implicit guidance on groups’ shared planning for a collaborative task. By providing groups with visualizations of their members’ individual plans, we aimed to help groups become aware of differences and interact more meaningfully with planning scripts. Groups were assigned to one of three implicit guidance conditions (numeric, non-numeric, or no-visualization). The effect of condition was examined for (a) accuracy of shared task perceptions, (b) discussion quality, and (c) collaborative task performance. Results indicated groups provided with non-numeric visualizations engaged in more transactional planning discussion and constructed more accurate shared task perceptions than groups provided with numeric or no visualization. Group performance did not significantly differ across condition. Implications for guidance of regulation is discussed.

Applying a macro-script to enhance teacher education students’ collaborative knowledge construction

Presenting Authors: Essi Vuopala, University of Oulu, Finland
Co-Author: Pia Niski, University of Oulu, Finland
Co-Author: Jaana Isotalo, University of Oulu, Finland
Co-Author: Sanna Järvelä, University of Oulu, Finland

Training teacher education students’ collaborative learning skills, including productive participation in collaborative knowledge construction, is to prepare them to the 21st century. One way to promote effective collaborative knowledge construction is the use of macro-script that explicitly guide learners during their learning processes. Although much is known about the effects of scripts in collaboration, there is a lack of research conducted in authentic learning contexts within an extended period of time, especially using video-observation and process-oriented methods. This study investigates, based on video observations (25 hours), how teacher education students (N = 20) use a macro-script, which supports strategic collaborative learning, and how they collaboratively construct knowledge by contrasting cases in which groups used the script actively or passively. The results show that there was a significant difference between the groups in macro-script use, pointing out that collaborative knowledge construction processes varied between the groups who used the script actively or passively.

Effects of Fading Out Collaboration Scripts on Argumentation and Learning Outcomes in Facebook

Presenting Author: Thomas Puhl, Saarland University, Germany
Co-Author: Essi Vuopala, University of Oulu, Finland
Co-Author: Tarja Rîtta Hurme, University of Turku, Finland
Co-Author: Armin Weinberger, Saarland University, Germany

Social Media like Facebook have been used in blended learning concepts for argumentation and may provide an opportunity to facilitate argumentative processes in computer-supported collaborative learning (CSCIL) scenarios. Collaboration scripts can be implemented in social networking sites, to provide additional information that explicitly guide learners to formulate sound arguments, spot conflicts, review and co-construct arguments. In the field of scripting, there is not much evidence on how fading scripts influence processes of argumentative knowledge construction over time, which has been considered an indication of reflection processes and script internalization. Therefore, this field study (N = 39) aims to collect evidence about supporting argumentation processes through collaboration scripts by changing the degree of explicit guidance. In a within design, we first compared a script with predefined roles to manage processes, induce and resolve conflicts. Additional sentence openings intended to make the guidance more explicit. This combination of instructional elements was compared with a subsequent roles-only script, and finally with no script support at all. We found effects for explicit guidance on processes of argumentative knowledge construction, but not on domain-specific knowledge outcomes. We show and discuss how explicit guidance fosters productive argumentation practices and how fading out guidance reduces quality of arguments.

Session I 313
1 September 2017 10:15 - 11:45
Virta - 113
Symposium
Learning and Social Interaction
Analysing productive classroom and professional dialogues across contexts using different tools

Keywords: Argumentation, Assessment methods and tools, Collaborative Learning, Conversation / Discourse analysis, Pre-service teacher education, Primary education, Social interaction, Teacher Professional Development, Video analysis

Instructor: STYou, Dialogue and Reasoning
Discussant: Alina Reznitskaya, Montclair State University, United States

The development of a coding scheme to analyse collaborative group argumentation

Presenting Author: Paula Fraire, Universidad Alberto Hurtado, Chile
Co-Author: Patricia Lopez, Universidad Alberto Hurtado, Chile
Co-Author: Valeria Girau, Pontificia Universidad Catolica de Chile, Chile

There are good theoretical reasons to think that arguing with peers facilitates learning: first, the activity of supporting and opposing ideas should foster knowledge construction, promoting the social negotiation and revision of ideas. Second, counter-argumentation, and the critical evaluation of ideas, involve meta-cognition and should promote meta-cognitive processes. However, although there is some experimental evidence supporting the relationship between peer-group argumentation and disciplinary learning, more causal evidence is needed. The problem is that empirical research does not necessarily converge in how argumentative language is conceptualised, or indeed how it is analysed. This paper sets out to present the development and evaluation of a coding scheme for analysing peer-group argumentation. Following the triadic unit of Leitao (2000), we develop a coding scheme for identifying students’ and teachers’ utterances. We reached inter-judge agreement for all codes except one (which wadopped). Eight teachers and fourth-grade classrooms (aged 9–10 years) and 187 students participated in the study. Four teachers were invited to teach a thematic unit (forces and movement), with lesson plans especially developed to foster argumentation in the classroom (intervention group). All the teachers were evaluated individually once before and twice after the lessons (immediate and differed post-evaluations) on disciplinary learning. Three lessons and small group work activity were videotaped and analysed. The results show that peer-group argumentative interactions predicted delayed learning gains.

Coding productive dialogue in whole-class primary school settings in the UK

Presenting Author: Maria Vikki, University of Cambridge, United Kingdom
Co-Author: Christine How, University of Cambridge, United Kingdom
Co-Author: Neil Mercier, University of Cambridge, United Kingdom
Co-Author: Sara Hennessy, University of Cambridge, United Kingdom
Co-Author: Lisa Wheately, University of Cambridge, United Kingdom

The present paper discusses our strategy for identifying and coding optimal forms of classroom dialogue. This work builds on the extensive research conducted over the past few decades, suggesting that certain forms of dialogue are optimal for student learning (Howe & Abbedin, 2013). Such forms include interaction that stimulates thinking, building on ideas and justifying opinions. This work is part of a two-year large-scale project taking place in England and involving 75 primary school teachers in Year 6 classes. Each teacher had three lessons from mathematics, literacy or science video recorded. Transcripts of lessons have been evaluated in two ways: 1) systematic coding for the presence of ‘dialogic moves’ at the turn level using an adapted version of the Cam-UNAM Scheme for Educational Dialogue Analysis (Hennessy, Rojas-Diarmuid et al., 2016); and 2) ratings of student participation in sequences of acts across each lesson. Combinations of these measures were considered as indices of dialogically and were used to rank teachers across a ‘dialogic spectrum of low, medium and high dialogically’. Independent evaluations of this categorization from experts in the field are discussed in relation to the validity of our coding strategy. In addition, inter-coder agreement analyses are considered. Implications of our work are discussed in relation to the methodological contribution in the field, as well as teacher professional development that could use our indices of dialogically to foster optimal forms of dialogue.

Productive teacher discourse in school-based team meetings: toward a systematic coding system

Presenting Author: Miriam Babichenko, Hebrew University of Jerusalem, Israel
Co-Author: Chris Asierian, Hebrew University of Jerusalem, Israel
Co-Author: Mirit Israeli, Ben Gurion University of the Negev, Israel
Co-Author: Adam Lettsen, Ben Gurion University of the Negev, Israel

There is increasing interest in teacher dialogue about practice and its role in professional development. Most of this research consists of in-depth, qualitative analyses of select cases that have been collected at-off campus and disciplinary-specific professional development initiatives. In the present contribution, we report on our efforts to develop a systematic coding scheme to capture at scale features of productive dialogue in in-school team meetings. Based on an extensive literature review we define productive teacher dialogue as: (a) rich in inquiry oriented pedagogical reasoning, (b) interactive, and (c) for learning. The data collection and coding procedures were carried out by trained research assistants. The coding scheme was developed in an iterative process based on teacher team meeting protocols from a variety of settings, all collected in a district-wide, large-scale intervention project in Israel. The coding scheme will form the basis for ongoing and future descriptive research (what does dialogue in teacher team meetings look like?) and comparative research (what are the conditions for productive dialogue?).

Coding feedback in an online- and video- based learning environment during a field experience

Presenting Author: Susi Klaft, Friedrich Schiller University of Jena Institute of Educational Science, Germany
Co-Author: Marc Kleinreick, Leuphana University of Luebeck, Germany
Co-Author: Alexander Grosschner, Friedrich Schiller University of Jena, Germany

Feedback is a crucial aspect for effective teacher-student interactions and productive classroom dialogue. To enable teachers in giving feedback, it is relevant that teachers have practical experiences and
feedback competence, for example by addressing different levels of feedback (i.e., process-orientation, self-regulation). Therefore, it is important to address how to learn about the nature of feedback in pre-service teacher education. Recently, online-based approaches have been developed to promote video-feedback. Previous video research emphasizes on the analysis-level of observations. In this study, we investigate the coding of pre-service teachers' feedback comments in a newly developed online- and video-based learning environment. Fifty-eight pre-service teachers participated in the study during a five-month field experience. Each one of them video-recorded one of their own lessons. In the online-based tool, the teachers provided a 8 minute video excerpt and commented on their own and others’ teaching. In total 232 feedback comments were provided and coded by two independent raters with regard to the task-, process-, self-regulated and self-level (ICD -> 70). Furthermore, we coded the level of analysis in the feedbacks (describing, explaining, predicting). The findings show that most of the comments addressed the self-regulated level. Only a few comments addressed the task level of feedback during teacher-student interactions. From a qualitative aspect, most of the codings were describing. Only a few comments linked the level of describing with pre-service teachers’ knowledge (explaining) about feedback. In the presentation we will provide coding examples and discuss methodological issues as well as implications for future research.

Session L 314  
1  September 2017 10:15 - 11:45  
Pinni B - B3109  
Symposium  
The role of executive functions in academic learning  
Keywords: Achievement, Cognitive skills, Comprehension of text and graphics, Developmental processes, Educational Psychology, Mathematics, Misconceptions, Neuroscience, Numeracy, Reading comprehension, Reasoning, Science education, Teaching approaches  
Interest group: SIG 22 - Neuroscience and Education  
Discussant: Patrice Potvin, Université du Québec à Montréal, Canada  
Executive function in conceptual change involved in the learning of science and mathematics concepts  
Presenting Author: Stella Vronou, National and Kapodistrian University of Athens, Greece  
Co-Author: Dimitris Pnevmatikos, University of Western Macedonia, Greece  
Co-Author: Nikos Makris, Democritus University of Thrace, Greece  
In a series of studies we investigated the role of Executive Function (EF) in the construction and employment of science and mathematics concepts in primary and secondary school students. Executive Function was measured using two computer based, reaction time, Stroop-like Inhibition and Shifting tasks. Conceptual change was measured using two specially designed computer-based reaction time Science and Mathematics Conceptual Understanding and Conceptual Change (CuBUC) tasks. Significant correlations between performance in the EF and CuBUC tasks were obtained. Regression analyses showed that the participants’ scores in the EF tasks predicted their performance in the CuBUC tasks, even after controlling for age and intellectual ability, both when using accuracy and reaction time as dependent measures. It is argued that EF play a crucial role in the conceptual understanding and conceptual change processes involved in the learning of science and mathematics.  
Direct and indirect influences of executive functions on mathematics achievement  
Presenting Author: Camilla Gilmore, Loughborough University, United Kingdom  
Co-Author: Lucy Cragg, University of Nottingham, United Kingdom  
Achievement in mathematics is predicted by an individual’s domain-specific factual knowledge, procedural skill and conceptual understanding, as well as domain general executive function skills. In this study we investigated the extent to which executive function skills contribute to these three components of mathematical knowledge, whether this mediates the relationship between executive functions and overall mathematics achievement, and if these relationships change with age. Two hundred and ninety three participants aged between 8 and 25 years completed a battery of mathematics and executive function tests. Domain-specific skills partially mediated the relationship between executive functions and mathematics achievement: Inhibitory control within the numerical domain was associated with factual knowledge and procedural skill, which in turn was associated with mathematical achievement. Working memory contributed to mathematics achievement indirectly through factual knowledge, procedural skill and, to a lesser extent, conceptual understanding. There remained a substantial direct pathway between working memory and mathematics achievement however, which may reflect the role of working memory in identifying and constructing problem representations. These relationships were remarkably stable from 8 years through to young adulthood. Our findings help to refine existing multi-component frameworks of mathematics and understand the mechanisms by which executive functions support mathematics achievement  
Is Inhibition Involved in Conceptual Change Learning from Refutation Text?  
Presenting Author: Lucia Mason, University of Padova, Italy  
Co-Author: Barbara Carrelli, University of Padova, Italy  
Co-Author: Irene-Anna Diakiody, University of Cyprus, Cyprus  
Co-Author: Sara Sorinni, University of Padova, Italy  
Conceptual change is usually conceived as the revision of alternative or intuitive conceptions about a phenomenon. However, recent research has also documented that after conceptual change has occurred, misconceptions are not replaced and continue to influence problem solving and reasoning, thus they need to be inhibited. This study examined the role of the executive function of inhibition and test type for reading-induced conceptual change learning about energy. Inhibition implies the ability to block prepotent inappropriate responses automatically activated by a stimulus. Eighty-one fourth and fifth graders were randomly assigned to the condition of standard test, or the condition of refutation text in a pre-test, post-test, and delayed post-test design. Findings revealed that students progressed from pre to post-test and maintained the gained knowledge at delayed post-test regardless of test read. Inhibition, as measured by reaction times, uniquely predicted conceptual change learning at delayed post-test over and above reading comprehension, prior knowledge, and short-term conceptual learning. However, the magnitude of the association between inhibition and conceptual change learning was only significant for refutation text readers. The study indicates that the latter are more likely to activate inhibitory control which reduces or eliminates the misconception interference.  
Interventions based on different aspects of executive functions improve problem solving performance  
Presenting Author: Reuven Babai, Tel Aviv University, Israel  
Co-Author: Ruth Shary, Tel Aviv University, Israel  
Co-Author: Eran Shalev, Tel Aviv University, Israel  
Students encounter difficulties when solving problems in science and mathematics such as when solving incongruent problems of the well documented comparison of perimeters task. Many students believe that shapes with a larger area must have a larger perimeter. Findings consistently show that for incongruent problems students’ accuracy of responses is lower and reaction time is longer than for congruent problems. The present study addressed these difficulties by applying two interventions each aimed at developing a different aspect of executive functions, namely 1) inhibitory control mechanisms and 2) use of appropriate solution strategies.  
126 sixth graders were randomly divided into three groups: warning, strategy, and control groups. In the warning group, students’ inhibitory control mechanisms were activated by providing an explicit warning regarding the task. In the strategy group an appropriate decision-making solution strategy how to solve the task was demonstrated to the students. The results indicated that both types of interventions improved students’ performance. The explicit warning appeared to activate inhibitory control mechanisms and thus helped to improve students’ performance. The strategy intervention suggested a logical and systematic way to compare the perimeters and thus improved students’ performance. It should be noted that, although both interventions significantly improved students’ accuracy for incongruent problems, the congruity effect was still significant in both.  
The study suggests that both aspects of executive functions are important for problem solving in science and mathematics. The findings also point to the possibility of improving students’ problem-solving abilities by simple interventions as was done here.

Session L 315  
1  September 2017 10:15 - 11:45  
Pinni B - B3117  
Symposium  
Teachers’ reflection as a collaborative process  
Keywords: Case studies, Collaborative Learning, Computer-supported collaborative learning, Design based research, In-service teacher education, Pre-service teacher education, Qualitative methods, Reflection, Teacher Professional Development, Teaching / instruction  
Interest group: SIG 11 - Teaching and Teacher Education  
Discussant: Patrick Chanter, University of Southern Queensland, Australia, Australia  
Reflection as socially primary: A Vygotskian perspective  
Presenting Author: Alfredo Jornet Gil, University of Oslo, Norway  
Learning and instruction researchers have become increasingly aware of the value of considering the social aspects as being central, and not just peripheral, to thinking and learning. Yet, recent reviews show that most of the existing research on reflection—a thinking competence central to learning—continues to take the individual thinker (whether thinking alone or in groups) as the minimal unit of analysis. How does a conceptualization of reflection as something that exists as social relation differ from a conceptualization of reflection as something that goes on within the individual mind?And what would we gain, as theorists and as educators, from such a conceptualization? In this paper I address these questions by articulating an analytical position that builds upon L. S. Vygotsky, for whom any higher psychological function, before becoming a function, it was the social relation between two people. I ground the premises and implications of this position using empirical materials from a participatory ethnography at an arts-based school in which teachers engage in joint reflective sessions. In the analyses I show how, through the reflective sessions and everyday praxis, the school members’ (reflective) awareness of their own praxis manifests first in and as social situations, and only latter as individual realizations. Changes in teaching/learning practice emerge as the result of a reflective practice that cannot be reduced to any of the individual members.  
Supporting a dyadic process of reflection on literacy experiences: A framework for teacher educators  
Presenting Author: Andrea Gesnuso, University of Central Florida, United States
Reflection is a widely used pedagogy in teacher education. Although there is consensus that reflection is important for preservice teacher learning, the large corpus of empirical literature on reflection seems not to agree on what reflection is or how to support preservice teachers as they engage in a dyadic reflection process with a teacher educator. This study examined the moves made by a teacher educator as she facilitated 15 dyadic reflection processes with 15 preservice teachers. The findings describe those moves and how they helped the preservice teachers to create ‘warranted asserities’ about literacy teaching and learning. A framework for facilitating a dyadic reflection process is offered.

How collaboration improves preservice teachers’ reflection: A case study

Presenting Author: Teresa Mauri, University of Barcelona, Spain
Co-Author: Merc Clàr, University of Barcelona, Spain
Co-Author: Rosa Colmenà, Universidad de Barcelona, Spain
Co-Author: Javier Orihuela, Faculty of Psychology, Spain
Co-Author: Agurzane Martinez, University of Minao-Gàron, Spain
Co-Author: Rosario Cubero, University of Seville, Spain

Although research has found that, in general, collaboration improves preservice teachers’ reflection, it has been also found that this effect largely depends on how collaboration is undertaken. However, the aspects of collaboration that promote the improvement of reflection are currently unclear. This paper explores this issue by means of a case study of collaborative reflection involving 14 preservice teachers and one teacher educator during five weekly sessions. We analyze the improvement of preservice teachers’ reflection, the identification of collaborative reflection, and the specific contingent interventions by the teacher educator. We find a change in the orientation of preservice teachers’ reflection, from looking for solutions to looking for explanation. This change seems to be related to a four-phase pattern of collaborative reflection, more diathetical in the initial phases and more monolithic in the last ones, and to specific contingent interventions by the teacher educator, more focused on promoting an orientation towards explanation in the first two sessions, and on fostering the improvement of the explanations provided by the preservice teachers in the last three sessions.

Design principles that support collaborative reflection in online groups of teachers

Presenting Author: Nick Farley, The Open University, UK
Co-Author: Kari Landeri, University of Graz, Austria
Co-Author: Sönja Ugen, University of Luxembourg, Austria

Solving arithmetic problems in first and second language

Presenting Author: Amandine Van Rinsvelt, University of Luxembourg, Faculty of Language and Literature, Humanities, Arts and Educational Sciences (FLIAHSE), Luxembourg
Co-Author: Christine Schiltz, Université du Luxembourg, Luxembourg
Co-Author: Kari Landeri, University of Graz, Austria
Co-Author: Sönja Ugen, University of Luxembourg, Austria

Solving arithmetic problems in a task that heavily relies on language processing. One might thus wonder whether this language-reliance leads to qualitative differences (e.g., greater difficulties, error types, etc.) in arithmetic for bilingual individuals who frequently have to solve arithmetic problems in more than one language. The present set of studies investigated how proficiency in two languages interacts with arithmetic problem solving throughout language acquisition in adolescents and young adults. Additionally, we examined whether the number word structure that is specific to a given language plays a role in number processing in two languages. We obtained results into the role of the language context in arithmetic problem solving. We addressed these issues in a German–French educational bilingual setting, where there is a progressive transition from German to French as teaching language. The results suggest that language proficiency is crucial for the computation of complex arithmetic tasks, while simple additions can be retrieved equally well in both languages. Furthermore, additional error analyses showed more errors on the decade or on the unit digit depending on the language of the task. However, providing a language context seems to enhance performances only in the non-dominant language. Taken together, our study provides important new information on how language context impacts arithmetic in bilinguals. It also allows drawing more general conclusions on the importance of language context when solving arithmetic problems in a second language and may have implications for math teaching and learning environments.

Language-dependent knowledge acquisition: Mechanisms underlying language-switching costs

Presenting Author: Christian Hahn, University of Leipzig, Germany
Co-Author: Heinrich Saatbach, University of Leipzig, Germany
Co-Author: Clemens Brunner, University of Graz, Austria
Co-Author: Roland H. Grabner, University of Graz, Austria
Co-Author: Lennart Schalk, ETH Zurich - Research on Learning and Instruction, Switzerland

Given the increasing number of bilingual education programs in Europe and beyond, the question if knowledge is represented in a language-dependent way has gained high practical importance. First studies have revealed that content learned in one language will be retrieved and applied more slowly and less accurate when participants have to switch the language from instruction to testing (i.e., language switching). In two experiments, we investigated whether switching between L1 and L2 are a function of the arithmetic operation as well as the kind of knowledge, and what are the underlying cognitive mechanisms. In experiment A (n=40), students learned arithmetic facts of three different operations over a period of four days. In experiment B (n=35), students acquired procedures and facts in a novel arithmetic task. Participants of both experiments were tested in the trained and untrained language while measuring RT and accuracy as well as looking at reaction strategies. The results a) replicate LSC using auditory stimuli, b) show that the number of trials for which participants reported to translate numbers before responding significantly predicted the size of the individual LSC, c) reveal LSC parity for numeric fact retrieval, not for trained procedures, and d) indicate that individual differences in language proficiency, intelligence profile, and math fluency were unrelated to the size of LSC. The implications of these findings for (bilingual) mathematics learning and cognition will be discussed.

Does Language Background Matter? Majority- and Minority-language Skills in Dual Immersion

Presenting Author: Johanna Flickenstein, Leibniz Institute for Science and Mathematics Education, University of Kiel, Germany
Co-Author: Jürgen Baumert, Max Planck Institute for Human Development, Germany

Dual immersion is a form of bilingual education in which two languages are used to teach students from different language backgrounds. Its goal is for minority- and majority-language students to reach high levels of proficiency in both languages. In two experiments, we investigated whether length of immersion and proficiency in the second language (L2) had a significant effect on the students’ L1 and L2 performance. The present study investigates whether proficiency in a German and English Immersion program (Berlin’s ‘Europäische Schule’, SESB) and how far students transfer language to identical tasks in L2. The results are discussed in line with the official tests in the bilingual environment. The results are discussed with respect to the transfer of academic skills in bilingual settings and implications for dual immersion practice.

Effects of dual immersion: Reading comprehension and Math

Presenting Author: Jens Möller, University of Kiel, Germany
Co-Author: Johanna Flickenstein, Leibniz Institute for Science and Mathematics Education, University of Kiel, Germany
Co-Author: Sandra Preusler, Christian-Albrechts-Universitäts zu Kiel, Germany
Co-Author: Jürgen Baumert, Max Planck Institute for Human Development, Germany

Berlin’s Europe School (Staatliche Europa-Schule Berlin, SESB) is a dual-immersion program which provides bilingual instruction for students with different first languages. I. e. German and one of nine partner languages (English, French, Greek, Italian, Polish, Portuguese, Spanish, Russian, Turkish). Half of the students in each class speak German as their L1, the other half speak the partner language as their L2. In the evaluation of the SESB, in grade 4, achievement tests were administered with N = 769 students from the SESB and N = 684 students from the control group of conventionally taught students. SESB students overall reached the same level of German reading comprehension and math skills as monolingual students. Students who were taught in SESB, but not in the SESB, did not differ significantly from their SESB peers. Students with German as L1 and bilingual students who were taught in SESB did not differ significantly from their SESB peers. Students with German as L1 and bilingual students who were taught in SESB did not differ significantly from their SESB peers.

Session L 317

1 September 2017 10:15 - 11:45
Room: B1097
Symposium
Higher Education

Feel, teach, learn -- how emotions fuel learning and teaching in Higher Education

Keywords: Emotion and affect, Experimental studies, Higher education, Multicultural education, Quantitative methods, Student learning, Teaching / instruction
Interest group: SIG 04 - Higher Education
Discussant: Liisa Postareff, University of Helsinki, Finland
Based on the self-determination theory (Deci and Ryan 2002, this study seeks to explore whether a study environment that provides conditions for students’ basic psychological need-satisfaction can lead to a higher level of emotions and self-efficacy. We also addressed the question how emotions experienced in the university context are related to students’ overall life satisfaction and study commitment. German students in teacher education programmes (N = 792) participated in a questionnaire study. The results (estimated by path-modeling) reveal that students’ emotions can be predicted by a variety of personality and environmental conditions associated with different basic psychological needs. Altogether, the model is able to explain 28.5% of the variance in positive emotions and 39.6% in negative emotions. The strongest predictor of students’ positive and negative emotions was the perceived relevance of the study material, a factor related to the need for autonomy. This perceived relevance also had a direct impact on students’ study commitment. Emotions in relation to courses of study was of importance for positive and negative emotions as well as for overall life-satisfaction. As expected, emotions at university predicted life satisfaction and study commitment, with a particularly strong association between positive emotions and study commitment. The results point out the necessity to support study conditions that facilitate the fulfillment of students’ basic psychological needs in order to foster students’ emotional wellbeing and enhance study commitment.

The role of picture book reading in early mathematics learning

Using picture books is a key component of young children’s informal experiences and activities in kindergarten. Stories narrated in a book may contain mathematics, and as such they offer children opportunities to encounter mathematics. The present contribution addresses the role of picture books in kindergartners’ learning of mathematics with a focus on number-related aspects of children’s thinking. This topic is approached from different perspectives, based on an overview of various studies we have recently carried out, which aimed to provide insight into the power of picture books to contribute to children’s mathematics learning. Firstly, we address the role of picture books in children’s learning of mathematics. Then, we analyse succinctly children’s spontaneous mathematics-related utterances, with a focus on the number-related utterances, which occur during the reading of a picture book. This is followed by a detailed look at the influence of the pictures in a picture book which is written for teaching a specific number competence, namely counting backwards.

SES-related differences in Ecuadorian kindergartners’ early numerical abilities and SFON

Using picture books is a key component of young children’s informal experiences and activities in kindergarten. Stories narrated in a book may contain mathematics, and as such they offer children opportunities to encounter mathematics. The present contribution addresses the role of picture books in kindergartners’ learning of mathematics with a focus on number-related aspects of children’s thinking. This topic is approached from different perspectives, based on an overview of various studies we have recently carried out, which aimed to provide insight into the power of picture books to contribute to children’s mathematics learning. Firstly, we address the role of picture books in children’s learning of mathematics. Then, we analyse succinctly children’s spontaneous mathematics-related utterances, with a focus on the number-related utterances, which occur during the reading of a picture book. This is followed by a detailed look at the influence of the pictures in a picture book which is written for teaching a specific number competence, namely counting backwards.
Young children’s home environment importantly contributes to their early numerical abilities development. Up to now, empirical evidence on the relationship between children’s home environment and their spontaneous focusing on numerosity (SFON) and on the relation between the former and early numerical development in general in developing countries is non-existent. We investigated the contribution of entering kindergartners’ home environment, i.e., SES, to their early numerical abilities and SFON in a developing country (Ecuador), controlling for children’s intelligence, working memory, and age. At kindergarten entry, 355 5-year-olds solved a test battery addressing their early numerical abilities (Ecuadorian Test of Early Number and Arithmetic [Bijojque et al., 2015]) and the Tools for Early Assessment in Math (Clements & Sarama, 2011]). SFON (Eli Bird Imitation task [Hannula & Lethinen, 2005]), intelligence, and working memory: in line with previous findings, we observed large inter-individual differences in Ecuadorian children’s early numerical abilities and SFON at kindergarten entry. Moreover, Ecuadorian kindergartners’ SES was positively related to their early numerical abilities but not their SFON. Our results complement current theoretical models on early numerical development and its relation to children’s SES in general and in developing countries in particular, and point to the need for focused interventions on young children’s informal learning experiences at home in developing countries.

Session L 319
1 September 2017 10:15 - 11:45
Mani Building D - D13
Symposium
Teaching and Teacher Education

Teachers’ adaptive resilience process at different career stages

Keynote: Attributes and beliefs. Competences. In-service teacher education, Motivation, Pre-service teacher education. Quantitative methods, Teacher Professional Development
Interest group: SIG 11 - Teaching and Teacher Education
Discussant: Susan Beilman, Curtin University, Australia

The development of a generic resilience model and its application to the teaching profession

Co-Author: Marloot Wosniutz, RWTH Aachen University, Germany

The importance of resilience in learning and working environments has become evident over the last years. This led to a variety of conceptualisations and definitions of resilience and research focussing on and investigating specific aspects of this complex construct.

Albeit these varieties of conceptualisations, operationalisations and definitions, there are key elements that distinct resilience from other constructs, and are generic to every resilience process.

In this theoretical paper a model of individual resilience is presented, that focuses on these key elements, which are: the existence of antecedents of resilience, a resilience process that is conceptualised as an appraisal process that is influenced by internal and external resources at disposal, and a resilient outcome which is relative to a point of reference before the occurrence of the antecedent, namely any stressful appraised event or situation.

This resilience model is embedded in a context model, which shapes the setting and therefore influences the resilience process.

This generic model is applied to teacher resilience, by inserting factors found to be important in research on teacher resilience into each key element of the model.

This allows a comparison of teacher resilience with e.g. students’ resilience and helps to identify the specificities of different resilience processes in educational contexts and thus allows in a second step to identify the elements where personal resilience might be enhanced.

Mentor teachers’ perceptions of Spanish pre-service teachers’ personal and professional competencies

Presenting Author: Glòria Gisacats, C.I.U. Villanueva, Spain
Co-Author: Marius Barceló, C.I.U. Villanueva (affiliated with Universidad Complutense de Madrid), Spain
Co-Author: Inmaculada Rodríguez, C.I.U. Villanueva (affiliated with Universidad Complutense de Madrid), Spain
Co-Author: Miguel Alfonso, C.I.U. Villanueva (affiliated with Universidad Complutense de Madrid), Spain

From the very beginning of the European Higher Education Area (EHEA) in 2010, key competencies were introduced in Teacher Education programs. School placements, also known as practicum, were recognized as having an important role in Initial Teacher Education. The practicum gives pre-service teachers the opportunity to contextualize their theoretical knowledge and learn how to manage in real educational contexts. This study focuses on the mentor teachers’ perceptions of pre-service teachers’ personal and professional competencies, in order to improve them through the evaluation by said mentors. Two questionnairees were developed by the Practicum Department of a private university in Spain as quality indicators in the new Teacher Education Degree, after being revised to meet EHEA requirements: (1) personal and professional competencies from the mentor teachers’ perspective, and (2) pre-service teachers’ practicum satisfaction level. A total of 31 mentor teachers and 31 pre-service teachers participated in the survey. Although results showed highly rated personal and professional competencies by mentor teachers, the aspects less valued highlighted the importance of working on class management and taking into account the development of social skills, self-regulation, problem-solving abilities, and empathy. Satisfaction grades were very high and confirmed, from a pre-service teachers’ perspective, the usefulness of the practicum to put in practice what they have learnt and to be aware of their competencies and interpersonal abilities. We conclude that becoming resilient and becoming competent have some strong links and therefore, it would be very useful to take into account resilience-building activities in the practicum context.

Overcoming teacher induction challenges: The resilience process of Canadian novice teachers

Presenting Author: Mylene Loroux, Université du Québec en Outaouais, Canada

Recent research shows an increased interest in teacher resilience to promote positive adaptation to counteract negative consequences related to teacher induction huddles. This proposal, relying on a chapter in a forthcoming international edited book (Loroux, in press), outlines some results (five participants) of a longitudinal study exploring the development of 23 Canadian novice teachers’ resilience. Relying on questionnaires and a semi-structured interview, the risk and protective factors they experienced during their first two years of induction were identified, and different indicators of their psychological health as new teachers were analyzed. After a thorough analysis of these five cases, we can affirm that most of the participants are managing relatively well despite the challenges they face. Even if risk indicators are readily apparent for them, at least four of the beginning teachers seem to adapt quite positively. These outcomes provide a better understanding of the developmental process of novice teachers’ resilience during their first years and suggest directions to improve teacher education and induction.

Impact of Individual and contextual factors on Teachers’ Resilience and Commitment

Presenting Author: Joana Pia, Instituto de Educação da Universidade de Lisboa, Portugal
Co-Author: Francisco Peixoto, ISPA - Instituto Universitário / CIE - ISPA (Research Center in Education), Portugal
Co-Author: Marloot Wosniutz, RWTH Aachen University, Germany
Co-Author: José Castro Silva, ISPA-Instituto Universitário, Portugal
Co-Author: Vera Faust, RWTH Aachen University, Germany
Co-Author: Jennifer Schwarzs, RWTH Aachen University, Germany

Teacher resilience and teacher commitment are key variables to understand why some teachers remain in their profession and others prematurely leave it. Teacher resilience has been often described as a quality for sustaining teacher commitment or as a dynamic process, where teachers’ personal characteristics interact over time with contextual factors. In this paper we aimed to test a model proposed by the ENTREE project and evaluate how the different variables considered (capabilities, beliefs and contextual factors) interact and relate with teacher’s resilience and commitment. Secondly we aim to analyse the differences in the relationships between the variables among Portuguese and German teachers.

Participants were 378 teachers from Germany and Portugal, who responded to a survey comprising measures of resilience, commitment, personal life, rumination, school support, self-efficacy, and administrative and policy demands.

The results showed that there is an interplay between capacities, beliefs and contextual variables related to teacher’s resilience and commitment. Moreover findings indicated that capacities and beliefs have stronger impact on resilience whereas contextual factors have stronger effects on teachers’ commitment. These results highlight the necessity of an integrative perspective on the phenomenon of teacher’s resilience and commitment.

Session L 320
1 September 2017 10:15 - 11:45
Mani Building A - A07
Symposium
Cognitive Science

On the trajectories of rational number learning

Keywords: Cognitive development, Conceptual change, Educational Psychology, Mathematics, Misconceptions, Numeracy, Primary education, Secondary education, Student learning
Discussant: Andreas Obersteiner, University of Education Freiburg, Germany

Evaluating congruency and gap effects in fraction comparison

Presenting Author: David Maximiliano Gómez Rojas, Universidad de Chile, Chile
Co-Author: Mabel Urrutia, Universidad de Concepción, Chile
Co-Author: Pablo Dartnell, Universidad de Chile, Chile

Several studies on the cognitive bases of the learning of fractions have reported the relevance of congruency effects in learners’ reasoning, referring to the often-reported result that smaller error rates and shorter response times occur when reasoning about fractions as a mere juxtaposition of natural numbers leads to a correct answer. This framework seems useful for understanding errors made by learners in their first steps learning fractions, where they have a weak concept of fraction as an entity in itself, and confuse the fraction with the natural numbers that compose it. However, it is unclear how relevant the congruency dimension is for studying fraction understanding beyond this initial stage. In the present work, we extend previous studies by presenting a fraction comparison task where not only the congruency dimension is controlled, but also the applicability of gap thinking, a reasoning strategy where learners indirectly estimate a fraction’s magnitude by subtracting the numerator from the denominator. We first show that the relation between congruency and gap applicability is not straightforward and needs to be considered, and then provide results from an empirical fraction comparison study with 83 young Chilean students.
Objective: The purpose of this study was to investigate the relationship between creativity and emotional intelligence in a university sample. The study aimed to explore whether creativity and emotional intelligence are associated, and to what extent these two constructs contribute to academic success.

Methodology: The study employed a correlational design, utilizing a survey instrument to collect data from a sample of university students. The survey included measures of creativity and emotional intelligence, as well as demographic information.

Results: The analysis revealed a significant positive correlation between creativity and emotional intelligence, indicating that students who score higher on measures of creativity also tend to have higher emotional intelligence scores. Furthermore, the results showed that creativity and emotional intelligence together explained a substantial portion of the variance in academic success, suggesting that these constructs are important predictors of academic performance.

Discussion: The findings support the notion that fostering creativity and emotional intelligence in educational settings may have significant benefits for students' academic outcomes. The integration of these qualities in educational environments could potentially enhance students' ability to cope with the challenges of higher education, leading to better academic performance and personal well-being.
movement toward membership in subgroups exhibiting more motivation for studying. Accounting for prior-interest and ability, utility-value and self-efficacy are essential for future interest. Longitudinal person-centred insights supported the unique role of utility-value and self-efficacy, signalling movement to more adaptive subgroups.

Session I 322
1 September 2017 10:15 - 11:45
Virta - 114
Session Chair: Teacher and Teaching Education

Language Teachers’ Professional Knowledge: Conceptualization, Assessment, Development
Keywords: Cognitive skills, Competencies, In-service teacher education, Language (Foreign and second), Language (L1/LStandard Language), Pre-service teacher education, Qualitative methods, Secondary education, Teacher Professional Development
Interest group: SIG 11 - Teaching and Teacher Education
Organiser: Johannes König, University of Cologne, Germany
Discussion: Editing Committee of Teaching and Teacher Education St.Gallen, Switzerland

Teachers’ professional competence for teaching English as a foreign language
Presenting Author: Sarah Strauß, The University of Cologne; Empirical School Research, Germany
Co-Author: Sandra Lammerding, University of Cologne, Empirical School Research, Germany
Co-Author: Gisbert Nold, Technical University of Dortmund, Germany
Co-Author: Andreas Rohde, University of Cologne, Germany
Co-Author: Sarantis Tachtisoglou, University of Cologne, Greece
Teachers’ professional competence has been considered a multidimensional construct. Besides the central teacher knowledge categories (content knowledge, CK; pedagogical content knowledge, PCK; general pedagogical knowledge, GPK), also affective-motivational dispositions are increasingly focused on. However, relationships between cognitive and affective-motivational teacher variables have mainly been described by empirical case studies in the context of primary education. This presentation therefore reports on a study conducted in Germany with 444 pre-service teachers of English as a foreign language (EFL). Their PCK, CK, and GPK was assessed using paper-pencil tests, together with a measure of their language proficiency. Moreover, their teacher self-efficacy, enthusiasm for teaching EFL, and Gellfells about teaching were measured.

Impact of opportunities to learn in teacher education on teacher professional knowledge in France
Presenting Author: Marie Evans, KU Leuven, Belgium
Co-Author: Jan Elsen, KU LEUVEN, Belgium
Co-Author: Fein Depape, KU Leuven, Belgium

As teacher professional knowledge (PCK, PK and CK) has been shown to positively impact educational quality, an important goal of teacher education (TE) is to improve pre-service teachers’ PCK, PK and CK. Some attempts to study the effect of TE on teacher professional knowledge development, mainly in the domain of mathematics, have shown positive effects of TE. It is however not always clear what kind of courses exactly contributed to the development of teacher knowledge. Furthermore, notwithstanding Shulman’s (1986) claim that PCK is an amalgam of both PK and CK, most studies have only focused on the effect of the TE in PK and not on CK. The present study is situated in the domain of French as a foreign language, and aims to examine the effects of several opportunities to learn (OTL) in TE courses on PCK, PK, CK, and experiences in practice on pre-service teachers’ development of PCK, PK and CK. The participants are 360 pre-service elementary teachers, recruited from all three years of study that are part of Flemish TE. Quantitative test instruments are developed to measure PCK, PK and CK. After controlling for prior education, positive effects of OTL related to PCK on PCK and PK scores are found, as well as positive effects OTL related to CK on CK scores. OTL on PK and experiences in educational practice did not significantly impact participants’ professional knowledge.

Feedback in foreign language writing; Exploring teachers’ pedagogical content knowledge area
Presenting Author: Helma Goldberg-Kirk, Maribud, Radboud University, Netherlands
Co-Author: Astrid Eekelaar, Radbout University Nijmegen, Netherlands

The study of teacher’s pedagogical content knowledge in the FL writing domain is an under-researched area, and although studies in teaching FL writing have steadily grown in the last few years, most of these focused on English-as-a-foreign-language context. In this study we address this gap by studying the pedagogical content knowledge (PCK) of five foreign language (FL) teachers of French in the Netherlands. In the first phase, in the upper secondary school classroom; PCK was elicited in a way by concept mapping followed by a semi-structured interview and a stimulated recall interview per curriculum area and observation. Results revealed that writing was mainly assessed as a means by which to learn the language, with day-to-day language teaching as preparation for writing. Discrepancies were found in all five teacher’s PCK, showing non-alignment between learning objectives corresponding to various aspects to writing, and assessment focusing exclusively on accuracy. We identified institutional and pedagogical factors hindering enactment of teachers’ knowledge and beliefs, which might inform the design of future interventions for professional development and the implementation of educational innovation.

German language teacher knowledge and its effects on instructional quality
Presenting Author: Sandra Lammerding, University of Cologne, Empirical School Research, Germany
Co-Author: Sarah Strauß, The University of Cologne; Empirical School Research, Germany
Co-Author: Albert Bremerich-Vos, University of Dusseldorf Essen, Germany
Co-Author: Christiane Buchholz, Technical University Berlin, Germany
Co-Author: Koen Klok, University of Cologne, Germany

Teacher knowledge research has increased over the past decade. Especially for the domain of mathematics, researchers have remarkably put forward the state of research. However, relevant language teacher studies with an intensive scholarly focus making teacher knowledge accessible through tests and assessments are still scarce. This presentation will outline the framework of a study conducted in German secondary schools in Germany as a matter of principle through the combination of assessment and assessment using paper-pencil test instruments. Measures for their content knowledge (CK) and pedagogical content knowledge (PCK) were developed, whereas their general pedagogical knowledge (GPK) was measured using the existing test instrument from TEDS-M. Test data from a representative sample of 290 pre-service teachers in Germany’s region of Northrhine-Westphalia who graduated in 2016 from university and who had entered their induction phase is used to analyze two research questions. First, we ask for construct validity of the three teacher knowledge measures, that is how they are related to each other at the time point when pre-service teachers enter induction. Second, we ask for predictive validity of the teacher knowledge measures by analyzing its effects on instructional quality the pre-service teachers provide when teaching German during induction.

Session II 335
1 September 2017 12:00 - 1:30
Main Building E - E350
Roundtable
Assessment and Evaluation, Teaching and Teacher Education

Roundtable: Assessment and Teacher Education
Keywords: Assessment methods and tools, Conceptual change, Design based research, Educational Psychology, Goal orientation, History, Motivation, Reflection, Secondary education, Teaching / instruction Interest group: SIG 51 - Assessment and Evaluation, SIG 11 - Teaching and Teacher Education
Chairperson: Christine Kreuzer, Institute for Human Resource Education and Management, Germany

Teachers’ views on preparing students for university
Keywords: Conceptual change, Goal orientation, Secondary education, Teaching / instruction
Presenting Author: Merel van der Wal, Radboud University, Netherlands
Co-Author: Paulien Meijer, Radboud Teachers Academy, Netherlands

Students going through the transition from secondary education to university education can encounter problematic changes due to a change in expectations of their study skills, understanding, self-direction and transfer of knowledge.

Interviews with three teachers from pre-university tracks are analyzed to understand the type of activities are used to prepare students for university. Subsequently, these activities are linked to mechanisms of boundary crossing. Preliminary results show that pre-university track teachers mention activities related to four mechanisms of boundary crossing. This way of looking at teaching in pre-university education can help to see and create learning opportunities where boundaries are encountered.

Assessing historical thinking: developing formative assessment tasks for historical causal reasoning
Keywords: Assessment methods and tools, Design based research, History, Secondary education
Presenting Author: Uldhava Rozendal, University of Amsterdam, Netherlands
Co-Author: Carla Van Boxtel, University of Amsterdam, Netherlands

Formative assessment tasks that measure historical thinking abilities, such as causal reasoning, in the secondary school classroom are still scarce. The aim of this study is to develop such tasks. The design of these tasks was based on an earlier developed model of cognition of historical causal reasoning. In total, five different formative assessment tasks were designed and subsequently tested in the history classroom. Some attempts to study the effects of the tasks included eight teachers and their respective students in secondary education in the Netherlands. We endeavored to include the tasks as much as possible in the regular curriculum. Several types of data were collected. First, all student responses that were produced while administering the tasks. Second, videotaped think-aloud sessions with up to two random students from each class. Third, we observed students on their interest and ability and history and how they experienced the task. Finally, fourth, a teacher’s log, in which they reflected on the implementation of the task. Data analysis will take place in winter 2016/2017. This study contributes to the improvement of assessment practices in history education in secondary schools by designing and testing instruments that teachers can use in the classroom. Simultaneously, this study sheds further light on the progression of historical causal reasoning of high school students.

Fostering a more motivating approach to assessment through video-based reflection
Keywords: Assessment methods and tools, Educational Psychology, Motivation, Reflection
Presenting Author: Christa Kriegsman, Ghent University, Belgium
Co-Author: Tim Marinard, Utrecht University, Netherlands
Co-Author: Jan van Tertwijk, Utrecht University, Netherlands
Co-Author: Lars Borghouts, Forbisy University Applied Sciences, Netherlands
Co-Author: Katarzyna Glinska, Ghent University, Belgium

Teaching strategies such as goal clarification and progress oriented feedback are considered effective subcomponents of assessment that is aimed at improving learning. Self-Determination Theory suggests that goal clarification and progress oriented feedback stimulates motivational types of motivation. However, it is unclear if teachers can be trained to implement such strategies in an efficient way, to benefit students’ motivational experiences. The present study will investigate whether a training on ‘motivating assessment’ is effective for changing the teachers’ practice, and for enhancing b) students’ motivational experiences for physical education. Thirty teachers and their students will be randomly assigned to one of three groups. The first intervention group will receive an evidence-based one-day long
training only. The second intervention group will take part in the one-day evidence-based training and four additional individual sessions. Specifically, teachers will self-report on their assessment strategies using an online video feedback reflection. The control group will be provided with the opportunity to participate in the training after the study has ended. Pre-intervention, intermediate and post intervention, validated questionnaires will be used to measure perceived autonomy and competence and quality of motivation. An instrument to measure goal clarification and feedback will be developed for this study. Simultaneously, a subsample of 12 teachers will be filmed to observe the application of the assessment strategies. The researchers seek to elicit a discussion about this study’s design, the employed measures, and how the intervention is shaped.

Session M 324
1 September 2017 12:00 - 13:30
Pinni B - BS118
Roundtable
Culture, Morality and Religion, Educational Development, Aspects of Instruction, Teaching and Teacher Education
Roundtable: Learning and Teaching in Culturally Diverse Settings
At-risk students, Citizenship education, Cultural diversity in school, Literacy, Multicultural education, Parental involvement in learning, Primary education, Science education, Social aspects of learning and teaching, Teacher Professional Development
Interest group: SIG 21 - Learning and Teaching in Culturally Diverse Settings
Chairperson: Justin Haradariewicz, University of Wisconsin-Madison, United States
Negotiating inclusive citizenship of Muslims through school-family partnership in Finland and Sweden
Keywords: Citizenship education, Cultural diversity in school, Parental involvement in learning, Multicultural education
Presenting Author: Inkeri Rissanen, University of Tampere, Finland
In Finland and Sweden, polarization through increasing social, economic, and cultural divides damages the development of a healthy society. Religious diversification and the increasing political significance of religion are influencing the on-going renegotiation of citizenship, and Muslims have been positioned as the critical case of multiculturalism. Schools are central spaces for the negotiation and development of citizenship, and family engagement in schools is known to increase the achievement and well-being of the students throughout their life. For immigrant families, the school is often the primary place through which they interact with the larger society. School-family partnership in the promotion of immigrant Muslims; however, it is rarely researched as such. The data of this study include semi-structured interviews with principals (n=10 in both countries) and Muslim parents (n=8 in Sweden, n=9 in Finland). Through analyzing negotiations related to the central values of inclusive citizenship, justice, recognition, self-determination, and solidarity (Kabani 2005; Lister 2007), the study aims to answer the main research question: “How is the inclusive citizenship of Muslims developed through school-family partnerships?”. The preliminary results depict negotiations related to 1. religious rights 2. recognition of identities 3. parents vs. school’s authority over the children. In the analysis, attention is also paid to the strategies used in these negotiations in different school communities, the role of the Muslim teachers as mediators, as well as to the impact of the different contextual factors in Finland and Sweden for these negotiations and their outcomes.

Literacy development of Roma children over the summer break: Is it more than a socio-economic issue?
Keywords: At-risk students, Literacy, Primary education, Social aspects of learning and teaching
Presenting Author: Dacian Dolean, Babes-Bolyai University, Romania
Co-Author: Crina Damsa, University of Oslo, Norway
This experimental research examines the growth of reading skills among Roma children and their non-Roma peers over a summer break. Empirical evidence points out to the potential detrimental effects of summer break on children’s reading skills coming from disadvantaged socio-economic and ethnical backgrounds and speaking languages with inconsistent orthography. However, while most of the studies were conducted in US, it is not clear whether they apply to European countries and whether they pertain to consistent orthographies. In this study, the reading skills of 469 Roma and non-Roma children learning to read the consistently orthographic Romanian were assessed at the end of the 1st grade and at the beginning of 2nd grade. Results indicated that a) overall, reading skills improved significantly over the summer; b) reading rate did not varied significantly as a function of socio-economic status (SES); c) reading rate of non-Roma children increased significantly compared with their Roma peers, even after accounting for SES. The findings help refine our knowledge on how reading skills change over the summer break as a function of the degree of orthographic consistency, SES and ethnicity.

Teachersons perspectives on science literacy in multilingual classrooms – multidisciplinary explorations
Keywords: Cultural diversity in school, Literacy, Science education, Teacher Professional Development
Presenting Author: Maaike Hager, University of Applied Sciences, Netherlands
Co-Author: Russel Tyler, Deakin University, Australia
Co-Author: Zuraini Ramli, Sultan Idris Education University, Malaysia
How can different disciplinary perspectives meet and lead to a deeper understanding of science literacy learning in an educational design approach? Especially in multilingual settings, science teachers need an understanding and a repertoire to move between daily and scientific discourses and to connect with students’ daily knowledge and language in the language of instruction (Jakobsson, Mååktå, & Stål) 2009). In this study, teachers’ and teaching of science literacy requires a multidisciplinary approach.

In this international Roundtable session we present and discuss short video clips from teacher discussions and classroom data from the Swedish Science and Literacy Teaching (SALT) project (specifically the Clarke & Jollysworth) 2002) model of teacher growth is used while analyzing. The model distinguishes between teachers’ personal domain of knowledge and beliefs, practice domain of experimenting in the classroom, the domain of consequence including salient student outcomes and the external domain of school based professional development. Having previewed the selected video clips, presenters from two other countries were invited to discuss the analytical approach to drawing on their own research in science teaching in multilingual settings. The audience is invited to actively discuss the contributions of different disciplines to the analyses of these concrete science classroom data.


Session M 325
1 September 2017 12:00 - 13:30
Pinni B - BS0039
Roundtable
Higher Education, Learning and Instructional Technology
Roundtable: Online Learning and Writing
Keywords: Argumentation, E-learning / Online learning, Educational Technology, Higher education, Informal learning, Teaching / instruction, Writing / Literacy
Presenting Author: Elenke Avaru, Eindhoven University of Technology, Netherlands
Chairperson: Jannet Doppenberg, Eindhoven University of Technology, Netherlands
To tweet or not to tweet?: Can using Twitter improve learning and instruction in higher education?
Keywords: Educational Technology, Higher education, Informal learning, Teaching / instruction
Presenting Author: Brit Adams, Ghent University, Belgium
Co-Author: Annelies Raes, Ghent University, Belgium
Co-Author: Tammy Schellens, Ghent University, Belgium
Co-Author: Hannelore Montreuil, Ghent University, Belgium
Co-Author: Roxana de Zeeuw, Vrije Universiteit Brussel, Belgium
Of the range of recent technological developments, social media have become the most widely adopted by the current generation of students. However, despite the widespread use and the potential of social media to enhance learning and instruction in higher education, research on students’ actual user experiences is still lacking. This paper describes two consecutive interventions in which two comparable social media were used to start using Twitter (the context of a Third Academic Bachelor Course Instructional Strategies). The first intervention was conducted from September 15 January 16, the second intervention has just started in September 16, Based on the results of the first intervention, we could conclude that our students were rather skeptical about using Twitter in higher education, and that this is moderate to high initial expectations. One of the critical obstacles students put forth was competence: frustration, overload, and external motivation. These results led to concrete suggestions for future practice which are taken into account in the second intervention. We are looking forward to present the results of both interventions at a round table session, and discuss with the participants the opportunities and conditions for using Twitter - and social media in general - in higher education.

Improving integration skills for argumentative writing: a pilot intervention in an online university
Keywords: Argumentation, E-learning / Online learning, Educational Technology, Higher education, Instructional Strategies
Presenting Author: Maria Luna, Universidad de Madrid (UDIMA), Spain
Co-Author: Mer Meote, Universitat Autònoma de Madrid, Spain
Co-Author: Elena Martín, Universidad Autonoma de Madrid, Spain
Co-Author: Lina Fernandez, Universidad Autonoma de Madrid, Spain
Effective argumentation in written tasks is a demanding task for secondary and university students. It involves understanding, evaluating, weighing, combining and generating arguments and counterarguments from different sources and perspectives to support a final position. Despite its difficulty and complexity, argumentative writing is scarcely taught at the Spanish university, so students need, in particular, more instruction to improve their argumentative skills. This pilot study is aimed to design and test instructional assistance supported by Moodle platform in an online university. Volunteer undergraduates participated in this pre-post design. They were asked to write a previous synthesis from two source texts and to attend to two types of instructional virtual environment ("traditional" / "metacognitive") in order to write a synthesis text from two new texts. In this paper, which focus on the reading and writing processes of written argumentation, this intervention includes explicit instruction, a modelling video and a script to guide the reading and writing processes. It employs several resources such as videos, graphic organizers and exercises. Results show that, after the training, the written products which reached at least a minimum integration were more frequent. However, the products that presented medium and maximum integration were still limited. This results suggest that students still need more training and support in order to expand their skills for generating new integrative arguments.

Session M 326
Roundtable: Higher Education

Keywords: Educational policy, Higher education, Informal learning, Out-of-school learning, Pre-service teacher education, Problem-based learning, Student learning, Survey Research, Teacher Professional Development, Teaching approaches

Interest group: SIG 54 - Higher Education

Chairperson: Marlies Nederlander, Erasmus University Rotterdam, Netherlands

Evolution of international traineeships in a South European University

Keywords: Higher education, Informal learning, Out-of-school learning, Survey Research

Presenting Author: Josipa Almeny-Costa, Universitat Pompeu Fabra, Spain

Co-Author: Xavier Pina-Romero, Universitat Politècnica de Catalunya, Spain

This work intends to study the effects of international internships on the employability of recent graduates of a public South European university, the type of employment achieved and the relationship with the knowledge and skills acquired during the internships. A survey was conducted during the international internship and a new survey has been administered one year later in order to follow the situation immediately after the internship and after a few years in terms of employability. This survey includes different aspects such as: relationship between theory and current job, type of employment and labour contract, and soft skills used in the current work. The expected results will show the relationship between the international internships and the graduate international employability.

The Goals of Problem-based Learning through the Eyes of Educational Staff

Keywords: Higher education, Student learning, Teaching approaches, Problem-based learning

Presenting Author: Gerry Geitz, Stenden University of Applied Sciences, Netherlands

Problem-based learning finds its foundation in problems teachers encountered within medical educational programs in Northern-America. These problems are nowadays still valid and it can be questioned whether the intended goals linked to this student-centered approach are achieved. In this study the perspective of educational staff is chosen to learn more about their implicit or explicit educational goals within a PBL-environment. Out of the data 12 intended goals were identified, insights were gained on the achieved goals and to what extent they contributed to the development of constructivistic, self-directed, collaborative and contextual learning. Future research directed at influencing the intended goals of staff might be worthwhile in order to optimize the effectiveness of PBL.

While there is a positive claim for internationalization both in school and higher education, the percentage of teacher candidates participating in exchange activities is perceptively lower than the average students' share in German universities. One possible explanation may be found in national or regional restrictions of teacher education programs. Other studies point out that institutional, economical, and personal factors play key roles. To understand motives of teacher candidates regarding study or internships abroad and to find out about the differences between teacher candidates and other students, the authors are planning a survey study which will be presented and discussed in the round table session.

Session M 327
1 September 2017 12:00 - 13:30
Main Building A - A05
Roundtable
Educational Policy and Systems, Instructional Design

Roundtable: Assessment and Conceptual Change

Keywords: Arts, Assessment methods and tools, Attitudes and beliefs, Computer-supported collaborative learning, Conceptual change, Educational policy, Educational Psychology, Reflective society

Interest group: SIG 93 - Conceptual Change

Chairperson: Ralph Schumacher, ETH Zurich, Germany

Reflective Assessment in Computer-Supported Collaborative Learning for Pre-Service Teachers

Keywords: Assessment methods and tools, Computer-supported collaborative learning, Educational Psychology

Presenting Author: Carol Chan, University of Hong Kong, Hong Kong

Co-Author: Wincy Lue, Education University of Hong Kong, Hong Kong

Co-Author: Rhoda Wang, The University of Hong Kong, Hong Kong

This study examined the design and implementation of a computer-supported environment using online discussion for alignment creating, collaboration and assessment. Participants were 155 student teachers attending a course in psychology of classroom learning in a teacher education program in Hong Kong. The design included students contributing to online forum; engaging in regular discussion; and reflecting on their discussion. For reflective assessment, student teachers identified three best examples (clusters of notes) from the class community’s discourse and explained why they were important for their inquiry. Data consisted of questionnaires on epistemic beliefs and collaboration; students’ postings on online forum; reflective assessment notes (3 best clusters of notes); and end-of-term theory-practice summary paper.

Correlation analysis shows that students’ beliefs about collaboration was related to their beliefs about knowledge (development); as well, regression analysis indicate that reflective assessment scores significantly predict summary paper (domain understanding). Implications of examining both individual and community learning through reflective assessment in computer-supported environments are discussed.

Influencing policy makers and institutional leaders in Finnish Arts Education via systems thinking

Keywords: Arts, Conceptual change, Educational policy, Reflective society

Presenting Author: Tuulikki Lasis, Sibelius Academy of the University of the Arts Helsinki, Finland

Co-Author: Lauri Valvev, Sibelius Academy of the University of Arts Helsinki, Finland

Co-Author: Sanna Kirjavä, Sibelius Academy of the University of the Arts Helsinki, Finland

Co-Author: Kati Nieminen, Sibelius Academy of the University of Arts Helsinki, Finland

Co-Author: Hanna Kamensky, Sibelius Academy of the University of Arts Helsinki, Finland

In this roundtable discussion we examine how systems thinking can be used in policy work and communication with institutional leaders. We ask, can systems thinking in the context of Basic Education in the Arts be a tool for conceptualizing social change and strengthening democratization in contemporary Finnish society? The participants in the discussion are involved in the ArtsEqual/Inclusive ArtsEqual (2015-2020) that explores the treatment of arts in Finland by regarding them as a basic service that should be equally available for all. From the perspectives of equality and well-being, the project generates new knowledge on how already existing arts services could be developed in order to enhance the democratic and inclusive thinking and action in diverse society. The project will propose policy recommendations to support decision-making and to consolidate new arts and arts education based services. Through examples of three innovative case studies of the ArtsEqual, we will raise the question: how can systems thinking in the context of Basic Education in the Arts (BEA) be a tool for strengthening the process of democratization in contemporary Finnish society?

Session M 328
1 September 2017 12:00 - 13:30
Pinni B - B41/16
Roundtable
Lifelong Learning

Roundtable: Professional Development and Neuroscience

Keywords: Assessment methods and tools, Educational Psychology, Informal learning, Lifelong learning, Neuroscience, Psychology, Philosophies and applied sciences, Psychometrics, Workplace learning

Interest group: SIG 14 - Learning and Professional Development, SIG 22 - Neuroscience and Education

Chairperson: Chiel van der Veen, Vrije Universiteit Amsterdam, Netherlands

From neurons to nations and back: Translating across levels of explanation in educational research

Keywords: Educational Psychology, Neuroscience, Philosophy, Psychometrics

Presenting Author: Lennart Schenk, ETH Zurich, Switzerland

Co-Author: Elisabeth Stern, ETH Zurich - Research on Learning and Instruction, Switzerland

Co-Author: Manu Kapur, The Education University of Hong Kong, Hong Kong

Co-Author: Roland H. Grabner, University of Graz, Austria

Co-Author: Tommi Kokkonen, University of Helsinki, Finland

Co-Author: Peter Edelbrunner, ETH Zurich, Switzerland

Co-Author: Alexander Renki, Freiburg Institute of Psychology, Germany

Co-Author: Samuel Grieff, University of Luxembourg, Luxembourg

Co-Author: Joshua McGraw, University of Oxford, United Kingdom

This roundtable brings together experts who address questions of learning and instruction in educational research at different levels of explanation: from educational neuroscience investigating networks of neurons to large-scale assessments comparing nations. The idea is to start a constructive debate on how these levels interrelate. Following short presentations from the organizers and the presenters, we will engage in an open discussion with the attending participants about the following set of interconnected questions: Is it possible to translate across levels of explanation and how should this be done? Is it
Learning to do the right thing: Learning social and ethical accountability

Keywords: informal learning, Workplace learning, lifelong learning

Presenting Author: Leonie Beatrice Jacob, University Regensburg, Germany
Co-Author: Allison Pittiglio, Open University, United Kingdom

Everyday professionals have to make decisions that have consequences that are not easily predicted. This roundtable session examines a range of methods used to explore how professionals learn to make ethical decisions. These decisions are made in ways that take into consideration factors including responsibility towards others, integrity in relationships, respect for the dignity of other people and responsibility towards society. Ethical behaviours are demonstrated through work practice, often by mimicking more expert colleagues. Strengths, weaknesses and assumptions underpinning qualitative and quantitative methods used in empirical studies of how professionals learn to act in an ethical way will be examined.

Evaluating the Impact of Learning from Incidents

Keywords: Assessment methods and tools, Informal learning, Professions and applied sciences, Workplace learning

Presenting Author: Victoria Murphy, The Open University, United Kingdom
Co-Author: Allison Pittiglio, Open University, United Kingdom
Co-Author: Bart Rienties, Open University UK, United Kingdom

Learning from incidents (LFI) is a sub-section of workplace learning, where being able to evaluate the effectiveness of educational processes is crucial. LFI involves learning after an accident to ensure that similar events do not occur. Many companies invest substantial resources into LFI processes to ensure the lives of their employees are safe, hence it is vital to understand which of their interventions are most impactful. Assessment is a challenging topic in workplace learning, as studies have shown that employees’ learning is often generated during everyday activities, without employees knowing what they have learned. While assessment of learning is vital to allow companies to invest their resources wisely, there remains areas of the LFI process where no method for evaluation exists.

A systematic review of literature identified 75 articles related to LFI as a learning process. Attempts in the articles to evaluate the LFI process were noted along with important aspects that have not yet been evaluated.

Assessments of the LFI process have taken several forms, such as modelling accident rates to understand if an incident prompts learning. Our review indicated that limited attention has been paid to understanding or evaluating learning on the job. At EARLI we will report the findings of our meta-review and exploratory study on workplace learning - particularly on the impact of LFI interventions, with the goal of using the roundtable format to discuss ways of gaining insight into the effectiveness of LFI processes, particularly aspects where assessment has yet to be fully developed.

Session M 329
1 September 2017 12:00 - 13:30
Main Building A - A35
Roundtable: Educational Evaluation and Early Childhood Education

Keywords: Assessment methods and tools, Bilingual education, Conversation / Discourse analysis, Early childhood education, Educational policy, Motivation, School effectiveness, Social interaction, Teacher Effectiveness, Teaching approaches

Interest group: SIG 05 - Learning and Development in Early Childhood, SIG 23 - Educational Evaluation, Accountability and School Improvement

Chairperson: Carmen Zurbriggen, University of Fribourg, Switzerland

Teacher-child interactions with monolingual and multilingual kindergarten teachers

Keywords: Bilingual education, Conversation / Discourse analysis, Early childhood education, Social interaction

Presenting Author: Annegjen Langelo, University of Groningen, Netherlands
Co-Author: Maya Mascareño, University of Groningen, Netherlands
Co-Author: Marjolijn Deurk, University of Groningen, Netherlands
Co-Author: Maike van Rooijen, University of Groningen / GION, Netherlands
Co-Author: Jan-William Strips, University of Groningen, Netherlands

The interaction between teacher and child is the main proximal process for delivering learning opportunities to a child in educational settings, and therefore the main determinant of classroom quality. However, the same teacher input might represent different learning opportunities to children with diverse backgrounds. The current study will investigate the learning opportunities that monolingual and multilingual children experience through teacher-child interactions in early childhood education classrooms. Previous research shows that multilingual children have more managerial interactions, get fewer responses of the teacher in educational situations and receive less affirmations on correct responses than their monolingual peers. Therefore, we expect interactions to differ for children with diverse language backgrounds on, among other things, the level of complexity and in types of conversational turns such as feedback types. Data will be collected in 20 Dutch kindergarten classrooms at three time points, all roughly three months apart. In each classroom, four children (aged 5-6 years) are selected of which two are multilingual. At each time point, video recordings are made to measure general classroom quality and to assess the individual teacher-child interactions. Data for time point 1 is currently being collected (October 2016). During the round table at EARLI, findings from teacher-child interactions with monolingual and multilingual kindergartners will be discussed, aiming to refine a coding scheme for analyzing the data.

Agreement Between Students’ and Principals’ Ratings of Teacher’s Use of Motivational Strategies

Keywords: Assessment methods and tools, Motivation, Teacher Effectiveness, Teaching approaches

Presenting Author: Chrisli Bergin, University of Missouri/Columbia, United States
Co-Author: David Bergin, University of Missouri/Columbia, United States
Co-Author: Eli Jones, University of Missouri/Columbia, United States

This paper addresses whether students and principals perceive teachers similarly regarding their use of motivational strategies. Classroom observations and student surveys of teacher’s effectiveness are widely used, but poorly debated, as U.S. policies push schools toward rigorous teacher evaluation. Little is known about the agreement between these two important sources of data. In the present study, data are from surveys of secondary students and 455 teachers who also experienced 3-5 classroom observations conducted by their principals throughout the school year in Missouri (USA). Principals completed annual training on how to do classroom observations using a standardized rubric. Student surveys were delivered online at schools. Results suggest there is only modest overlap between students and principals, but differences are larger when they are asked about a teacher’s use of the same strategies. The mean of student survey items and the mean classroom observation ratings correlated r = .326 (p < .000). Our results are in accordance with one other study that addressed this same research question conducted in Pittsburgh schools. Both the present study and the Pittsburgh study raise issues about lency in principals’ ratings of classroom observations.

The Principal Effect: Detecting Principal Error in Classroom Observations

Keywords: Assessment methods and tools, Educational policy, School effectiveness, Teacher Effectiveness

Presenting Author: Chrisli Bergin, University of Missouri/Columbia, United States
Co-Author: Eli Jones, University of Missouri/Columbia, United States

This study investigates the quality of principals’ observations of teaching practices (OTP) in an authentic teacher evaluation system in the U.S. Data are from 259 school districts (421 principals, 4,440 teachers). Principals are trained annually to use a standardized rubric to score teaching effectiveness. Principals rated a standard set of classroom videos at Time 1, and a different set again a year later at Time 2; between these time periods principals rated four teaching episodes of teachers in their own buildings. Many-facets Rasch measurement (MFRM) was used to investigate the functioning of OTP ratings in teacher evaluation. Results suggest that all principals tended to be less consistent with their own teachers, with substantial individual differences in lency. Generally, principals used the scale consistently and differences were not specific to individual teaching practices within a single OTP. Results were similar for elementary and secondary schools. Thus, overall OTP ratings are meaningful and useful. OTP can distinguish between teachers of varying effectiveness. However, caution is warranted when comparing ratings across schools and rating should generally be interpreted as inflated. MFRM techniques proved useful in identifying specific teaching practices that need improvement as well as principals (12%) who may need remediation in conducting OTP.

Session M 330
1 September 2017 12:00 - 13:30
Main Building C - C2
Roundtable: Teaching and Teacher Education

Keywords: Collaborative Learning, Communities of learners, Cooperative / collaborative learning, Design based research, In-service teacher education, Mixed-method research, Qualitative methods, Reflection, Researcher education, Teacher Professional Development

Interest group: SIG 11 - Teaching and Teacher Education, SIG 17 - Methods in Learning Research

Chairperson: Antoine Lecat, Universiteit catholiek de Louvain (UCL), Belgium

Engaging in Lesson Study: How it Impacts Teachers’ Learning and Professional Agency

Keywords: Collaborative Learning, Cooperative / collaborative learning, In-service teacher education, Teacher Professional Development

Presenting Author: Mihaela Mituscu Manea, The National University of Arts “George Enescu” Iasi, Romania

The initial phase of an exploratory study focusing on understanding how Romanian teachers learn to teach for diversity and inclusion allowed for an insight into what matters most to the teachers and to their schools in the course of learning. The findings in this early stage of our research had become indicative of teachers’ preferred strategies of finding and affirming, in the space of the schools’ common practices, specific positions regarding the challenges of teaching and learning for diversity and inclusion. Emphasis on confinement to the traditional boundaries of discipline specialization and the habitual approach to educational change by deploying ready-made meanings and procedural prescriptions for action in a top-down dynamic of delegating responsibility for efficient action in the classroom, have
restricted practitioners from developing contextualized, collaborative practices of professional learning by inquiring and experimenting with the various tools of the profession available in their schools. Drawing on cultural historical activity theory framework, the proposed study aims at an exploration of the effects on Romanian teachers’ language and understanding of professional agency, whilst for the first time engaging in Lesson Study (Dudley, 2013) approaches to planning and learning to teach for diversity and inclusion. The implications for research and for educational practice of first findings in this exploratory study are proposed for discussion.

Exploring configurations of personal and situational factors in teachers’ identity development

Keywords: Communities of learners, Qualitative methods, Reflection, Teacher Professional Development

Presenting Author: Gonny Schellings, Eindhoven University of Technology, Netherlands

Co-Author: Janine Mommers, Eindhoven University of Technology, Netherlands

Co-Author: Maaike Koopman, Eindhoven University of Technology, Netherlands

Co-Author: Douwe Beljaard, Eindhoven University of Technology, Netherlands

Learning to teach is a process strongly influenced by configurations of personal and situational factors. Beginning teachers should find a satisfying balance between what they personally find important for learning to teach and the professional demands or expectations expressed in standards and set by their schools. During four professional development meetings, 40 beginning teachers from 13 secondary schools were supported to become aware of these personal and situational factors that shape their professional identity development. The teachers wrote short reflection reports and answered reflective questions. These data were transformed into portraits of each teacher; subsequently these portraits were analysed for configurations of personal and situational factors. Some portraits included similar personal factors, such as being perfectionistic, others portrayed included similar situational factors, such as getting support from colleagues. A broad concern such as experiencing work load consisted of different configurations, namely, being perfectionistic and feeling no support, or being perfectionistic and experiencing high demands. Different configurations led to different kinds of behaviour (e.g., taking own responsibility) or feelings (e.g., feeling insecure) of beginning teachers. In all, beginning teachers should become aware of their configurations of personal and situational factors to give direction to their construction of a professional identity.

Shifting positions when engaging in practice through Design-Based Research

Keywords: Design based research, Mixed-method research, Qualitative methods, Researcher education

Presenting Author: Lea Tâle Rosenlund, University of Southern Denmark, Denmark

Co-Author: Roland Hachmann, University of Southern Denmark, Denmark

Co-Author: Jens Jørgen Hansen, University of Southern Denmark, Denmark

In this round table discussion, we wish to portray and negotiate different perspectives of participation as a basic condition when conducting Design Based Research. The position of the researcher is not fixed and must adjust and adapt in-process, and in collaboration with practitioners. Although the literature on Design Based Research addresses perspectives on roles of the researcher, and the co-designers or practitioners, we find that focus is often on skills needed, e.g. being an expert in the field, rather than on the phenomena of shifting positions in the phases and contexts of research. We propose the phenomenon of shifting positions as consequential to the scope and outcomes of a project. Discussing these shifts in relation to benefits and challenges particular to the Design based Research approach is necessary to stimulate awareness of these issues. As these issues are valuable to both researchers and practitioners, considering them may generate recommendations on how to prepare for these shifts when conducting Design Based Research. To illustrate how these positions shift in actual practice, we draw upon two empirical studies conducted in the context of Teacher Education Programme. We present one case where the researcher is positioned as a second teacher within the classroom, and another case where the researcher needs to renegotiate his position as co-designer and researcher after an intervention in the design experiment. Our goal is to gather ideas and contributions through discussion of the concept and characterisation of shifting positions, collectively considering how this concept may advance Design based research.

Session M 321

1 September 2017 12:00 - 13:30

Main Building C - C1

Roundtable: Motivation and Emotion

Roundtable: Motivation and Emotion

Keywords: Arts, Attitudes and beliefs, Cognitive development, Developmental processes, Educational Psychology, Emotion and affect, Informal learning, Mixed-method research, Motivation, and emotion

Interest group: SIG 08 - Motivation and Emotion

Chairperson: Jan van Driel, University of Melbourne, Netherlands

Exercising Survey and Interview Measures of Individual Interest

Keywords: Arts, Attitudes and beliefs, Mixed-method research, Motivation

Presenting Author: Amanda Durik, Northern Illinois University, United States

Co-Author: Sarah Coley, Northern Illinois University, United States

Co-Author: Steven McGee, The Learning Partnership, United States

Many researchers use rating scale survey measures of individual interest because surveys have the benefit of efficiency with regard to collecting data for large groups of people. However, it is important to know whether survey approaches correspond with a lengthier interview approach. This research aimed to evaluate the correspondence between several self-report survey measures of individual interest and an interview measure. College student participants (N = 138, 66% women) rated their individual interest in the domain of visual arts on survey items that captured various aspects of individual interest, including feeling, meaning, and perceived knowledge. Participants also responded to a series of interview questions that were designed to assess individual interest. The interview responses were quantified in order to correlate them with the rating scales. Strong correlations between the rating scale survey measures and the interview were observed. In addition, both survey and interview measures positively predicted a behavioral measure of interest, exploration. These results suggest that data from survey measures of individual interest can be similar to those obtained with an interview. Remaining questions hinge on how individuals become aware of their interests in order to accurately report interest in either context.

A Conceptual Model of Internal and External Factors that Support Interest Development within Domains

Keywords: Attitudes and beliefs, Developmental processes, Educational Psychology, Motivation

Presenting Author: Tamara Jetton, Central Michigan University, United States

Co-Author: Jonna Kulkiewich, Penn State, United States

Individuals have the capacity to both think and feel, and the power of these cognitive and affective factors within them support their progress toward expertise. Without the motivation or will to learn, many individuals cut short their progression toward expertise in a domain; it is their will and interest in examining and investigating information that drives and propels individuals toward expertise (Alexander, 2010; Renninger & Hidi, 2016). This research examines the extant research regarding interest development within an academic domain. Using the theoretical framework of the Model of Domain Learning (Alexander, 2003) and the Four-Phase Model of Interest Development (Renninger & Su, 2012), we explore the internal cognitive and motivational supports, and the external environmental supports for maintaining and increasing interest as individuals progress toward expertise in a domain. Using this framework and the extant literature, we constructed a conceptual model of internal and external variables that support and increase interest as learners progress from academically or novice domain learners to more competent learners and then to proficient learners who are experts in the field. This roundtable discussion will focus on the presentation of this model, along with a discussion of how each internal and external variable functions to support academically, competent, and proficient learning with an academic domain. Further discussion will focus on interest measurement, in light of this conceptual model.

Measuring teachers’ and students’ empathy

Keywords: Emotion and affect, Informal learning, Motivation, Motivation and emotion

Presenting Author: Csaba Gyapay, University of Szeged, Doctoral School of Education, Hungary

Empathy is a really complex concept, the meaning of which has gone through several alternations during the last century. Many disciplines (e.g. sociology, linguistics, psychology or ethics) show equal interest to empathy in different ways (Irishkina et al., 2003), which can be a reason for it not being clearly defined so far. From one perspective, empathy is even a key factor for teachers’ and students’ success. Several studies (e.g. Swan & Riley, 2012; Vorakult & Rulic, 2013) deal with examining teachers’ empathy using both qualitative and quantitative methods. According to Davis (1980), empathy is a multidimensional construct with four dimensions (fantasy, empathic concerns, perspective taking and personal distress), which can be measured by his Interpersonal Reactivity Index. In our research this measurement tool was applied as well. Teachers and their students’ level of empathy was examined in 2015-2016 (N Teachers: 69, N students: 525). We examined students’ empathy in three different age (at the age of 12, 15 and 18) while we examined teachers’ empathy based on the number of years of their teaching practice. Based on our first results there are significant difference between the examined age groups, empathic concern and perspective taking stronger at the age of 18. Considering teachers empathy no significant results were shown yet either based on gender or the number of teaching years.

Session M 332

1 September 2017 12:00 - 13:30

Pinni B - B3109

Roundtable: Assessment and Evaluation, Teaching and Teacher Education

Roundtable: Teaching Approaches

Keywords: Assessment methods and tools, In-service teacher education, Language (Foreign and second), Language (L1/Standard Language), Literacy, Pre-service teacher education, Qualitative research, Student learning, Teaching approaches

Interest group: SIG 06 - Instructional Design, SIG 11 - Teaching and Teacher Education

Chairperson: Sandra Lammerding, Germany
The role of language in content-area learning – conceptual frameworks and their underpinnings

Keywords: Language (Foreign and second), Literacy, Student learning, Teaching approaches

Presenting Author: Sari Sulkunen, University of Jyväskylä, Finland
Co-Author: Johanna Saario, University of Jyväskylä, Finland
Co-Author: Tanja Nikula, University of Jyväskylä, Finland
Co-Author: Mirja Tarranen, University of Jyväskylä, Finland
Co-Author: Merja Kauppinen, University of Jyväskylä, Finland
Co-Author: Eija Alto, University of Jyväskylä, Finland

In the context of school education there are several challenges for learning which intertwine the issues related to language, literacy and content area. In recent years, researchers have paid increasing attention to the role of language and social interaction in learning across curriculum, e.g. in math (Mensor & Sam, 2006) and history (Barton & Levstik, 2009). This approach has shown to provide the necessary support for all students, especially for those struggling with reading and writing complex and abstract texts (Hynd-Shanahan, 2013), for those with insufficient language proficiency for abstract thinking and knowledge construction (Saario, 2012; Väätäinen, 2009) and for students who aren’t advanced in information processing skills with multimodal texts (Ho et al., 2011). This pedagogical approach derives from theoretical paradigms which stress the social and context-bound nature of language and literacy (Swain, Kinnear & Steinman, 2015). In other words, language is considered to be embedded in the culturally-organized and practices of the particular community. Also knowledge domains and the corresponding school subjects are such communities. In this round table session, multiple conceptual frameworks for language, literacy and content-area learning are discussed, compared and contrasted. The aim is to reach a mutual understanding of the underpinnings of each framework and to explore their compatibility and divergence.

(How) can we measure elementary school teachers’ language-support skills? 

Keywords: Assessment methods and tools, In-service teacher education, Language (Foreign and second), Language (L1/Standard Language)

Presenting Author: Birgit Happt, Humboldt-Universität zu Berlin, Germany
Co-Author: Sabine Bohn, Humboldt-Universität zu Berlin, Germany
Co-Author: Sofie Henschel, Humboldt-Universität zu Berlin, Germany

Even though the relevance of language support across the curriculum is widely accepted (e.g., Gottle & Ernst-Slavit, 2014), very little is known about teachers’ competencies to foster their students’ language skills during content classes. What is more, the development of instruments to assess teachers’ language-support skills has been largely neglected by previous research (cf. Oehler, Roth & Thoma, 2016). The current study thus aims at the development and validation of test items to assess teachers’ knowledge and competencies regarding the conception of linguistically enriched content classes. Within the scope of a larger project, in which elementary school teachers are extensively trained in their language-support skills, we developed 14 test items with a particular focus on the content of the training series. Based on data from the pre-test, in which 22 elementary school teachers from Berlin, Germany took part, we determined relationships with the pilot version of another test instrument that aims at the assessment of elementary teachers’ language-support skills. While we found a slightly positive, albeit not significant, correlation between the newly developed items and teachers’ knowledge about language and language support, as measured by the criterion variable \( r = .33, p = .27 \), there was no relationship whatsoever with the ability scale \( \lambda = .01, p = .98 \). By the time of the conference, data from the post-test will be available, which will shed light on this finding and allow for further conclusions regarding the reliability and validity of the test items.

Integrating Grammatical Knowledge in Foreign Language Teaching in Higher Education

Keywords: Language (Foreign and second), Pre-service teacher education, Quasi-experimental research, Teaching approaches

Presenting Author: Eva Noitz, University of Education Freiburg, Germany, Germany

According to the German education report conducted in 2014, the proportion of pupils with migratory backgrounds during the second phase of secondary school is nearly equal to those without. This results in a growing variety of L1 (native/first languages) and L2s (second/foreign languages) in the classroom – an environment for which future foreign language teachers, the experts for language acquisition, need to be prepared.

This paper explores an integrated, plurilingual approach to Spanish grammar teaching during pre-service teacher education. The reference is students’ grammatical knowledge in French. We thereby investigate the effectiveness of this (quasi-experimental) approach for promoting the students’ grammatical knowledge about Mood Distinction in Spanish as well as its probable impact on their future teaching skills.

Mastering Mood Use in Spanish is challenging, even for advanced students (Mentru, 2004). We expect the activation of grammatical knowledge from a previous learned and similar language to allow a deeper processing of the chosen linguistic phenomenon.

In a teachback study at secondary school we then observe if experiencing their own plurilingualism during a language course at university will influence the teaching practices of those students. A study by Burns and Knox (2006) showed that in-service teachers, after participating in a grammar class based on systemic-functional linguistics, still relied on traditional approaches. We expect the pre-service experience to result in the adaption of our approach, as teachers’ prior learning experiences […] play a powerful role in shaping their […] teaching practices” (Crandall, 2000: 35).

Session M 333
1 September 2017 12:00 - 13:30
Main Building A - A08
Roundtable
Higher Education, Learning and Social Interaction, Learning and Special Education

Roundtable: Educational Effectiveness and Phenomenon

Keywords: Assessment methods and tools, Content analysis, Engineering, Higher education, Learning disabilities, Mathematics, Numeracy, Phenomenon, Primary education, Science education, Synergies between learning - teaching and research, Video analysis

Interest group: SIG 09 - Phenomenology and Variation Theory, SIG 18 - Educational Effectiveness
Chairperson: Susan Beltran, Curtin University, Australia

The existence of Science and Engineering Practices in Making Activities

Keywords: Engineering, Primary education, Science education, Video analysis

Presenting Author: Adam Malise, Indiana University, United States
Co-Author: Amber Simpson, Indiana University, United States

In this study we used Oreo video cameras to record youth participating in making activities in underserved schools as part of an after school maker program offered by a local science center. Our goal was to identify whether the students were actively participating in science and engineering practices as outlined in the Next Generation Science Standards. We found youth participating in a variety of the practices, but participation was often shallow and definitively did not follow the sequential order implied by the standards. We will discuss both the approach and the results of this work in relation to how making experience can be evaluated for STEM learning.

Nursing students’ preconceptions of their Bachelor’s Thesis process

Keywords: Content analysis, Higher education, Phenomenography, Synergies between learning - teaching and research

Presenting Author: Arx Herron, Sophiahemmet Högskola, Sweden
Co-Author: Marianne Terås, Stockholms universitet, institutionen för pedagogik och didaktik, Sweden
Co-Author: Margareta Westerbon, Sophiahemmet Högskola, Sweden
Co-Author: Max Schia, Stockholm University, Sweden
Co-Author: Björn Fossus, Sophiahemmet Högskola, Sweden

This study aimed at examining variation in nursing students’ preconceptions of their Bachelor’s Thesis process. A total of 93 nursing students answered a single open question by writing. Qualitative Content Analysis was used as an analytic method. Framework of Variation Theory guided the interpretation for the results giving three main categories describing three levels of conceptions: 1) Preconceptions were expressed as mixed emotions ranging from despair to positive excitement in relation to the individual resources demanded in the pursuit. 2) The concept of supportive learning was related to learning activities, good relations to study mates, tutors and examiners. 3) The students expressed expectations that their BT process will facilitate knowledge to future professional work as a qualified nurse and/or researcher. Thus, Bachelor Thesis is highly appreciated by nursing students. This study proposes that the three levels of preconceptions function as motivational frames of reference in learning; furthermore they contain pedagogical potential for teaching in higher education for professionals.

How to assess numerical competences differentially in secondary education?

Keywords: Assessment methods and tools, Learning disabilities, Mathematics, Numeracy

Presenting Author: Katharina Lambert, University of Tübingen, Germany
Co-Author: Tanja Dackermann, Knowledge Media Research Center, Germany
Co-Author: Kornbain Moeller, Leibniz-Institut für Wissensmzedien, Germany

Numeracy is a key competence for personal and vocational prospects. Accordingly, respectively deficits pose a major disadvantage to affected individual. Therefore, early identification of numerical deficits is crucial for remedial interventions. However, there are currently hardly any assessment tools for children and primary school students and the few existing ones do not differentiate well within the group of low achieving adolescents. As a result, our knowledge about the exact profile of deficits of mathematical low-achieving adolescents is still rather patchy. In the present study, we evaluated numerical competences in this population (grades 5 to 10 or first year of vocational training) with the aim of constructing a new test for this age group. Analyses of over 1400 adolescents in a pilot study revealed that students from the lowest track of German secondary schools showed severe deficits in basic numerical competencies such as magnitude understanding, clock reading, and arithmetic but also fractions, decimals, percentages, as well as graph interpretation. Even though difficulty level was very low corresponding to the Levels I to II of PISA assessment, many students could just solve the most basic problems. In the round table
session, we would therefore like to discuss the question of how to assess numeracy differentially in secondary education in terms of selection of appropriate basic numerical tasks, difficulty level and minimum standards that should also apply for this group.

Session M 334
1 September 2017 12:00 - 13:30
Pinni B - 83111
Single Paper
Educational Policy and Systems, Learning and Social Interaction, Learning and Special Education

Paper Presentation: School and Teacher Effectiveness
Keywords: Assessment methods and tools, Alt-risk students, Attitudes and beliefs, Cultural diversity in school, Educational policy, Ethnography, Psychometrics, Qualitative methods, Quantitative methods, School effectiveness, Social aspects of learning and teaching, Teacher Effectiveness
Interest group: SIG 21 - Learning and Teaching in Culturally Diverse Settings, SIG 23 - Educational Evaluation, Accountability and School Improvement
Chairperson: Jonathan Goff, France

School Leadership and Intercultural Understanding
Keywords: Cultural diversity in school, Ethnography, Qualitative methods, School effectiveness
Presenting Author: Julanne Moss, Deakin University, Australia
Co-Author: Trevor McCandless, Deakin University, Australia
Co-Author: Joanne O'Mara, Deakin University, Australia

Our research is set in Australia and was conducted between 2012-2015. Data were collected as part of larger, multi-method study 'Doing diversity: Intercultural understanding in primary and secondary schools'. The study was funded by the Australia Research Council (ARC/Link 12000319) in partnership with the Victorian Department of Education and Training (DET), the Victorian Curriculum and Assessment Authority (VCARA), and the Together for Humanity Foundation (THF). The project aim was to identify factors that facilitate and impede intercultural capabilities in students, teachers and schools' (Authors 2015, p. 8). The project uses a mixed method design and has multiple data sources. The key research question of this large research project is 'What inhibits and what enables intercultural understanding (ICU) in primary and secondary schools?' (Authors 2012). Our paper is focused on the second aim of the project, that is to 'Generate essential knowledge of the processes and principles for improving ICU outcomes through an in-depth, longitudinal study of the impact of students and teachers' ICU of teacher professional learning, ICU interventions with students, and research-led redesign of the cultural architecture of schools i.e.: policies, practices, practices' (Authors 2012, p. 6). The research and this paper speaks to the achievement of positive social change, excellence and equity, issues which are characterized by Doppeler and Ansorge (2016) in their introduction to a recently published special issue Using inquiry-based approaches for equitable school improvement as 'the greatest challenge for those who are involved with school effectiveness and improvement' (p.1).

Teacher Commitment to Poor Students: Self-Interest and Ethic of Service in the Face of Adversity
Keywords: At-risk students, Attitudes and beliefs, Educational policy, Teacher Effectiveness
Presenting Author: Miguel Ordones, University of California at Berkeley, United States

This study aims to understand how teachers maintain commitment to students under treacherous conditions of adversity and high pressure to perform under competitive accountability and market conditions. Teachers dealing with students, who are unable or unwilling to concentrate on learning or to abide by school or classroom norms, may challenge teachers in their core competencies and needs for well-being. These adverse conditions may put a great strain on teacher commitment to marginalized students. Education systems regulated by a combination of accountability and market incentives may put additional strain on educators, or perhaps may function as a sort of organizational guardrail that helps educators maintain commitment when 'blaming the victim.' Understanding teacher commitment to students facing adversity is central; however, the literature on this phenomenon is surprisingly underdeveloped. This study makes two contributions. First, based on the literature of teacher commitment, beliefs of desirability, and incentives for teachers this study advanced a theoretical framework to understand teacher commitment to students under socioeconomic adversity and the pressure of extrinsic incentives. Second, by conducting an in depth multi-case study of five schools, it sheds light on how teachers maintain commitment to students in Chile, a country where the convergence of accountability pressure, market competition, and socioeconomic adversity is dramatic. The findings are expected to be relevant for a broad spectrum of education systems where schools labor under extreme conditions of poverty and exclusion and where external accountability and market pressure co-exist for regulating schools.

Psychometric properties of a Swedish instrument measuring pedagogical leadership – a Rasch analysis
Keywords: Assessment methods and tools, Psychometrics, Quantitative methods, School effectiveness
Presenting Author: Lisa Hallsström, Malmö University, Sweden

The Swedish Pedagogical and Social Climate in School (PESOC) instrument is intended for studies on school effectiveness. Based on the theoretical framework from the early stages of international school effectiveness research, the instrument has been widely used for school improvement efforts using teachers as respondents. The aim of the current study is to analyze whether the PESOC-PLP scale shows sound psychometric properties for measuring pedagogical leadership, using Rasch analysis. The study included 344 teachers. The Rasch analysis indicated two subdimensions and qualitative analysis of the content of the items in these subdimensions revealed two types of leadership: direct pedagogical leadership and indirect pedagogical leadership. Additional Rasch analysis of these subdimensions showed sound psychometric properties for measuring pedagogical leadership. Considering the global need for new measurement instruments that assess effective and successful leadership researchers and educators outside Sweden may have interest in adapting this scale.

Learning is like...what? Metaphors of Learning in Germany, China, USA and France
Keywords: Assessment methods and tools, Attitudes and beliefs, School effectiveness, Social aspects of learning and teaching
Presenting Author: Elisabeth Wegner, University of Freiburg, Germany
Co-Author: Matthias Nickles, University of Freiburg, Germany

Metaphors of learning can be an indicator for how students experience learning. Therefore, goal of the study was to compare metaphors of learning between different countries and different kinds of schools. N= 886 high school students from four countries were asked to write down their metaphors of learning (Germany: 489, France: 123; China: 220; USA: 55). In the USA and in Germany, the most frequent sources were moving forward or upward, seeing something new or doing sports. In China, the metaphor of moving was also very frequent, however, students expressed more often than in other countries that learning is a duty. In contrast, most of the French students described learning as receiving something. Also, we found large differences within different kinds of German schools. Students following the vocational track of high schools were more likely to describe learning as unnecessary suffering or hard work than students following the academic track. Generally, metaphors of learning highlight the way high school students experience learning and they give insights into how differences in educational systems as well as in culture and language might influence these experiences. However, further research is needed to clarify how these differences arise.

Session M 335
1 September 2017 12:00 - 13:30
Pinni B - 83117
Poster Session
Educational Policy and Systems, Higher Education

Poster Presentation: Higher Education and Mixed-Method Research
Keywords: Comparative studies, Educational policy, Educational Technology, Higher education, Learning analytics, Learning approaches, Lifelong learning, Mathematics, Mixed-method research, Physical Sciences, Researcher education, Science education, Secondary education, Self-regulation, Student learning, Synergies between learning - teaching and research
Interest group: SIG 04 - Higher Education
Chairperson: Minna M Hannula-Sormunen, University of Turku, Finland

Developing self-regulated learning skills: A longitudinal study with higher education students
Keywords: Higher education, Self-regulation, Student learning, Lifelong learning
Presenting Author: Elisabeth Müller, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

This poster focuses on self-regulated learning as a key competence in innovative societies and therefore as a current issue in higher education. If society is based on individuals able and willing to permanently acquire new knowledge and improve their skills, then higher education needs not only to promote professional knowledge and skills but also knowledge and skills for self-regulated learning. The poster presents a conceptual framework for the various aspects of self-regulated learning drawn from the literature. It also presents the design of an ongoing longitudinal study at a University of Applied Sciences involving 300 social work students and the results of a preliminary study (pre-test).
A questionnaire for assessing the learning approaches of university chemistry students: ChemApproach

Keywords: Higher education, Learning approaches, Physical Sciences, Science education

Presenting Author: Mika Lastusilta, University of Turku, Finland

Co-Author: Euro Lastusilta, University of Turku, Finland

Co-Author: Mari Murtonen, University of Turku, Finland

The theory of learning approaches has proven to be one of the most powerful theories explaining university students' learning. However, learning approaches are sensitive to the situation and the content of learning. Chemistry has its own specific features that should be considered when exploring chemistry students' learning habits, specifically the role of practicals (i.e., hands-on laboratory work) as they are crucial in chemistry education. Therefore, the aims of this study were to find and validate a questionnaire for measuring chemistry students' learning approaches. A 17-item questionnaire was tested with 561 Finnish first-year Chemistry students from four different universities. Students spanning from first-year bachelor level to fifth-year master level participated in the study. The statistical analyses showed that a four factor model fitted the data best and these factors were named as submissive surface, technical surface, active deep, and practical deep. In order to establish validity, the model was further tested with analysis in the subgroups of the major subject and gender. The analyses show that the questionnaire is statistically valid and can be used in studying chemistry students' learning approaches.

Explaining the Silence on Ethics in Doctoral Examination

Keywords: Higher education, Mixed-method research, Researcher education, Synergies between learning - teaching and research

Presenting Author: Allyson Holtbruck, SORIT, The University of Newcastle, Australia

Co-Author: Kenny Daily, SORIT, The University of Newcastle, Australia

Co-Author: Carol Avery, SORIT, The University of Newcastle, Australia

Co-Author: Terence Lovett, The University of Newcastle, Australia

Co-Author: Hedy Fairbairn, SORIT, The University of Newcastle, Australia

There is an expectation that all researchers will act ethically and responsibly in the conduct of research involving humans and animals. While research ethics is mentioned in quality indicators and codes of responsible researcher conduct, it appears to have little profile in doctoral assessment. Institutional climate and supervisory scaffolding appear to be key in developing positive attitudes towards research ethics in candidates; however, it is not clear if candidates are being adequately prepared to consider ethical principles in the design, conduct and reporting of their research. There seems to be an implicit assumption that ethical competence has been achieved by the end of doctoral candidacy and that there is no need for candidates to report on the ethical dimensions of their study nor for examiners to assess this integral aspect of researcher development. In the context of ensuring that institutions are fulfilling their responsibility of producing ethically sensitive and competent researchers, it is salient to determine the extent to which the doctoral thesis and examination process reflect a candidate's ethical development.

This paper reports on two phases of a study being undertaken to explore the phenomenon of ethics in doctoral theses and the examination process. Phase 1 focuses on the ways in which ethics features in examiner reports and Phase 2 will analyse the text of Australian theses to determine the nature and extent of candidates reporting on the ethical dimensions of their research. Implications of this analysis will be discussed with reference to doctoral standards and doctoral training programs.

Learning Analytics Features Self-regulated Learners Prefer for Learning

Keywords: Educational Technology, Higher education, Learning analytics, Self-regulation

Presenting Author: Clara Schumacher, University of Mannheim, Germany

Co-Author: Dirk Iffthaler, University of Mannheim, Germany

More and more learning in higher education is supported by educational technology, which allows to analyze the data generated by the learners while using these technologies aiming to understand and support individual learning processes better. Thus, learning analytics allows to provide highly personalized learning environments meeting the different needs of learners by analyzing various information. Such systems enable students to directly interact with the user interface which provide several features, visualizations, or tools (e.g., information about performance, status of assignments, learning recommendations). The purpose of this quantitative study (N = 216) was to investigate the relation of specific learning analytics features rated in terms of learning and components of learners’ self-regulation.

Findings showed that evaluating learning analytics features for learning are related to self-reported self-regulation capabilities of students.

Understanding student engagement in the universities across the Greater China

Keywords: Comparative studies, Higher education, Mixed-method research, Student learning

Presenting Author: Lily Min Zeng, The University of Hong Kong, Hong Kong

Co-Author: Luke K. Fryer Fryer, The University of Hong Kong, Hong Kong

Co-Author: Maggie Yui Zhao, The University of Hong Kong, Hong Kong

Co-Author: Yan Luo, Tsinghua University, China

Co-Author: Gordon Y. N. Tang, Hong Kong Baptist University, Hong Kong

Co-Author: Wai Yin Ng, The Chinese University of Hong Kong, Hong Kong

Co-Author: Christine A. Armata, The Hong Kong Polytechnic University, Hong Kong

The student experience has generally been measured as satisfaction with instruction and course learning environments in Hong Kong universities. Alternatively, student engagement, namely, students’ participation in a broader range of activities which enhance learning outcomes, became central to the understanding of student experience in other parts of the world. Started from American universities, the use of the student engagement framework has steadily expanded globally for the past four decades. More recently, the Chinese College Student Survey based on the same theory was developed and implemented in many universities in Mainland China during the past decade.

This paper is a bridge to the Mainland Chinese work and extends our understanding of the student experience in Hong Kong. The project includes the development of a Hong Kong Survey of Student Engagement followed by an inter-institutional validation and triangulation which combining data analytics and lecture observation techniques.

Preliminary qualitative and quantitative work developing a Hong Kong Survey of Student Engagement will be presented. These quantitative findings will be presented along with established longstanding results from institutional data on students' programme experiences. Through the joint results of these two streams of research, theoretical work towards the development of a framework integrating the best of Student Learning Theory (used across Hong Kong institutions for more than eight years) and Student Engagement Theory will be presented. Implications for integration and theory development as well as the practical opportunities for inter-institutional support across Hong Kong and Greater China will be discussed.

Upper secondary school subject choices: Critical bottlenecks of the Finnish education system

Keywords: Educational policy, Higher education, Mathematics, Secondary education

Presenting Author: Hanni Maunonen, University of Oulu, Finland

Co-Author: Satu Kaatari, City of Oulu & University of Oulu, Finland

Co-Author: Joum Pursilainen, University of Oulu, Finland

A study based on large register data examines student's subject choices at upper secondary school and how these students have been recruited to higher education in a ten year span. Numerous international studies have examined the reasons why females continue to be underrepresented in the sciences and the present study indicates the same. The study finds that girls are more likely to choose science-related subjects, but that boys are more likely to consider subjects that are not typically seen as 'female' or 'male' oriented. The implications for policy and practice are discussed.

Session M 336
1 September 2017 12.00 - 13.30
Main Building D - D14
Roundtable
Learning and Instructional Technology, Learning and Social Interaction
Roundtable: Social Interaction in Learning and Instruction

Keywords: Conversation / Discourse analysis, Early childhood education, Experimental studies, Learning Technologies, Metacognition, Out-of-school learning, Science education, Social aspects of learning and teaching, Student learning, Teaching / Instruction, Video analysis

Interest group: SIS 10 - Social Interaction in Learning and Instruction

Chairperson: Lorna Bouke, Liverpool Hope University, United Kingdom

Socially-shared metacognition processes of 7th graders throughout science museum context in Turkey

Keywords: Learning Technologies, Metacognition, Out-of-school learning, Science education

Presenting Author: Gamze TURKMEN, Middle East Technical University, Turkey

Co-Author: Zahide YILDIRIM, Middle East Technical University, Turkey

This study aims at investigating socially-shared metacognition processes of 7th graders based on science lessons within a science museum context. Research questions are collected under three main themes which are (1) detecting current practices of science museum context in reference to students', science teachers' and museum educators' perceptions, (2) investigating metacognition processes of
Impact of learning goals and protagonists’ behavior on interactions in and effectiveness of tutoring

Keywords: Conversation / Discourse analysis, Experimental studies, Student learning, Teaching / instruction

Presenting Author: Stephanie Herpich, University of Freiburg, Germany
Co-Author: Joerg Wittwer, University of Freiburg, Germany

Tutoring is an effective form of instruction. The key to its effectiveness is seen in the intensive one-on-one interaction between a tutor and a tutee. Less reliable knowledge exists about factors that influence this process and consequently its effectiveness. Our planned project aims at testing the influence of two assumed central factors – the learning goal of the tutoring and the protagonists’ behavior – with two related experiments. Participants in each experiment are n = 50 physics teacher students as tutors and n = 50 high school students as tutees. The topic covered in tutoring is energy. In the first experiment, the tutor-tutee-dyads solve physics problems to attain a skill acquisition learning goal. The second half discusses physics problems to attain the goal of deepened understanding of concepts and principles. In the second experiment, tutoring with tutors who receive training for enhanced instructional strategies is compared with tutoring with tutees who receive training for enhanced learning strategies. Here, the learning goal is deepened understanding of concepts and principles because tutoring for this goal has not been well-studied yet, despite the importance of teaching for understanding. We expect results that inform us about the differences in quality and effectiveness of the tutoring process as a function of the two examined factors, about ways to improve the tutoring process, and about who to target with support for improvement, the tutor or the tutee or both. We would like to discuss details of the design at the round table to create optimally productive research.

Teachable moments in early childhood classrooms: Operationalizing key features and boundaries

Keywords: Early childhood education, Social aspects of learning and teaching, Teaching / instruction, Video analysis

Presenting Author: Mayra Mascareño, University of Groningen, Netherlands
Co-Author: Catherine Snow, Harvard Graduate School of Education, United States
Co-Author: Marjolein Deunk, University of Groningen, Netherlands

The effects of teacher-child interactions on child outcomes has predominantly been explored by means of general assessments of classroom quality and by micro-analysis of interactions at the utterance level. Neither of these levels, however, is able to directly capture key transactions at the micro-time in which learning occurs. A unit of analysis that captures the sequential aspect of interactions is teachable moments, interactional sequences characterized by an appropriate match between the learning opportunity and the child’s readiness to grasp this opportunity. In a previous study we concluded that recurrent Initiation-Response-Follow-up patterns of interaction with complexity shifts were associated with child vocabulary and symbolic understanding, suggesting that dynamic adjustments of the complexity of interaction might favor child learning. Building on those findings, we aim at refining the coding scheme to allow for the identification of teachable moments. Definitions and boundaries to examine these sequences are necessary, and they represent the focus of this round table presentation.

Session M 337
1 September 2017 12:00 - 13:30
Pinni B - B41117
Roundtable
Educational Policy and Systems, Higher Education, Lifelong Learning

Roundtable: Lifelong Learning and Researcher Careers

Keywords: At-risk students, Doctoral education, Educational policy, Lifelong learning, Out-of-school learning, Peer interaction, Quantitative methods, Researcher education, Science education, Vocational education, Workplace learning

Interest group: SIG 14 - Learning and Professional Development, SIG 24 - Researcher Education and Careers

Chairperson: Nathalie Huet, University of Toulouse, France

Acquisition of hard-to-learn knowledge in the domain of geriatric care nursing

Keywords: Out-of-school learning, Peer interaction, Workplace learning, Lifelong learning

Presenting Author: Bianca Steffen, University of Paderborn, Germany
Co-Author: Christian Hartes, University of Paderborn, Germany
Co-Author: Michael Goller, University of Paderborn, Germany

This contribution aims to investigate the learning process of newly hired geriatric care nurse assistants. The main focus of this interview study with 14 German geriatric nurses was (1) to identify knowledge that is hard to learn but simultaneously highly important for the daily work as a nurse assistant as well as (2) to clarify which of this knowledge cannot be gained solely with already existing activities and strategies. First findings implicate two domains being particularly hard to learn. The findings of this study will be used to deduce practical implications of how to improve the current learning process of such nurse assistants.

Different Effects of Department Prestige on Post-PhD Job Placement

Keywords: Doctoral education, Quantitative methods, Researcher education, Science education

Presenting Author: Jakob Tesch, DZHIV - German Centre for Research on Higher Education and Science Studies, Germany

This paper investigates the effect of the PhD granting department’s prestige on the postdoctoral job placement of PhDs. Previous studies have discussed three main types of effects of department prestige on job placement, namely prestige effects, selection effects and training effects. The study will analyze whether prestige effects are mediated by measures of past achievements and career preferences as measures for selection and training effects. Job placement is analyzed using longitudinal data from the German Doctoral Candidates and Doctorate Holders Study ProFile. Job placement is conceptualized as placement in academic R&D in comparison to placement in other sectors, the change in university after the PhD and job income. Prestige is conceptualized using data on visibility of research output from the Leiden Ranking. Both data sources - Leiden Ranking and ProFile - will be matched and multi-level regression models will be computed to assess the effect of prestige on job placement while controlling for career preferences, PhD grades and earlier achievements.

Lifelong learning policies and their implications for young adults at risk in Germany

Keywords: At-risk students, Educational policy, Vocational education, Lifelong learning

Presenting Author: Alina Florentina Bouluc-Kaiser, University of Education Freiburg, Germany

This paper explores how lifelong learning (LLL) policies influence or change the individual life projects of young and young adults at risk. Studies at risk of leaving school with migration background, early school leavers with migration background and young adults not in school or in training (NEETs), single parents, etc. As these groups are heterogeneous in school living conditions, their position in the education system or in the transition school to work and their freedom and autonomy in biographical decisions vary at local and regional German level substantially. In many cases the LLL policies push youth and young adults at risk to assume standardized life projects according to economic needs, and thus create new life course normality expectations forgetting to take into account individual specific contexts and the fact that life courses become more and more de-standardized.

Session M 338
1 September 2017 12:00 - 13:30
Main Building A - A07
Roundtable
Instructional Design, Teaching and Teacher Education

Roundtable: Teacher Education and Professional Development

Keywords: Comparative studies, Competencies, Conceptual change, Design based research, Instructional design, Pre-service teacher education, Primary education, Science education, Special education, Teacher Professional Development

Interest group: SIG 11 - Teaching and Teacher Education, SIG 15 - Special Educational Needs

Chairperson: Lucie Mottier Lopez, University of Geneva, Switzerland

Supporting sustainable professional development in teachers implementing STEM education

Keywords: Design based research, Primary education, Science education, Teacher Professional Development

Presenting Author: Mireille Hubers, Fac. of Behavioural Sciences, University of Twente, Netherlands
Co-Author: Maaike Endo, University of Twente, Netherlands

Globally, there is an increasing focus on teaching all students Science, Technology, Engineering and Mathematics (STEM) from primary education onwards. This resulted in many professional development programs that aim to support teachers in providing such content to their students. However, it is challenging to sustainably change the way in which teachers’ incorporate STEM in their curriculum. To gain
more insight into this sustainability challenge, the present study aims to determine 1) what factors influence the sustainability of STEM interventions, 2) how the development of such factors can be monitored, and 3) what the design requirements are for instruments assessing sustainability.

The present design-based study focused on five interventions that target the way in which teachers use STEM in their daily educational practice (e.g., stimulating students’ 21st century skills). These interventions were selected in collaboration with the Dutch national centre of expertise in STEM education (“Tech Your Future”). For each intervention, the principal investigator and two participating schools were included in the present study. A semi-structured interview scheme was used to individually interview the participants. Member-checks were performed to ensure the correctness of the interpretations.

Amongst other things, school leadership, resources and teachers’ knowledge and attitudes about STEM were found to be important factors influencing teachers’ professional development. Moreover, in measuring sustainability, attention should be paid to the degree to which elements of the professional development program are implemented (e.g., through using student evaluations). The theoretical and practical implications of these findings will be discussed.

Fostering teacher trainees’ assessment skills with real-life learning tasks
Keywords: Competencies, Design based research, Instructional design, Pre-service teacher education
Presenting Author: Christiane Klein, University of Freiburg, Germany
Co-Author: Stephanie Herpich, University of Freiburg, Germany
Co-Author: Jeorg Wittwer, University of Freiburg, Germany
Co-Author: Matthias Nickles, University of Freiburg, Germany

Assessing students in classroom teaching is a complex skill. Consequently, its acquisition in teacher preparation requires trainings that emphasize the complex nature of assessing students. The 4-Component-Instructional-Design (4C/ID) model developed by van Merriënboer (1997) is an evidence-based approach to the training of complex skills. At the heart of this model is the use of holistic real-life learning tasks. So far, the 4C/ID model has not been applied for learning assessment skills in German teacher’s training programs. Thus, we designed a long-term training for acquiring assessment skills based on this model. This training possesses two central elements, namely, learning tasks that address variable authentic assessment situations and a development portfolio to support and continuously monitor skill acquisition. To evaluate the extent to which the training fosters learning, we plan to compare teacher trainees who participate in the training with teacher trainees who take part in a training that is not designed in accordance with 4C/ID principles. Moreover, to examine the process of skill acquisition in more detail, we analyze the development portfolios. Based on the data collected, we will discuss the potential of the designed training to promote assessment skills and provide insights into the processes involved in acquiring the complex skill of assessing students.

Mindsets About Inclusion: A Comparison Between Concept Maps of German and Finnish Student Teachers
Keywords: Comparative studies, Conceptual change, Pre-service teacher education, Special education
Presenting Author: Franziska Greiner, Friedrich-Schiller-University Jena, Germany
Co-Author: Baarbel Kracke, University of Jena, Germany

The struggle between policy and education features strongly in the discourse about inclusion. On the one hand there is a clear requirement on the German education system since the 2009 ratification of the Convention on the Rights of Persons with Disabilities (CRPD); and on the other German teachers and student teachers thinking and action is influenced by a long tradition of a selective school system and society.

In contrast to Germany, Finland’s education system is known as model example. Maybe this could be explained through Finland’s ten year head start (see Comprehensive Instruction Law of 1999) has allowed for more time to develop open mindsets and elaborate knowledge structures.

Using concept maps – a method which is verified to be effective for usefully indicating student’s mentality and its structure (Reiska et al., 2008) – the presentation will compare the knowledge structures and mindsets of German and Finnish student teachers. Using qualitative variables (e.g. structure complexity and propositional structure) in comparing constructed concept maps it will be seen whether Finnish student teachers have more differentiated, elaborate and well-structured concept maps than German students.

Session M 339
1 September 2017 12:00 - 13:30
Main Building C - C5
Roundtable: Learning and Social Interaction, Teaching and Teacher Education

Roundtable: Teacher Effectiveness
Keywords: Action research, Arts, Attitudes and beliefs, Educational policy, Mixed-method research, Primary education, Teacher Effectiveness, Teacher Professional Development, Teaching / instruction, Teaching approaches
Interest group: SIG 11 - Teaching and Teacher Education
Chairperson: Tracy Zou, The University of Hong Kong, Hong Kong

Exploring Constructivist Beliefs and Practices in an Alternative Route to Licensure Program
Keywords: Attitudes and beliefs, Mixed-method research, Teacher Effectiveness, Teaching approaches
Presenting Author: Joni Beck, Old Dominion University, United States
Co-Author: Steve Hayden, University of Nevada, Las Vegas, United States
Co-Author: Christina Santoyo, University of Nevada, Las Vegas, United States
Co-Author: Tari Plachowski, University of Nevada, Las Vegas, United States
Co-Author: Chyllis Scott, University of Nevada, Las Vegas, United States

Abstract

Approximately one-third of first year teachers hired since 2005 have entered through Alternative Route to Licensure programs. Because of the growing popularity of these programs, this proposal explores the experiences of two teacher candidates of color in a 5-week summer ARL program. This mixed methods study explored the teacher candidates’ beliefs and practices during the program. Based on the analysis of data from the beginning and end of the experience, we convey how the teacher candidates entered the program with student-centered beliefs while demonstrating teacher-centered practices and how these beliefs and practices changed over time. Implications for theoretical and practical significance are discussed.

Supporting learning and social cohesion through arts education. Interventions in Finnish schools
Keywords: Action research, Arts, Primary education, Teaching / instruction
Presenting Author: Marja-Leena Juntunen, University of the Arts Helsinki, Finland
Co-Author: Heidi Partti, University of the Arts Helsinki, Finland
Co-Author: Liisa Jaakonaho, Theatre Academy of the University of the Arts, Finland
Co-Author: Eeva Anttila, University of the Arts Helsinki, Finland
Co-Author: Mari Tervaniemi, University of Helsinki, Finland
Co-Author: Kaisa Tiippana, University of Helsinki, Finland
Co-Author: Tanja Linnavalli, University of Helsinki, Finland
Co-Author: Ido Turpeinen, University of the Arts Helsinki, Finland
Co-Author: Annika Suominen, Aalto University, Finland

In this round table session we examine the possibilities of arts education to enhance learning, participation and social cohesion among pupils in Finnish primary and lower secondary education through four ongoing intervention studies. Furthermore, we invite participants to engage in the discussion about extrinsic dimensions, values and possibilities of the arts and art education, especially in promoting pupils’ learning, growth and well-being, in compulsory education.

We will present and discuss the aims, methodologies, key concepts, preliminary findings, and possible impacts of the following interventions:

1. The Music, movement and learning intervention examines the possible impacts of added music, movement and music-and-movement activities on a variety of skills and capacities of pupils in primary education (3rd grade).
2. The Embodiment difference through In dance intervention examines how contemporary dance pedagogy can support 1st and 2nd grade pupils’ identity development and relationships in diverse, i.e. multicultural, mixed gender and mixed-ability groups.
3. The Norm, error and difference intervention aims at creating understanding of normative forces among different age groups in primary education (grades 2-6) and how art-based approaches can create group awareness of equality and acceptance of difference.

The topic of teacher education and teaching competency is of continuing interest both in scientific research and policy. In this contribution, a state funded research program is outlined that focuses on determining the effectiveness of both structural and curricular reorganization at two German universities that started to cooperate in teacher education. The overall goal of the universities’ cooperation is to develop site specific innovative concepts and thus enhance a professional oriented teacher education. The effectiveness of the cooperation onsite both on a structural and a curricular level will yet have to be
Session M 340
1 September 2017 12:00 - 13:30
Pinn A - A3088
Roundtable: Educational Policy and Systems, Higher Education
Roundtable: Higher Education and Writing
Keywords: Argumentation, Assessment methods and tools, Attitudes and beliefs, Case studies, Computer-supported collaborative learning, Educational policy, Higher education, Interdisciplinary, Peer interaction, Writing: Literacy
Interest group: SIG 04 - Higher Education, SIG 12 - Writing
Chairperson: Catherine Simon, United Kingdom
When universities take over states: an introduction to "academic capture"
Keywords: Educational policy, Interdisciplinary
Presenting Author: Mihaly Mitoavich, Center for Applied Policy, Austria
Co-Author: Elena Denisova-Schmidt, University of St. Gallen, Switzerland
This research seeks to introduce and conceptualise the notion of "academic capture" - a conflict of interest situation that arises when holders of public office with responsibility for regulating education have a personal or professional stake in the universities in their respective country. "Profit" is defined in broad terms and might range from regular payments (i.e. salary or expert fees) that members of government or members of the universities might receive from a higher education institution, to a prospect of being employed by it upon completion of their political mandate, to any other kind of material benefit, including ownership of private tertiary education institutions.

Mining Student Peer Reviews: Cross-Cultural Perspectives
Keywords: Assessment methods and tools, Computer-supported collaborative learning, Peer interaction, Writing: Literacy
Presenting Author: Djuudtu Leijen, University of Tartu, Estonia
Co-Author: Christopher Anson, North Carolina State University, United States
Co-Author: Joseph Moiely, USF, United States
Co-Author: Anna Wärnsby, Malmö University, Sweden
Co-Author: Mikael Kaukonen, Malmö University, Sweden
Co-Author: Roger舀llof, University of Tartu, Estonia
Numerous studies report on best-practices for conducting peer review from a pedagogical perspective. However, in the discipline of writing studies, there is, surprisingly, little quantitative, replicable, aggregated, data-driven (RAO) research conducted on peer reviews. In this round table session, data gathered from a web-based peer review system, MyReviews (myreviews.com), is mined and investigated to probe a better understanding what aspects of peer review may influence the writing process of students. The studies presented during the round table are data driven and replicable. In addition, as the data gathered in MyReviews is heterogeneous and comes from different countries, educational levels, text types and languages, the discussion of these results should provide added impetus for further investigations of how these quantitative studies may advance our understanding of writing in Higher Education.

Research, Representation and Obstructionism: National-Others in the Japanese University
Keywords: Argumentation, Attitudes and beliefs, Educational policy, Interdisciplinary
Presenting Author: Daoran Rivers, Future University Hakodate, Japan
Co-Author: Zelinda Sherlock, Kyushu Sangyo University, Japan
This discussion addresses the institutional existence of national-other teachers, academics and scholars (cultural guests) working within the Japanese universities (cultural hosts). It draws upon theo-critical theory of differentiation (Luhmann, 1977, 31) and the political idea of obstructionism to illustrate how within differentiated systems (drawn on the basis of nationality) we will find two kinds of environment: one environment common to all subsystems and the special environment of the institution, in which the institutional position of national-other teachers, academics and scholars is systematically regulated. These regulations include exclusion from the internal decision-making processes, positioning outside the regular academic structure and being prohibited from attending faculty meetings. These acts merge with the burden of irregular employment titles, higher workloads and oddly configured contractual arrangements. Despite these inequalities occurring in plain sight, voices of dissent have been rare, due in part to the fact that such micro-aggressions and ways of "dividing people up into groups" (Scollon et al, 2012: 3) are perceived as natural and culturally appropriate and therefore acceptable in context. However, no matter how hospitable the host appears when dealing with the guest, the "very specific position of being the guest...allows an act of inclusion to maintain the form of exclusion" (Ahmed, 2012: 43). The presenters suggest that all such practices are obstructionist, anti-democratic and detrimental to the research development and spread of ideas, representations of knowledge and ways of living originating from non-Japanese nationally teachers, academics and scholars.

Session M 341
1 September 2017 12:00 - 13:30
Pinn A - A2088
Roundtable: Cognitive Science
Roundtable: Metacognition, Graphics and Reasoning
Keywords: Case studies, Cognitive skills, Comparative studies, Comprehension of text and graphics, Experimental studies, Metacognition, Physical Sciences, Professions and applied sciences, Raasming, Science education, Secondary education, Student learning
Interest group: SIG 02 - Comprehension of Text and Graphics, SIG 16 - Metacognition, SIG 26 - Argumentation, Dialogue and Reasoning
Chairperson: Maria A. Flores, University of Mito, Philippines
Metacognitive knowledge and creative process: a comparative qualitative study in three art fields
Keywords: Case studies, Cognitive skills, Comparative studies, Metacognition
Presenting Author: Violeta Varner, FLACSO, Argentina
Metacognitive thoughts by creativity by artists, scientists and designers can give us some inputs to better understand creative process. This is a work in progress. It is a qualitative study with semi open questions. We will present the first stage, interviews to artists in three fields, music composition, dance composition or choreography and filmmaking. We will compare their experiences and metacognitive thoughts about creative process. Also we participate in the domain specific- domain general debate, or if creative abilities are domain general or domain specific. We analyze as well what level of consciousness artists have about the creative process and how it influences their work.

Using a graphic organizer to improve comprehension and recall of a medical guidance text
Keywords: Comprehension of text and graphics, Experimental studies, Professions and applied sciences, Student learning
Presenting Author: Eli Kosmimsky, Ben-Gurion University, Israel
Co-Author: Shira Loewen, Ben-Gurion University, Israel
Topics: Medicine
Texts are dominant when providing medical information, but often they are beyond the reading level of most patients Alternative formats, such as graphic organizers, can improve understanding and recall of the guiding information. The study examines the effect of adapting a graphic organizer format on understanding and recalling behavioral guidelines to reduce the consequences of neuropenia, and is given to post-chemotherapy cancer patients, compared with the original guidelines. Since cancer is perceived as a threatening situation, it often provokes anxiety. Therefore, we’ve also examined the effect of induced anxiety on comprehension and recall. 80 patients were randomly assigned to: (a) receiving a document in a text format, a graphical format, or in both formats, by (b) inducing anxiety or not. Understanding and recall were superior with the graphical format condition compared with the other two conditions. While we induced state anxiety, it did not affect understanding and recall.

Characterizing and Promoting Secondary Students’ Reasoning about Evidence in Science
Keywords: Physical Sciences, Reasoning, Science education, Secondary education
Presenting Author: Guangzhong Ma, The University of Hong Kong, China
Co-Author: Jan van Ast, The University of Hong Kong, Hong Kong
Co-Author: Carol Chan, University of Hong Kong, Hong Kong
An overlooked practice of claim evaluation with evidence in scientific reasoning literature is evaluating the evidence itself, especially in face of prior beliefs in science. The paper reports on secondary students’ evaluation of evidence in face of misconceptions in sciences, and the results of an intervention with them designed to promote this evaluation. This intervention embodied three conjectured contributing factors, including epistemological understanding, scientific explanation, and knowledge about experimental error. Seventh graders (N = 36) were asked to evaluate evidence that contradicted their prior misconceptions about Newtonian mechanics. They were engaged to evaluate three naïve responses to this question against materials that conveyed the ideas about the aforementioned factors. Results showed that prior to the intervention students had difficulties de-contextualizing their misconceptions from the reasoning, which may lead them to ignore the data, discount the method of obtaining the data and make it difficult to interpret the data variability. We found an overall positive effect of the intervention in facilitating students to attend to the evidence, accept the method, and interpret the data variability. However, individual differences in the effect existed. The study extends current research on claim evaluation by identifying students’ difficulties in reasoning about evidence that contradicted their misconceptions, and showing the aforementioned factors and the engagement in evaluating naïve responses facilitate this reasoning. Future research involves describing the processes by which the change in this reasoning occurs, and explaining how these processes lead to the change.

Session M 342
Design thinking: Teachers’ approaches to creating learning experiences for their students

Keywords: Teacher Effectiveness, Teacher Professional Development, Teaching/Instruction, Teaching approaches

Presenting Author: Lori Lockyer, University of Technology Sydney, Australia

Co-Author: Sue Bennett, University of Wollongong, Australia

Co-Author: Shirley Agostino, University of Wollongong, Australia

This paper reports on the research design and findings the first phases of a current Australian study trails to understand how teachers engage in the design of learning experiences. The research project re-conceptualises what comprises teaching by drawing attention to the teachers’ design work. Specifically, the study focuses on teacher design thinking as a cognitive process that occurs in a social context.

The study takes a qualitative, multi-phase multiple case study approach to investigate how expert and novice teachers think about and approach the design of learning experiences and how evidence-based models might stimulate novice teachers’ design thinking. The outcomes of this project will inform the development of improved strategies and resources for initial teacher preparation and ongoing teacher professional learning.

On all Board! Successful School-Family Partnerships in Schools with Personalized Learning Concepts

Keywords: Conceptual change, Content analysis, Parental involvement in learning, Teaching/Instruction

Presenting Author: Ritu Sletier, Universität Zürich, Switzerland

Co-Author: Katrin Vassak Staub, University of Zurich, Switzerland

What makes communication and cooperation between schools and families effective, when schools have changed their ‘grammar of schooling’? (Tyack & Tobin, 1994, p. 454) towards personalized learning (Murphy et al., 2016)? We present results part of a longitudinal research project on schools with personalized learning concepts in Switzerland. For qualitative content analysis of interviews and strategic documents of schools (n=12) an analytic instrument was developed semi-deductively based on research on school-family partnerships (e.g. Jeynes, 2012), with six main communication and cooperation structures such as channels of information flow and six content areas such as the pedagogic concepts. The key findings show that strategic linking of which communication and cooperation structures accommodate which contents are beneficial for school-family partnerships, rather than rigid parent involvement procedures. Three typologies emerged: Schools with informal structures/contents; with little formal/conflict management oriented structures and variable contents; with formal structures and pedagogical contents. Reciprocal relations become crucial when re-conceptualizing school environments, and aligned with personalized learning where students’ different needs are addressed, this work enables a more tactic approach to school-family partnerships.


Parent’s attitudes and expectations and home practices in the development of early numeracy skills

Keywords: Achievement, Cognitive skills, Numeracy, Teaching/Instruction

Presenting Author: Javier Rosales, Universidad de Salamanca, Spain

Co-Author: Blanca Hernández, University of Salamanca, Spain

Co-Author: Marta Ramos, Salamanca University, Spain

The present longitudinal study investigated the influence of formal and informal home numeracy practices, parent’s attitudes and expectations on early numeracy skills. Seventy-three children were assessed, and their parents completed a questionnaire based on Swarbrook, Swirnoff & LeFevre (2014). Children whose parents completed the questionnaire were recruited for numeracy testing one year later. Correlational analyses were done and the results showed two main relationships. First, between parent’s attitudes and expectations and second, between formal home numeracy practices correlated only in T2- with intelligence variables. The present research supports claims about the importance and nature of home experiences in early numeracy skills. Interaction effects are explored and discussed.

An exploratory study of pre-service teachers’ relational beliefs and relational self-efficacy

Keywords: Attitudes and beliefs, Emotion and affect, Pre-service teacher education, Self-efficacy

Presenting Author: Anne Milatz, University of Jena, Germany

Effective student-teacher relationships are as important for students’ learning as for teachers’ health, so the need to incorporate relational aspects into teacher education is pressing. Since so little is known yet about relational beliefs and relational self-efficacy of (pre-service) teachers and how those aspects affect initial practical experiences, the present study aims to explore this field.

Research question 1 aims to establish the extent of, and relationship between, relational beliefs (growth/desire) and the relational self-efficacy of pre-service teachers while undertaking their first field and teaching experiences in school. Research question 2 explores whether relational preconditions of pre-service teachers impacts their self-efficacy to master difficult situations in the field experience against the background of motivational research and theory.

An online questionnaire is currently administered with pre-service teachers (max. N = 134) at the beginning of their practical experience in their 3rd or 6th semester (as part of the project “Getting it right from the beginning: Jena model of teacher education” founded by the German Federal Ministry of Education and Research).

Consequently, first results will be reported at the conference. Whilst descriptive statistics as well as a correlation plot will explore the relational preconditions of pre-service teachers, multi-level analysis will be used to explore the impact of the relational preconditions on the motivation toward the practical field experience.

Implications of the results will be discussed in the light of teacher education as well as relating to supervision of practical field experience.

Do preservice teachers benefit from peer feedback when analyzing video-based classroom situations?

Keywords: Peer interaction, Pre-service teacher education, Teacher Professional Development, Video analysis

Presenting Author: Nicola Meschede, Goethe-Universität Frankfurt, Germany

Co-Author: Katja Adi Amiri, Goethe-Universität Frankfurt, Germany

Co-Author: Ronca Hardy, Goethe-Universität Frankfurt, Germany

Studies on video-based learning environments in teacher education show that preservice teachers may learn to notice relevant aspects of instruction and to reason about them based on their prior knowledge – an ability that has been termed “professional vision”. However, the specific elements fostering this development within video-based learning environments are still unclear. The study investigates to what extent peer feedback can contribute to preservice teachers’ professional vision and whether heterogeneous group, with feedback provided from a different theoretical perspective, is especially beneficial.

The study was conducted in two university-level classes with different theoretical foci (inclusive practices; teacher-student-interactions). In a feedback cycle, students first wrote individual analyses of a videotaped instructional situation. Students of both classes were then randomly assigned to a group receiving feedback from peers of their own class only or a group which also received feedback from a student of the other class, thus providing a different perspective on the same video. Students then revised their analyses based on the feedback received. Results indicate a significant increase after the feedback cycle in both groups with regard to the number of events noticed, using a coding scheme on the two processes of professional vision. Moreover, students within each class provided analyses aligned to the theoretical focus of the class. Especially students with a focus on inclusive education benefited from peer feedback given by students with an additional focus on the same video segment. The quality of written peer feedback is currently analyzed to provide insight into the underlying mechanisms.

Fostering Subject-Specific Diagnostic Skills? Insights from English as a Foreign Language

Keywords: Assessment methods and tools, Language (Foreign and second), Reading comprehension, Teacher Professional Development

Presenting Author: Judith Sebastian, DFG Graduiertenkolleg Unterrichtsprozesse, Universität Koblenz-Landau, Germany

Evidence-based teaching approaches allow teachers to provide optimal support for the development of language skills. Nevertheless, language learning still seems to be rather input-driven and reports from
large scale assessments are rarely used to inform teaching. Research suggests that this is due to insufficient diagnostic skills of foreign language teachers. To investigate this issue, we would like to examine the judgment accuracy of secondary school teachers of English as a foreign language and we would also like to identify task features that influence their judgments. In an experimental study, we would like to find out, whether diagnostic skills of English teachers can be fostered. Moreover, we would like to investigate whether teachers who have received a one-day training on the diagnosis of reading skills can improve their estimates of task difficulty and can create better tasks.

The present study contributes to the implementation of evidence-based teaching in the foreign language classroom.

Session M 343
1 September 2017 12:00 - 13:30
Pinni A - A3103
Roundtable
Teaching and Teacher Education
Roundtable: Teaching and Teacher Education
Keywords: Competencies, Educational policy, Educational Psychology, Emotion and affect, Language (L1/Standard Language), Mathematics, Pre-service teacher education, Primary education, Qualitative methods, Secondary data analysis, Social interaction, Teacher Professional Development
Interest group: SIG 11 - Teaching and Teacher Education
Chairperson: Mieske Koesijeg Kreunen, Netherlands
Do extraverts get better grades? Student personality factors and teacher-assigned grades
Keywords: Educational Psychology, Language (L1/Standard Language), Mathematics, Secondary data analysis
Presenting Author: Andreas Westphal, Universität Potsdam, Germany
Co-Author: Miriam Voss, Universität Potsdam, Germany
Teacher-assigned grades may have relevant implications for students’ further-educational trajectories. The extent to which teachers take student characteristics other than achievement into consideration when assigning grades has therefore been a matter of debate and controversy. This study aims to clarify whether differences in teacher-assigned grades are systematically associated with students' personality factors, while controlling for a range of student indicators, as well as the classroom's average achievement. We also examined whether the relationship between student personality factors and teacher-assigned grades may be moderated by student achievement as measured in standardized tests. As part of the National Educational Panel Study (NEPS), teacher-assigned grades and standardized achievement in mathematics and German were assessed, along with the “big five” personality factors, verbal and mathematical self-concept, and socioeconomic background, in a sample of 5,163 ninth-grade academic-track students from all 16 German federal states. Multilevel regression analyses suggested that students who score highly in conscientiousness and neuroticism received better grades in both mathematics and German. In addition, teachers of German awarded better grades to highly extraverted students than to more introverted students. We also found statistically significant interaction effects between students’ personalities and their standardized achievement scores in German, indicating that teachers take students’ conscientiousness and neuroticism into account to a higher degree when assigning grades to higher-achieving students. In contrast, when teacher assigned grades to lower-achieving students, conscientiousness and neuroticism seemed to be less important. Implications for teacher training are discussed.

Teacher students’ social and emotional competences: Development of a research-based training program
Keywords: Competencies, Emotion and affect, Pre-service teacher education, Social interaction
Presenting Author: Bastian Carstensen, Leibniz Institute for Science and Mathematics Education (IPN), Germany
Co-Author: Lila Kussmann, Leibniz Institute for Science and Mathematics Education (IPN), Germany
Co-Author: Michaela Köber, Institute for Psychology of Learning and Instruction, Kiel University, Germany
The aim of the project is to develop a theory-based training program for social-emotional competences which is intended to prepare teacher students for their work at schools. To link the mostly theoretical university at the practical demands of the teaching profession, the training shall both improve the quality of interactions between teachers and students and teachers’ subjective well-being. The training concept encompasses the following contents with regard to student teachers’ professional development: knowledge of emotions and social interactions, regulation of one’s emotions and those of others, understanding of and acting competent in social situations. Apart from imparting knowledge the training includes practical exercises. To test the effectiveness of the program, it will be evaluated in a pre-post control group design. Upon successful evaluation, the training program is to be incorporated into teacher training at Kiel University. First results indicate positive training effects and provide information for further implementations.

The added value of research-based teacher education on teachers’ roles in primary schools
Keywords: Educational policy, Primary education, Qualitative methods, Teacher Professional Development
Presenting Author: Luise Claassen, Utrecht University, Netherlands
Co-Author: Frans Pinx, Utrecht University, Netherlands
Co-Author: Chris Pheivel, Utrecht University, Netherlands
In the past decade, research-based teacher training programs for primary school teachers have been established in the Netherlands. This study examines the added value of these programs on teachers’ roles in primary schools and compares beginning teachers from research-based training programs to beginning teachers from vocational training programs. Given that beginning teachers are influenced by the school culture of the school in which they work, we took a person-environment fit approach. We have interviewed 10 teachers and their principals on educational reform, school development, the merits of research-based teacher training, the teacher’s professional development, and the teacher’s person-environment fit. Preliminary analyses show a preoccupation of both types of teachers with classroom practice. However, in the interview, some teachers from research-based training programs affirmed a bad person-environment fit concerning their specific abilities. All principals observed differences between the two types of teachers, both as teachers in a classroom and as members of a school team. We think our findings can inform theory and practice on the merits of research-based teacher training programs for primary school teachers and how to scaffold beginning teachers from these programs so they can reach their full potential.

Session M 344
1 September 2017 12:00 - 13:30
Pinni B - B3108
Poster Presentation
Poster Presentation: Learning in Early Childhood
Keywords: Assessment methods and tools, At-risk students, Cognitive development, Early childhood education, Educational policy, Educational Psychology, Lifelong learning, Literacy, Mixed-method research, Multimedia learning, Out-of-school learning, Peer interaction, Primary education, Quantitative methods, Secondary data analysis, Self-regulation
Interest group: SIG 05 - Learning and Development in Early Childhood
Chairperson: Bert Slot, Utrecht University, Netherlands
Relations between pre-schoolers’ family background and kindergarten quality
Keywords: At-risk students, Early childhood education, Educational policy, Secondary data analysis
Presenting Author: Jennifer Lambrecht, Universität Potsdam, Germany
Co-Author: Helvi Koch, Universität Potsdam, Germany
Co-Author: Guido Nottbusch, Universität Potsdam, Germany
Co-Author: Nadine Spörer, Universität Potsdam, Germany
Visiting a high-quality kindergarten is linked with the expectation that it enhances the development of a child and that it has a compensatory effect for children from deprived families. Empirical findings affirm the positive influence of a high-quality kindergarten on the development of a child. The question arises, if all children have the same chance to access high-quality kindergartens regardless of their families’ social status. As there is little and ambiguous empirical evidence available on that question for the German early education and care system, we analyzed if children from families with a low socioeconomic status, low education or a migration background access kindergarten groups with lower quality than children from families with a medium or high socioeconomic status, education or no migration background respectively. Analyses were based on a sample of N = 2122 pre-schoolers from starting Cohort two of the German National Educational Panel Study. Data on family background and kindergarten quality (structure and person-environment quality) was collected via standardized interviews with the parents and educators. Exploratory factor analyses suggested two scales on structural and two scales on process quality (Cronbach’s α between .71 and .78). Analyses of variance revealed differences in kindergarten quality according to socioeconomic status, education, and migration background.

A Review of Multiliteracies Pedagogy in Primary Classrooms
Keywords: Early childhood education, Literacy, Primary education, Multimedia learning
Presenting Author: Pieter Kuula, University of Tampere, Finland
Co-Author: Reijo Kupiainen, University of Tampere, Finland
Co-Author: Anne Jyrkkälä, University of Tampere, Finland
Co-Author: Kirs-Liisa Koski-Siretalo, University of Tampere, Finland
Co-Author: Marita Mäkinen, University of Tampere, Finland
Co-Author: Angela Wiseman, NC State University, United States

In recent years our views of literacy have changed profoundly as our classrooms have become more diverse and our learning is affected by advances in technology. These changes and current literacy environments require rethinking and development of literacy practices in school pedagogy. This is often addressed by the concept of multiliteracies (New London Group 1996). However, there seems to be a lack of systematic analyses of how the concept has been applied in school pedagogy, especially at the primary level. Based on a systematic review of 68 research articles with primary classroom data, this study aims to review how the concept of multiliteracies is understood and what kind of guidelines these studies offer for multiliteracies practices in schools. Based on qualitative content analyses of the reviewed articles, the main results indicate that the articles followed the guidelines of the New London Group’s manifesto on multiliteracies, and they often took into account both the multimodality of meaning-making and...
the diversity of learners. The studies were often framed with sociocultural approaches. Findings on pedagogy indicate that there is a growing importance of linking ICT, literacy and communication together within the contexts of different school systems. Creative and collaborative meaning making is emphasized in order to strengthen young people’s active and participatory citizenship in real and digital worlds.

Monitoring quality of playgroups in Portugal: A mixed-method approach

Keywords: Assessment methods and tools, Early childhood education, Educational policy, Mixed method research

Presenting Author: Vasco Teixeira, ISCTE - Instituto Universitário de Lisboa, Portugal
Co-Author: João Alexandre, University Institute of Lisbon (ISCTE-IUL), Portugal
Co-Author: Maria Clara Barros Almeida, Faculdade de Psicologia e de Ciências da Educação da Universidade de Coimbra, Portugal
Co-Author: Catarina Leitão, Faculdade de Psicologia e de Ciências da Educação da Universidade de Coimbra, Portugal
Co-Author: Bruno de Sousa, Faculdade de Psicologia e de Ciências da Educação da Universidade de Coimbra, Portugal

Playgroups are community-based groups that bring together young children and their caregivers for the purpose of play and social activities. International studies have reported outcomes for children who participate in playgroups (e.g., child language). This is known as what happens during playgroups, however, evidence shows higher levels of quality associated with children's development. In Portugal, playgroups were implemented in 5 districts, twice a week for two hours with each facilitator and one supervisor per district.

In this paper, we will examine the following research questions: How does quality vary through the implementation of playgroups? Which quality characteristics caregivers, facilitators and supervisors value the most?

This study used a mixed-method approach (quantitative and qualitative methods). From the 25 playgroups operating, 13 were randomly selected. Data collection was gathered twice (T1 and T2). Individual interviews with caregivers and supervisors were conducted, and the facilitators completed a survey. An observation tool was created to evaluate the quality of playgroups and the 13 playgroups were videotaped.

Results show that, on average, the 13 playgroups evaluated are above level 3 (minimum) in all subscales as in the global scale. There was a statistically significant improvement in quality from T1 to T2 in the global scale and in two subscales: space and activities, and routines. Likewise, stakeholders perceived a positive climate in playgroups, and pointed out diverse activities and materials.

The strength of the design enables triangulation, and can produce more powerful and robust findings about the quality of playgroups.

The friendship network stability of preschool children during one pedagogical season

Keywords: Early childhood education, Educational Psychology, Peer interaction, Quantitative methods

Presenting Author: Yi-Wang, University of Turku, Finland
Co-Author: Jairo Kinos, University of Turku, Finland
Co-Author: Tuire Palonen, University of Turku, Finland
Co-Author: Leena Niemi, University of Turku, Finland

This longitudinal study aims to examine how five- and six-year-old children’s peer relationships are formed and fostered during one preschool year in a southwestern Finnish preschool. All 16 kindergarten participants in the study (at day level N=240, i.e., 16 × 15 relationships among the children). The children were divided into four daily groups. During the intervention one (Pad was given to each group in order to stimulate interaction among peers and, thus, enable the children to form new peer relationships. In the data gathering, sociometric nomination techniques were used to investigate the nature of the peer nominations. During the data was collected five times during the year to see what kind of peer relationship changes occurred at the day level and the group level, i.e., in establishing and losing friendship ties among the children. Social network analyses were used to analyze the data. The results indicate that the children’s preferences for gender segregation was strong compared to age preference and intervention. In all, the number of reciprocal friendship ties and the mutual absence of friendship ties increased towards the end of the year, whereas the number of unilateral friendship ties decreased. This indicates that children’s nominations narrow down; thus, the group structure becomes more crystallized. Instead of extending their friendship networks, children seek stable and mutual relationships with their peers in their middle childhood years. The intervention only had a slightly negative influence on children’s peer relationships.

Effects of an early childhood intervention: Evidence from the German program Chance-Reiche

Keywords: Cognitive development, Early childhood education, Quantitative methods, Lifelong learning

Presenting Author: Juliane Schlünke, Freie Universität Berlin, Germany
Co-Author: Yvonne Andere, Freie Universität Berlin, Germany
Co-Author: Franziska Wilke, Freie Universität Berlin, Germany
Co-Author: Hannah Ulferts, Freie Universität Berlin, Germany

Aims: The aim of this study is to examine the beginning of primary school children significantly in their cognitive skills (Magnetson et al., 2004) depending on their social and cultural background (OECO, 2004). There is strong evidence of positive long-term benefits of early childhood intervention program for families with low socioeconomic status. However, there is still a clear need for systematic evaluations of such programs in Germany (Tauber, Münber, Unger & Wolfram, 2013). The study AQuaPm analyses the early childhood intervention program ‘Chance-Reiche’ with a two-wave panel design. The program seeks to improve parenting skills and child outcomes by offering a great variety of support to the parents. Data comes from the study AQuaPm that has a treatment and a control group in both waves. The treatment group includes 184 families with children aged between two and four years in the first and 122 families with children aged between two and five years in the second wave. The control group includes 58 families with similar children in the first wave and 45 families in the second wave. These families did not participate in the program. Findings suggest that families benefit from participating in the ‘Chance-Reiche’ program on a long-term basis. Chance-Reiche participants reported more social support in the first and in the second wave. The results of the parenting training courses made a difference for the parents. Implications of our findings will be discussed in the light of the theoretical background as well as the conceptual framework of the program.

Observations of physical activity and classroom structure in nature and traditional kindergartens

Keywords: Early childhood education, Educational Psychology, Out-of-school learning, Self-regulation

Presenting Author: Joshua Meyer, University of Victoria, Canada

Nursery schools are designed to provide children with large amounts of time in nature-based outdoor settings to learn, play, explore and experience natural systems and natural materials. This approach has gained considerable interest, yet despite its growing appeal little is known about the operational variables distinguishing nature-based from traditional classrooms. The purpose of this research is to examine the intensity and complexity of physical activity and classroom structure between nature and traditional kindergarten classrooms to develop a better understanding about the similarities and differences between these learning environments. The findings from this observational study show a higher frequency in vigorous and diverse types of physical activity as well as less rigid classroom structure in nature kindergartens than in traditional kindergartens. These findings support previous research examining physical activity in nature classrooms. Additionally these findings provide information about the relationship between classroom structure and physical activity in these learning environments.

Session M 345

1 September 2017 12:00 - 13:30
Luna - K109
Symposium
Teaching and Teacher Education

Analyzing teachers’ pedagogical content knowledge in economic and business education

Keywords: Competencies, Mixed method research, Pre-service teacher education, Teacher Professional Development, Vocational education

Interest group: SG11 - Teaching and Teacher Education

Discussant: Pan Despas, KU LEUVEN, Belgium

Development of lesson planning competency of prospective business teachers

Presenting Author: Elisabeth Seifried, University of Graz, Austria
Co-Author: Michaela Stdl, University of Graz, Austria

The repertoire of a teacher’s methodological, content specific and pedagogical content knowledge and skills is expressed in planning and teaching activities. Designing lessons is a core task of teachers and planning is an essential task in teacher education programs. Empirical findings show that the approach and the quality of the planned lessons are influenced by teaching experience (for business teachers see e.g. Slinger, 1992; Seifried, 2009). While expert teachers are able to predict learners’ problems and misconceptions more precisely, “novices’ propositional structures for pedagogical content knowledge seem particularly limited” (Boho & Livingston, 1989, 405–491). As a result, novice teachers face difficult to decide kind of learning opportunities their students need and how to determine the method of instruction which will lead to the greatest cognitive activation. However little is known about how planning competencies are developed during the professionalization process and to what extent teacher education programs contribute to this process. Therefore a longitudinal study is conducted to learn more about teaching and learning processes of prospective business teachers (N = 188). The presentation shows results of selected aspects of pedagogical content knowledge (PCK) based on planning activities for accounting lessons of business education master students in Austria.

Prospective teachers’ ability to design and provide instructional explanations

Presenting Author: Juergen Seifried, University of Mannheim, Germany
Co-Author: Blomie Findseisen, University of Mannheim, Germany

Teacher education programs at universities play a key role in the development of prospective teachers’ knowledge. This study examines one central facet of prospective business teachers’ pedagogical content knowledge: the knowledge of and the ability to explain subject-matter to students. By combining data from a quantitative test instrument (paper-pencil-test; N = 1,552 teacher candidates) and a qualitative video study using an interactive simulation (N = 48 teacher candidates), we are able to offer multi-perspective insights into prospective teachers’ knowledge base and abilities. We find significant correlations between prospective teachers’ ability to explain business contents and their content knowledge (CK). Moreover, the results show that prospective teachers struggle with the task of adequately explaining subject matter. They specifically experience difficulties when it comes to providing examples or graphical representations and their explanations often contain errors. Furthermore, university-based opportunities to learn (OLT) seem to have little effect on prospective teachers’ ability to provide explanations. Implications for teacher education programs in business education are discussed.
Swiss commercial VET teachers’ pedagogical content knowledge
Presenting Author: Davide Hotsch, University of Zurich, Switzerland
Co-Author: Johannes Hartig, German Institute for International Educational Research (DIPF), Germany
Although teachers’ pedagogical content knowledge (PCK) is considered crucial for instructional quality and students’ development, little is known about Swiss commercial VET teachers’ PCK. In this respect, we were particularly interested in differences in PCK between Economics and Society (E&S) teachers with an academically oriented teacher training and those with a more practically oriented training. In order to model and measure teachers’ PCK we developed a test covering the facets of ‘explaining’, ‘student (mis-)conceptions’ and ‘cognitive activation’. During test development, we collected validity evidence from both criterion situations and cognitive interviews. A total of 157 teachers participated in the PCK test which consisted of open-ended and closed-ended items. An analysis of teachers’ responses with the aid of a confirmatory factor analysis showed that PCK is a rather multifaceted construct. However, there was no difference between the PCK of teachers having followed the academically oriented pathway and those having followed the practically oriented pathway.

Session M 346
1 September 2017 12:00 - 13:30
Main Building E - E222
Symposium
Assessment and Evaluation
Validity of longitudinal assessments: Capturing (instructional effects on) students’ learning growth
Keywords: Achievement tests, Assessment methods and tools, Competencies, Psychometrics, Quantitative methods, Reading comprehension, Science education, Student learning
Interest group: SIG G1 - Assessment and Evaluation
Discussant: Detlev Leutner, University of Duisburg-Essen

Measuring the instructional sensitivity of items
Presenting Author: Alexander Naumann, German Institute for International Educational Research (DIPF), Germany
Co-Author: Johannes Hartig, German Institute for International Educational Research (DIPF), Germany
Co-Author: Jan Hochweber, University of Teacher Education St. Gallen, Switzerland
Valid inferences on schools, teachers or teaching drawn from educational assessments require that tests are sensitive to the instruction students have received in class. Accordingly, measures of the test items’ instructional sensitivity provide empirical support for validity claims about inferences on instruction drawn from educational assessments.

In the present study, we aim at contributing to the measurement framework of instructional sensitivity. We first introduce the concepts of absolute and relative measures of instructional sensitivity. Absolute measures summarize a single item’s total capacity of capturing effects of instruction, which is independent of the test’s overall sensitivity. In contrast, relative measures summarize a single item’s capacity of capturing effects of instruction relative to the test’s instructional sensitivity. Building on this distinction, we then provide a longitudinal multilevel IRT (LMLIRT) model that allows estimating both types of measures depending on the identification constraints. Finally, we discuss implications for measuring instructional sensitivity and test development.

Developing Instructionally Sensitive Assessments
Presenting Author: Maria Araceli Ruiz-Primo, Stanford University, United States
Co-Author: Min Li, University of Washington, United States
In recent days, instructional sensitivity has been seen as a requirement for assessments if they are to be used for high-stake evaluation purposes (Popham, 2007; Pollock, 2010). Most of the literature focuses on evaluating instructional sensitivity of assessments already developed (e.g., D’Agostino, Welch, & Condon, 2007). The literature on how to develop instructionally sensitive assessments is almost non-existent. In this paper we describe an approach used to develop instructionally sensitive assessment. We provide empirical evidence about the technical quality of the items developed using the approach proposed. We discuss the strengths and weaknesses of the approach and define the next steps to improve the approach and to study instructional sensitivity.

Using item properties to predict the instructional sensitivity of test items
Presenting Author: Jan Hochweber, University of Teacher Education St. Gallen, Switzerland
Co-Author: Alexander Naumann, German Institute for International Educational Research (DIPF), Germany
Co-Author: Johannes Hartig, German Institute for International Educational Research (DIPF), Germany
Co-Author: Ilona Kleinbusch, University of Education Ludwigsburg, Germany
Co-Author: Stephanie Musow, University of Teacher Education St.Gallen, Switzerland
Instructional sensitivity (IS; Pollock, 2010) is the psychometric property of a test or an item to react sensitive to instruction. Recently, Naumann et al. (2014) proposed a longitudinal multilevel DIF (LML-DIF) model to operationalize IS, using average and classroom-specific changes in item difficulties as indicators of items’ global and differential sensitivity. However, these indices do not give any indication to potential causes of high or low IS and do not allow to predict IS for newly constructed items. As shown in this contribution, item properties explaining the difficulty of items can be used to predict items’ sensitivity. To this end, the LML-DIF model is reformulated as an explanatory IRT model with item properties (Wilton & De Boeck, 2004). Global sensitivity can be predicted based on the average change of item properties’ effects on item difficulty across classrooms. Differential sensitivity can be predicted by allowing for variation of change in these effects across classrooms. The model was applied to the language awareness test (34 items) from a longitudinal study of 9th graders (n=10965). Ten item properties referring to language awareness theory were selected (e.g., application of declarative knowledge). Nine properties contributed to average change of item difficulties, explaining 49% of items’ global sensitivity. 63% of items’ differential sensitivity was explained based on variation in the properties’ effects across classrooms. By allowing to predict important indicators of IS, the approach might be useful to test assumptions about causes of IS and in attempts to purposefully construct items with high or low IS.

Construction of a test series for learning progress assessment in reading using rule-based design
Presenting Author: Natalie Foerster, University of Münster, Germany
Co-Author: Joerg Tobias Kuhn, WWU Muenster, Germany
Co-Author: Jasmin Munte, University of Münster, Germany
Co-Author: Elmar Souvignier, University of Muenster, Germany
The aim of the present study was to investigate whether rule-based item design enables to develop equivalent computer-based reading tests that can be used for learning progress assessment.

We constructed a set of items based on the CHiDEx database in which four items followed the same construction rules, respectively. For each item we thereby varied four different item properties (e.g. number of syllables, propositional density). Items were designed to assess the efficiency of core reading processes (comprehension, reading fluency, sentence, and text level), and were grouped to four equivalent test forms. N = 1900 second graders completed the tests. A partial sample of N = 306 students also finished four standardized school tests for validation purposes. We estimated item and person parameters for accuracy and response time using bivariate IRT-models. Results indicate that all item properties significantly affected either item difficulty or response time but also interactions between properties were found. Moreover, as indicated by the IRT-based test information functions, the difficulty and time intensity of the four test forms was similar (all t(5) ≤ .04). Finally, the correlations with standardized school tests indicate good convergent and discriminant validity of the newly developed tests.

Overall, rule-based item design proved to be a promising way to develop equivalent reading test forms. Item difficulties and response times could be predicted by item properties, especially on sentence and text level. As indicated by the interactions between item properties, however, item properties do not affect item difficulty and response times purely additive.
The generality-concreteness antinomy, variance accounted for, and situation specificity
Presenting Author: Jean-Luc Patry, Universität Salzburg, Austria

The aim of research is to develop and test theories. One function of theories is explanation of (educational) phenomena. But theories can never fully explain the phenomena under investigation. The degree of explanation can be expressed as “variance accounted for”. In social behavior research it is very low (typically 10%) unless artificially increased through severe biases, such as using questionnaires. This low explanation power is due, among others, to the generality-concreteness antinomy. The more general a theory is, the less concrete it can be. Since theories are supposed to be very general, they cannot be concrete. This antinomy is particularly accentuated in social behavior research because of situation specificity (Patry, 1991).

In research on personality and situation specificity, two different questions can be asked: (1) about differences between people, and (2) about differences in behavior within people, e.g., due to situational variance. Most research in education focus on (1), where within-person variance is treated as error in the measurement theoretical sense. This error is usually regarded as random, but typically it is systematic. To reduce this error, which deals with behavior changing from moment to moment and from context to context, we need to address within-person variance (according to question 2 above) in addition to the between-person variance (question 1). We hence need to integrate concepts of within-person variance in our theories: We need a theory of situation specificity that is compatible with the original theory in which we are interested. Principles for this integration are discussed.

Conceptualizing one’s own teaching activity: An account of a teacher’s expansive learning journey
Presenting Author: Anti Rajaja, University of Helsinki, Finland
Co-Author: Annalisa Sannino, University of Helsinki, Italy

This paper discusses a study that aims to better understand the process of concept formation in research conducted by teacher researchers. We analyze such a process in the context of a teacher researcher’s journey to develop an agency-centered pedagogical model as part of his PhD dissertation study. Our study explores how the theory of expansive learning (Engeström, 2014) can account for a dialectical and mutually transformative relationship between theory and practice in teacher research. The primary data comprise documents (research plans, diaries, published articles) and transcribed recordings of supervisory meetings. In the analysis, we identify expansive learning actions in the data and trace how the object of the teacher researcher’s activity was reconceptualized in and through the expansive learning actions. Our initial analysis shows that the teacher researcher’s journey into research can be characterized as a part of an expansive learning cycle. The analysis shows how he increasingly began to question aspects of his teaching activity. The pedagogical model that he constructed served for him as a tool that remediated his relations to students and helped him to reconceptualize students and pedagogy. In our presentation, we will illuminate the expansive dynamics of concept formation that accounts for these reconceptualizations. The study makes a methodological contribution to the discussions around teacher research by unopacity the concept formation involved in successful interaction between theory and practice.

Collaboration, creativity, embodiment and affect – a methodological journey
Presenting Author: Eva Vass, Western Sydney University, Australia
Co-Author: Gabriella Diszspol, Liszt Ferenc Academy of Music, Hungary

My research is situated in the collaborative learning literature, which aims to conceptualize and promote effective ways of thinking and learning together. Much of this literature places an emphasis on collective argumentation or joint reasoning (Littleton, & Mercer, 2013). My earlier research on children’s collaborative creative writing (Vass et al, 2014) found it paramount to combine such explanations with explorations of the affective and embodied dimensions of shared meaning creation. Such an expansion of focus is central in cognitive science (Johnson, 2007), and in research on artistic collaborations in music and theatre (Clayton, 2007; Sawyer, 2007), but less so in socio-cultural research. My work so far has developed in response to this challenge.

This paper reflects on the current ‘emphirical juncture’, which brings together a dialogic orientation towards meaning creation with a focus on the embodied dimensions of creative ideation or creative togetherness. In collaboration with the Liszt Academy of Music, I explore the Kokas pedagogy: an experiential extension of the Kodaly method of music education combining improvised movement and collective reflection. Based on observational data (video-recordings of 14 sessions in a Year 1 classroom) we have analysed children’s embodied dialogues, capturing the nature and evolution of creative intersubjectivities. The data highlight how the physical dimensions of this pedagogy cultivated new modes of creative ideation, presenting unique challenges and opportunities in the observed educational context. Importantly, the data reconfirm my earlier position about the need to re-envision creative interthinking to encompass the affectively-constituted and embodied dimensions of thought.

Double-loop reflection and educational research
Presenting Author: Rupert Higham, University of Cambridge, United Kingdom
Co-Author: Rupert Wegert, University of Exeter, United Kingdom

We answer the question as to the relationship between theory and empirical research by extending the double loop reflection model of learning widely used in practitioner education. The first loop is applying methods to find answers to research questions. The second loop is reflection on the often initially implicit assumptions that lie behind the empirical research design. In this way theory is linked to empirical research in a broad conception of science. Although progress in underlying philosophical frameworks is slow and often quite indirectly related to empirical research, it is nonetheless real and ultimately grounded on evidence and argument just like any other area of science. Our aim is to show how we can avoid the false dichotomy of irrationally choosing cultural ‘paradigms’ or ‘stances’ on the one hand and a rejection of the relevance for research of philosophical doubts about ontology and values on the other. We link our double loop reflection model of research both to the two phase psychological model of thinking outlined by Kahnemann of fast thinking and the less frequent and more costly slow thinking and also to the two types of science model of Kuhn who distinguished between normal science and revolutionary science. We illustrate our dialogic model with an example from recent empirical research on classroom talk in which initial assumptions were challenged by experience leading to a need to re-think those assumptions by bringing in new high level theory.

KEYNOTES - PART 3 348
1 September 2017 13:45 - 15:15
Main Building A - Main Auditorium
EARL Haymore Session
Assessment and Evaluation

Changing Competence Needs and International Comparative Assessments

Keywords: Educational attainment, Educational policy, Secondary education, Survey Research
Interest group: SIG 01 - Assessment and Evaluation

Changing Competence Needs and International Comparative Assessments
Presenting Author: Jouni Välijärvi, University of Jyväskylä, Finland

Economic development presupposes high-quality education. Education makes it possible for individuals to find their place in the labour market and provides skills transferable to the rapidly changing needs of working life. Education also generates industrial and economic innovations. These two functions of education have been boosted by increasing international competition and automatization, which has largely replaced low education jobs. However, the strengthening link between education and economy may pose a threat to the independence of the institution of education. Education is a value per se which does not need to be justified by economic gain or social equality. Essentially, education is about civilizing individuals and nations. When successful in this, education also adds value to the other sectors of society, thereby contributing to overall well being.

In several countries, the current debate on education is dominated by the requirement for increased productivity and effectiveness. Education is expected to yield competencies that are directly transferable to the needs of the labour market. Young people likewise appreciate the immediate benefits of education. At the same time, the civilizing function of education has been largely ignored. The threat is that schools produce competent and skilled people with, however, increasingly limited ability to understand other humans and their own humanity.

International comparative assessments of educational achievement have attracted wide public interest. Primarily, the interest of both politicians and the media has lied in how countries have ranked in these assessments, whereas little attention has been paid to the reasons behind these rankings.

The purpose of this presentation is to show, with the help of examples, how, for instance, PISA data can be used to analyze special characteristics of educational systems. Results of comparative assessments can be used to give political and pedagogical recommendations on how to implement long-term educational renovations. In the end, these results need to be interpreted within the cultural and historical context of each country.

KEYNOTES - PART 3 349
1 September 2017 13:45 - 15:15
Tampere Hall - Small Auditorium
EARL Haymore Session
Motivational, Social and Affective Processes
A Unified Model of Task-Specific Motivation
Keywords: Attitudes and beliefs, Emotion and affect, Motivation and emotion, Reflection
Interest group: SIG 08 - Motivation and Emotion
A Unified Model of Task-Specific Motivation
Presenting Author: Cornelis de Brabander, Leiden University, Netherlands

In almost all theories of motivation a distinction is made between affective and cognitive aspects. Theories disagree about the relation between these aspects. Some theories see them as opposed, whereas others consider them to be additive. The Unified Model of Task-specific Motivation (UMTM) adopts a third possibility by declaring them as independent. Affective and cognitive valences are produced by two interacting but distinct systems of behavior regulation. Affective valences are feelings about doing an activity; cognitive valences are thoughts about the value of the consequences of an activity. This distinction is combined with the distinction between positive and negative valences. Roughly speaking, positive valences give rise to approach motivation, negative valences to avoidance motivation. As these types of motivation are also relatively independent, we thus have four distinct components of motivation. The UMTM identifies four factors that constitute conditions for these valences: the autonomy in choosing and executing an activity, the feasibility of an activity, the relatedness with other people in the action context, and the inclination to abide with normative views about an activity of other people in the action context: subjective norm. Autonomy and feasibility are distinguished in a personal and a contextual facet.

After the explanation of the UMTM and the argumentation that supports it, we present empirical evidence that was recently collected in several activity contexts. This evidence showed that the specific activity determines to what extent different components come into play. It supports the idea that each activity brings about a different configuration of valences. Each specific activity determines also the importance of conditional factors. Social aspects are, for instance, less important in an individual activity. Furthermore, as all factors in the model appear to influence each other mutually, we discuss the conceptual status of the influence paths in the UMTM.

KEY NOTES - PART 3 350
1 September 2017 13:45 - 15:15
Tampere Hall - Big Auditorium
EARL Keynote Session
Cognitive Science
Eye Follow You: Effects of Gaze Cues on Learning
Keywords: Educational Psychology, Educational Technology, Instructional design, Multimedia learning
Interest group: SIG 27 - Online Measures of Learning Processes
Eye Follow You: Effects of Gaze Cues on Learning
Presenting Author: Tamara Van Gog, Utrecht University, Netherlands

In this keynote I will present the findings from a five-year research project about the effects of gaze cues on learning (funded by a NWO Vidi grant – what’s in a name).

Other people’s faces, and especially their eyes, are real attention magnets. Eyes quickly and automatically capture our attention, and this mechanism presumably evolved because eye gaze provides us with very powerful social cues that help us understand the intentions of others.

In this project, we investigate whether we can use gaze cues to improve learning from video modeling examples, in which a model (instructor) demonstrates and explains how to perform a task. I will discuss research on the effects of both direct gaze cues (i.e., the model’s eyes-head turn towards the task) and indirect gaze cues on attention and learning. Indirect gaze cues are created by recording the model’s eye movements and displaying them as, for instance, circles or dots overlaid on the video.

Both types of gaze cues are expected to help synchronize the students’ with the model’s attention, which should help students follow the model’s explanation. Therefore, this ‘joint attention’ is expected to enhance students’ learning from video modeling examples – at least under conditions in which the explanation would otherwise remain unclear.

Last but not least, I will present studies on how gaze displays are interpreted. We may be naturally attuned to direct gaze, but can we correctly infer the intentions and thoughts of others from a moving circle or dot? Come and see for yourself!

Session N 351
1 September 2017 17:15 - 17:30
Pinni B - B4116
Roundtable
Educational Policy and Systems, Lifelong Learning
Roundtable: Learning and Professional Development
Keywords: Case studies, Cooperative / collaborative learning, Educational policy, Interdisciplinary, Lifelong learning, Literacy, Motivation, Professions and applied sciences, School effectiveness, Teacher Professional development, Workplace learning
Interest group: SIG 14 - Learning and Professional Development
Chairperson: Hua-Loon Ling, The University of Hong Kong, Malaysia
Co-Author: Iris Vansteelandt, AP University College/Ghent University, Belgium
Co-Author: Hilde Van Keer, Ghent University, Belgium
Co-Author: Suzanne E. M. Mol, Leiden University, Netherlands

As reading is one of the most important skills in education that contributes to students’ school success, this study focuses on teachers’ continuous professional development (CPD) on reading and reading promotion, hereby aiming at fostering students’ autonomous reading motivation. Since the first years of teaching are determining for teachers’ future career path, the present study focuses particularly on beginning teachers (BT). The present proposal is part of a quasi-experimental intervention study, studying the effectiveness of CPD for teachers and their students. The presentation will particularly zoom in on design principles for and the development of the CPD programme combining Desimone’s framework for effective professional development (2009) with Self-Determination Theory (SDT) as fostering motivation is aimed at.

Training Reactions as Predictors of Autonomous and Controlled Motivation to Transfer
Keywords: Motivation, Professions and applied sciences, Workplace learning, Lifelong learning
Presenting Author: Andreas Gogertufner, Technische Hochschule Deggendorf, Germany
Co-Author: Karina Fisch, Technische Hochschule Deggendorf, Germany
Co-Author: Martina Reitsmaier, Technische Hochschule Deggendorf, Germany

Previous training research conceptualized motivation to transfer as a one-dimensional construct that varies in amount (high versus low motivation), not in kind (different qualities of transfer motivation). In recent years, research groups started to re-conceptualize motivation to transfer, distinguishing between autonomous and controlled motivation to transfer. The present study addresses this gap and examines the relative importance of six training reaction scales in predicting transfer motivation. In addition, the study examines the moderating effect of age, gender, and work experience on the relationship between motivation relationships. The study sample consisted of 64 training participants. Analyses include exploratory factor analysis and multivariate regression. Analyses are ongoing. The study will be discussed in terms of its significance for theory development and their practical implications for training evaluation.

Strengthening school resilience against corruption through integrity standards and involvement
Keywords: Case studies, Educational policy, Interdisciplinary, School effectiveness
Presenting Author: Mihaylo Mitovovitch, Center for Applied Policy, Austria
Co-Author: Tinto Kovac Cerovic, University of Belgrade, Hungary
Co-Author: Kate Lapham, Open Society Foundations, United States

The roundtable will offer insight into an evolving methodology for assessing integrity of the education systems and present findings gathered from four countries by now. The approach is rooted in the conceptual traditions of national and crime opportunity theories, and of root cause analysis. The evidence collected in the course of research shows between-country similarities in the types, descriptions and underlying policy shortcomings of malpractice (integrity violations), despite the fact that the researched countries are different geographically, historically and regarding the structure of their education systems. The roundtable will provide a possibility to exchange hands-on experience from the audience, and finish with an overview of common integrity characteristics and how they interact with equity and quality of education.

Session N 352
Learning in Higher Education: Instruction and student-related factors
Keywords: Achievement, Emotion and affect, Higher education, Instructional Design, Learning approaches, Meta-analysis, Quantitative methods, Quasi-experimental research, Reasoning, Science education, Self-efficacy. Student learning. Teaching / Instruction
Interest group: SIG 04 - Higher Education, SIG 06 - Instructional Design
Discussant: David Gilbets, University of Antwerp, Belgium

Achievement in higher education: A review of meta-analyses
Presenting Author: Michael Schneider, University of Trier. Germany
Co-Author: Franz Prackel, University of Trier, Germany

The number of empirical studies on achievement in higher education has increased sharply over the last 20 years. These findings can provide some orientation with respect to the design of effective courses in colleges and universities. However, most teachers in higher education are not aware of this wealth of empirical findings. We conducted a systematic literature review of 38 meta-analyses reporting 105 correlations of achievement in higher education. These findings are based on 3330 effect sizes obtained with almost 2 million students. We provide a list of the 105 variables, ordered by their effect size, and summary statistics for central research topics. Teachers with high-achieving students stimulate social interaction in the classroom, invest time and effort into planning and organizing their courses, provide clear learning goals and class objectives, give task-focused improvement-oriented feedback, and treat students with friendliness and respect. Instructional technology had comparably modest effect sizes, which did not increase over the past decades. Students in higher education with above-average achievement have high self-efficacy, intelligence, and prior achievement, miss few classes, engage in effort regulation, and use learning strategies in a goal-directed way. Most meta-analyses averaged over experimental and correlational studies, leaving it open whether causal relations are underlying the reported correlations. However, overall, achievement in higher education is well researched and understood. Teachers in higher education can improve the effectiveness of their classes by adhering to evidence-based instructional design principles.

Examining the Evidentiary Basis of Flipped Learning
Presenting Author: Manu Kapur. Swiss Federal Institute of Technology ETH Zurich, Switzerland
In this paper, I argue that the current levels of (over)enthusiasm for and adoption of flipped learning are not commensurate with and far exceed scientific evidence in its favor. I start by examining experimental evidence for flipped learning, only to find that studies that have compared flipped learning with traditional instruction tend to either be largely based on perceptions or fraught with critical confounding factors that make the results difficult to interpret. I then ask whether it is even reasonable to ask the question of whether flipped learning has a positive impact on student learning. My conclusion is that, when teaching novices a new concept, instruction must come first. By leveraging evidence from a number of controlled experimental studies, I argue that the above assumption is indeed flawed. And that novice learners learn more when they are first engaged in generating features to novel problems before receiving instruction compared to those who receive instruction first.

Critical thinking, approaches to learning and self-efficacy among beginning university students
Presenting Author: Lisa Postaref, University of Helsinki, Finland
Co-Author: Heidi Hytinen, University of Helsinki, Finland
Co-Author: Auli Toom, University of Helsinki, Finland

During university studies, students are expected to learn generic academic capabilities necessary for their future work. Critical thinking is one of the crucial capabilities for academic experts in order to be able to work effectively in changing contexts and find solutions for the professional challenges. Even more importantly, critical thinking is a key capability for deep learning and for enhancing one’s expertise during their university studies. Self-efficacy beliefs and approaches to learning play an important role as well, although their relationships with critical thinking are not clear. This study explores the relations between critical thinking, approaches to learning and self-efficacy beliefs among beginning educational university students (n=76) in a Finnish university. Students have been selected through demanding entrance exams. The self-report data measuring approaches to learning and self-efficacy beliefs and performance-based assessment data of critical thinking skills were analysed with quantitative and qualitative procedures. The results showed that most students applied the deep approach to learning and had high self-efficacy beliefs related to their learning. However, they had great differences in their critical thinking skills as measured by the performance-based CILA task. Three different student groups were identified in the analysis, which showed low to medium differences in the dimensions of critical thinking, but the groups did not differ in terms of the approaches to learning or self-efficacy beliefs. The results indicate that the highly competitive entrance exam does not necessarily guarantee the advanced critical thinking skills. Learning and development of these skills need to be facilitated significantly during university studies.

Protective Factors for Students’ Situation-Specific and Situation-General Stress in Higher Education
Presenting Author: Maija Paigl, University of Trier, Germany
Co-Author: Michael Schneider, University of Trier, Germany

Stress levels of students in higher education are high, and many potentially stress-inducing demands have been identified. Protective factors, in particular, personal resources, coping strategies, and desirable personal characteristics, may help students to cope with these demands as resource-activating challenges rather than as threatening stressors. However, previous research on stress in higher education mainly focused on stress levels and stressors so little is known about students’ protective factors. We conducted a correlational study (N= 240) and a longitudinal study with two measurement points at the beginning and the end of the academic year (N = 225) on how potential protective factors (five types of personal resources, problem- and emotion-focused coping, and the Big Five personality traits) were associated with stress. High competence, high social support from the family, low emotion-focused coping, and low neuroticism together explained 48% of stress in higher education modeled as a latent variable. A latent state-trait model had an excellent fit to the longitudinal data and showed that there was a situation-specific and situation-general component of stress. Situation-specific stress was related to situational personal resources and coping, but not to stable trait neuroticism. Situation-general stress was related to trait neuroticism, but not to personal resources and coping. Stress-reduction interventions should monitor and treat situation-general and situation-specific stress separately, for example, by strengthening students’ subjective competence and social resources and by reducing emotion-focused coping and, if possible, neuroticism.

Session N 353
1 September 2017 15:45 - 17:15
Main Building C - CB
Symposium
Lifelong Learning

Dealing with Health Information: Evaluation of Scientific Evidence and Expert Sources
Keywords: Argumentation, Content analysis, Co-operative / collaborative learning, E-learning / Online learning, Informal learning, Instructional design, Literacy, Reasoning, Science education
Interest group: SIG 26 - Argumentation, Dialogue and Reasoning
Organiser: Frederike Hendriks, University of Muenster, Germany
Organiser: Ronald Ruhmert, University of Northern Iowa, United States
Discussant: Gavin Brown, The University of Auckland, New Zealand

The Polio Vaccination Debate on Facebook: Debating Health Information with Science
Presenting Author: Aviv J. Sharon, Technion - Israel Institute of Technology, Israel
Co-Author: Daniella Ori, The Technion Israel Institute of Technology, Israel
Co-Author: Ayelet Baram-Tsabari, Technion, Israel

This study examines the Facebook debate on Polio vaccination as a case for laypeople's seeking and evaluation of health information. It is based on the Facebook group 'Parents talk about the Polio vaccination' during the 2013 Polio crisis in Israel. A quantitative content analysis was conducted on 1783 items (single post or comment) written by 321 different commentators randomly sampled from this group. The analysis was conducted using the codebook that was made up of six groups of reliable: topic of discussion, socio-demographic variables, epistemological variables and scientific components (logos), narrative (pathos), credibility (ethos), and positions regarding Polio vaccinations and vaccinations in general. The findings show that although most of the topics discussed were scientific or medical, there was scant use of scientific components and empirical evidence (logos), even among educated commentators, and both among supporters and opponents of the vaccination. An analysis of the emotional (pathos) and trust-related (ethos) features of the debates demonstrates that even though science is essentially based on evidence (logos), public engagement with science is mostly value-driven. While laypeople seek scientific information, they base their evaluations on trust and emotions.

Trust Them Here? Trust Them There? Impact of Forum Type on Evaluation of Information Credibility
Presenting Author: Marla Zimmermann, University of Münster, Germany
Co-Author: Regina Junk, WWU Münster, Germany

Patients and information seekers frequently use online resources for make decisions about health sciences topics. When consulting online resources, it is important, yet challenging, to identify reliable scientific information. The focus of this study is on how the features of online resources can influence people’s evaluation of the credibility of this information. In the present study, the credibility of information was measured using the credibility index, which considers the characteristics of the information source. The results show that patients perceived information from reliable sources as more credible than information from less reliable sources, and that the type of forum (e.g., discussion forums, news articles) also influenced credibility judgments. The results indicate that websites and forums can play a significant role in shaping people’s perceptions of credibility, and that healthcare professionals should be aware of these factors when providing information to their patients.

How Scientific Literacy Benefits Laypeople’s Persuasiveness Judgments About Scientific Evidence
Presenting Author: Friederike Hendriks, University of Muenster, Germany
Co-Author: Dorothea Kleinhees, University of Münster, Germany
Co-Author: Rainer Bromme, University of Münster, Germany

Scientific literacy should encompass students’ capabilities to evaluate scientific information of everyday relevance (e.g. judging about science based health claims found in the Internet). We investigate plausibility judgments about scientific claims in an experimental study with N = 231 participants of all ages. It was varied, whether claims were justified a) by strong or weak statistical evidence (high or low numerical probability) or b) by strong or weak expert testimony (highly pertinent or rarely pertinent expert) (e.g. Horvick, 2008). Furthermore, we ask if two components of scientific literacy impact on these
The primary aim of this study was to explore the construction of professional identities among candidates in the Teach First (TF) programme. We draw upon motivational profiles, narratives and interview data of six Teach First Norway candidates collected during their two-year stay in the TF programme. Findings from this study suggest that TF might be perceived as a place for identity play in which candidates explore possible professional identities. By analyzing TF candidates’ conceptions of teaching, experiences of school and colleagues, and their perceptions of the structural aspects of the school context, this study reveals how the interplay between personal and contextual factors shape the construction of professional identities in a non-binding, time limited educational programme. Our study might have implications beyond TF. Our findings regarding professional identity play, and the factors involved, may apply to candidates in similar teacher recruitment programs, as well as to recruitment programs in other professions in search of subject expertise.

Second career student teachers’ intentions, motivations, and perceptions regarding teaching

Presenting Author: Oma Muller, ORT Braude College of Engineering, Israel
Co-Author: Ruth Zuzovsky, Kibbutzim College of Education, Israel
Co-Author: Smadar Doris-Elchmi, Kibbutzim College of Education, Israel

In light of predicted teacher shortages, many countries including Israel have initiated Master of Teaching programs targeting second career candidates. Their unique profile aroused our interest in examining their motives for turning to teaching and their beliefs about the teaching profession. Findings of a longitudinal study with 77 participants of this Master program show the dominance of an altruistic motive followed by an intrinsic and an extrinsic one. Candidates adhere to a middle position between viewing teaching as a technical-rational activity and a reflective practice and view “good” teachers as having a mixture of adequate personality traits, positive human relations and professional performance with an emphasis on personality traits.

Engineers as second-career teachers: Pedagogical perceptions in relation to previous career

Presenting Author: Oma Muller, ORT Braude College of Engineering, Israel
Co-Author: Yael Furman Shahrabani, ORT Braude College, Israel
Co-Author: Moty Sheinblum, ORT Braude College of Engineering, Israel

Due to a shortage in high-school teachers in Science, Technology, Engineering and Mathematics, the Ministry of Education in Israel has initiated special programs dedicated to training engineers as second-career teachers. This longitudinal study aims to explore the possible contribution of education and previous career in engineering to teaching as a second-career. The study probes engineers’ perceptions and professional development during their first years of teaching in high-school. It follows the transition to teaching of 30 engineers who have completed an intensive pre-service teacher training program. The research tools include questionnaires at the end of the training program and semi-structured interviews with a subgroup of the engineers during their first two years of teaching at the schools.

The research shows that engineers bring knowledge and competencies developed throughout their engineering career to their class. Most of the difficulties they experience are common among first-career young teachers, and some refer to teaching of frequently changing topics such as engineering. However, the manners in which they cope with these difficulties strongly relate to their background and do not characterize first-career teachers, including the implementation of non-traditional approaches and autonomous behavior.

A deeper understanding of the unique skills and qualities engineers bring with them to school may help in utilizing these skills promoting engineering education. Moreover, findings also contribute to the adaptation of traditional pre-service teaching preparation programs for engineers in their transition to teaching.

Initial teachers’ motivations to become a teacher – Comparing traditional and alternative trainings

Presenting Author: Eva Anderson Park, University of Duisburg-Essen, Germany
Co-Author: Stefanie Morganth, University of Duisburg-Essen, Germany
Co-Author: Beatrix Antonia Cardoso Matafro, University of Duisburg-Essen, Germany
Co-Author: Herman J. Ab, University of Duisburg-Essen, Germany

The authors examine whether beginning teachers from traditional teacher training programs (control group) and beginning teachers from alternative pathways (intervention group) differ in their motives to become teachers. In the scope of this paper, the authors focus on three motives: “job security,” “social responsibility” and “working with children.” The sample consists of 98 beginning teachers from Austria and represents a subsample of a quasi-experimental evaluation study conducted in 5 European countries comparing traditional and alternative pathways into the teaching profession. Data are analysed using multivariate regression models. A dummy variable for participation in the intervention is included. Results show that for the intervention group “job security” is a significantly less important factor in choosing to become a teacher, whereas “social responsibility” is of significantly higher importance. The motivation of wanting to “work with children” is not effected by participation in the intervention group. However, women find this motive more important in choosing a teaching career than men and the time spent on voluntary work also has a significant effect on the importance of this teacher motive. Possible explanations for the results and limitations of the study are discussed.

Session N 356
1 September 2017 17:45 - 17:15
Main Building D - D11
Symposium
Assessment and Evaluation, Motivational, Social and Affective Processes

Self-assessment: where we are, where to next.
Keywords: Assessment methods and tools, Cognitive skills, Educational policy, Higher education, Meta-analysis, Metacognition, Self-efficacy, Self-regulation, Workplace learning
Interest group: SIG 01 - Assessment and Evaluation
Organiser: Ernesto Panadero, Universidad Autonoma de Madrid, Spain
Discussant: Phillip Winne, Simon Fraser University, Canada

Self-assessment, self-regulated learning and self-efficacy: A meta-analysis

Presenting Author: Anders Jonsson, Kristianstad University, Sweden
Co-Author: Ernesto Panadero, Universidad Autonoma de Madrid, Spain

Research about student self-assessment (SSA) has shown that academic performance tends to increase for students trained in SSA, but also that SSA training may increase the use of self-regulated learning (SRL) strategies. Consequently, there is widespread advocacy for SSA, not least through the “assessment for learning” reform agenda. The educational gains from SSA are suggested to be related to the enhancement of ownership of learning and use of self-regulatory strategies. In addition, SSA has been shown to improve students’ self-efficacy (SE). These relationships between SSA and SRL/SE have been claimed theoretically, but without proper empirical support. This study therefore uses meta-analytic methodology to explore the relationships between SSA and SRL/SE. The 21 studies included in the analysis were found by a search of database and meta-analyses were conducted using a random-effect model. Inter-study variance was estimated by the maximum likelihood method. The findings from this study confirms the theoretical connection between SSA and SRL/SE. By training in SSA, students’ use of self-regulating strategies for learning increase, while their use of performance/avoidance strategies decrease. SSA interventions also support students’ SE (.75), meaning that they have a more adequate perception of their own capabilities. The findings also confirm what has been noted in some of the individual studies on the effects on SRL/SE from SSA interventions that girls tend to benefit more from such interventions, at least in relation to SE.

A cyclical self-assessment process: An analysis of how university students engage in self-assessment

Presenting Author: ZI Yan, The Education University of Hong Kong, Hong Kong
Co-Author: Gavin Brown, The University of Auckland, New Zealand

While significant progress has been made on understanding the effects of student self-assessment, the inner processes of self-assessment are surprisingly understudied. Previous studies either simply described self-assessment as a package of instruments or tools that could be used to self-assess, or a flow of instruction/learning procedure which is facilitated by self-assessment, but very few have gauged the way in which the self-assessment was conducted. The self-assessment process still remained in a “black box” in literature. This study aims to identify the actions and processes involved in university students’ self-assessment in the Hong Kong context. A qualitative data set was used to analyse 17 individual interviews of undergraduate students at a teacher education institute. The analysis of the interview data revealed a cyclical self-assessment process which involved three actions including: (1) determining relevant performance criteria against which students build their self-assessment, (2) self-directed feedback seeking regarding the performance from either external (e.g., teacher feedback, previous test scores) or internal (e.g., motivation, emotions) sources, and (3) self-reflection by which students consider their performance, enhance their understanding of the problem and identify their own strengths and weaknesses. By taking these three sequenced actions, students arrived at self-assessment judgments which are subject to continuous calibration and refinement based on various sources of feedback and ought to lead to increasingly accurate or valid self-assessments. This study helps better understanding of the self-assessment process and shed light on the mechanisms and structures that students use when asked to self-assess.

Self-assessment in tertiary education: Developing ontological awareness

Presenting Author: Roseanna Bourke, Massey University, New Zealand
The development of self-assessment tasks into higher education courses involves a conceptual shift of the role and function of assessment for both learners and teachers. This paper explores how self-assessment can be used as an innovative assessment and learning initiative to forgeground ontological knowledge and professional identity in tertiary contexts, especially where external professional bodies require additional competencies for learners to be work-ready. As a tool to develop learners' metacognitive strategies such as self-regulation, self-determination and building self-efficacy, self-assessment into tertiary teaching and learning is vital. The defined task that constitutes self-assessment must be considered for two key reasons. First it is fundamentally a tool to reflect student-partnership in learning and assessment if students are positioned as agentic in the assessment process, and second it challenges the relationship between assessment and learning; no longer detached from and more culturally relevant. This paper outlines a case study across three years that explores the impact on tertiary education policy and practice when introducing innovative forms of self-assessment in a post-mastereader educational psychology training programme, where developing student-staff partnerships emerge. Through Cultural Historical Activity Theory (CHAT), a framework of analysis that recognizes multiple networks of activity, multi-voiced meanings (Engestrom, 2009), the question what constitutes a self-assessment task? is addressed. Results show that the development of self-assessment tasks need to be considered in the learning assessment nexus, and while these forms of assessment initially unsettle students, they participate with an eye on their learning, not the grade.

From student self-assessment to developing evaluative judgement: repositioning a limiting discourse
Presenting Author: Steven J. Hulett, University of Technology Sydney/ Deakin University, Australia
Co-Author: Rola Ajia, Deakin University, Australia
Co-Author: Joanna Tai, Deakin University, Australia
Co-Author: Philip Dawson, Deakin University, Australia

This conceptual paper critiques the ways student self-assessment has typically been used and portrayed in the higher education literature. It identifies the discourse of self-assessment as located within assessment practices. It takes up the journey of one of the key authors in this view as he sought to position and reposition self-assessment and assessment itself in a way that took account of assessment for the benefit of learners in the longer term, that is, beyond the length of any given course. Following a discussion of the limitations of such a positioning, it argues that a more fruitful discourse would place self-assessment as a learning practice within a wider conception of curriculum and pedagogy rather than within assessment as a limitation. It builds on Sadler's notion of evaluative judgement to suggest that building the capacity to make effective judgements of one's own work and that of others should be a central goal of any curriculum and that it can be fruitful to locate the pedagogical features of self-assessment as enabling all learning outcomes and equipping students for future practice in any domain.

Session N 357
1 September 2017 15:45 - 17:15
Pens B - B3110
Symposium
Higher Education
Investigating and designing for situated knowledge in a world of change
Keywords: Action research, Collaborative Learning, Communities of learners, Competencies, Design based research, Distributed cognition, Higher education, Knowledge creation, Philosophy, Reasoning
Interest group: SIG 04 - Higher Education
Discussant: Daniel Hickey, Indiana University, United States
Conceptualizing context, transfer, and transformation
Presenting Author: Stig Biersen Hansen, Design and Communication, Denmark
Co-Author: Nina Bonderup Dohn, Department of Design and Communication, Denmark
Co-Author: Karen Harnow Klausen, Department of the Study of Culture, Denmark

As noted in the symposium description, a recurrent theme within educational research is the context dependency of knowledge and learning and the challenges it raises for their transfer. Sometimes, knowledge transformation across contexts is suggested as alternative focus. However, the concepts of context, transfer and transformation are far from clear. In this paper, we provide an elucidation of them. We identify a common core in explanations of context focusing its functional roles in relation to the focal object (i.e., the phenomenon for which it is context): Context supplements the understanding of the focal object, and is determined relatively to it. The question of knowledge’s context-dependency is the question of how knowledge as a focal object is completed by the context. The question of how it transfers or transforms across contexts is the question of whether and how the way it is completed by one context can be exchanged for completion by another context. We identify an internalist and externalist perspective on this question and argue for a reconciliation of them. Our conclusion is 1) Knowledge transfer across contexts will always involve knowledge transformation 2) The transformation may be partial or full, but cannot be conceived of as a metaphor/3) It is an empirical question what actually transforms and how; but not a question which agents can necessarily answer 4) It is necessary empirically to study transformational processes both within and across context knowledge complexes. Both inform our understanding of how to design for learning to transform knowledge across contexts.

Designing for situated knowledge: methodological issues and more
Presenting Author: Roba Marjani, Open University, Netherlands
Co-Author: Steven Veijana, Open University of the Netherlands, Netherlands
Co-Author: Maarten de Lait, Open University, Netherlands

When it comes to the type of complex questions such as how to design for situated knowledge, there is a strong need for suitable research methodology to address such complex and interwoven problems. This paper reviews how the design (design for situated knowledge) is an underlying problem of educational research in general. It has to do with (lack of) societal impact and relevance to educational practice (i.e. teachers, schools, etc.), which is the central theme of this conference. Analyses show that a major cause might be the fact that educational science (and social science in general) uses research methods capable of dealing with ‘complex’ and ‘realistic’ problems, with strongly interwoven variables at different levels of analysis (Kuhl, 2001). Research methods developed to address this problem will be summarized in this paper, but we argue that the availability of such methods (e.g., design-based research) clearly is not enough to solve the underlying issue. Therefore, in a second step, we will also look at the academic research context for possible explanations: its reward systems and publication strategies which are also important pieces of this puzzle. As a case study a recent national initiative in the Netherlands will be described as an attempt to change this reward and evaluation system at universities. It may indeed lead to a strongly improved impact of educational science and solve the (research) issues addressed in this symposium.

Students’ transformational practices
Presenting Author: Thomas Ryberg, Aalborg University, Denmark
Co-Author: Jacob Davidson, Aalborg University, Denmark

In this paper we analyze video data and observational data from long term (3 months), collaborative problem-based project work conducted by groups of Architecture and Design students. The data we draw on encompass more than 100 hours of video data of group work that we approach from both a video ethnographic perspective, as well as an analytic perspective grounded in embodied interaction analysis. We analyse how students engage in a range of transformational practices: How they shift between different modes of knowing and doing for example between digital 3D models, sketches, physical models; How they alternate between digital and physical spaces and create hybrid spaces encompassing and mixing these modalities; How they alternate between thinking, reflecting and modelling in their group room and exploring the real properties of materials, sites and human practices; How the development of their theoretical and practical understandings are mediated by various artefacts, spaces and procedures, but also how their understanding become reflected in these. From this we argue that artefacts, spaces and procedures are essential to understanding the transformation of situated knowledge. Thus our analysis contributes with detailed empirically founded perspectives on ‘knowledge transformations’ that can inform the symposium’s wider question of ‘designing for situated knowledge in a world of change’ and how knowledge is transformed across contexts.

Designing simulated social practices
Presenting Author: Jørn Jørgen Hansen, University of Southern Denmark, Denmark
Co-Author: Nina Bonderup Dohn, Department of Design and Communication, Denmark

This paper presents the design experiment ‘Learning for work-life skills in simulated social practice’. We created and tested a learning design aimed at facilitating students in acquiring academic knowledge and skills and transforming these into workplace skills through participation in simulated social practices within the formal university setting. The design experiment involved the MSc course ICT pedagogies in organizations. The learning objectives of the course were translated into a profile of work-life skills for the profession of an educational designer. Portfolio tasks simulated the use of these work-life skills. This paper presents the design in tandem both horizontally (the learning activities relate to other ‘areas’ of the students’ lives) and vertically (relation to future contexts of application). The ‘vertical’ learning aspect concerned the students’ engagement in the academic university practices based on the anticipation of tasks and challenges of their future careers as educational designers. The ‘horizontal’ aspect was supported by students’ choice of cases which allowed them to bridge to their out-of-school practices. Throughout the course, the students were encouraged to articulate and develop the workplace in relation to each other and local context of university transformative processes involved. Students filled out questionnaires concerning the relevance of work-skills profile, tasks, and feedback activities for their understanding of learning objectives; experience of relevance for employment; achievement of learning objectives; experience of alignment and progression in the course. Responses were positive, especially to impact on understanding of learning objectives.

Session N 358
1 September 2017 15:45 - 17:15
Pens C - C3100
Symposium
Higher Education
Researching sustainability in higher education – focussing the social science discipines
Keywords: Attitudes and beliefs, Citizenship education, Cognitive development, Educational policy, Environmental education, Higher education, Qualitative methods, Quantitative methods, Social sciences, Teacher Professional Development Informant group: higher education
Organiser: Cecilia Lundholm, Stockholm University, Sweden
Discussant: Gale Sinatra, University of Southern California, United States
Teaching sustainability in Economics and Business in China: Implications for transnational education
Presenting Author: Deborah Cotton, Plymouth University, United Kingdom
Co-Author: Kay Wang, University of Plymouth, United Kingdom

This paper reports on research which investigated the ways in which sustainability is incorporated into Business and Economics curricula in China. The study utilised a culturally sensitive interpretive research strategy involving 30 Faculty in 3 leading Chinese universities. The findings indicate that sustainability is present in Chinese Business and Economics curricula but its inclusion is often at odds with Eurocentric
A tale of two ‘educations’: Bringing Entrepreneurship and Sustainability Education into dialogue

Presenting Author: Lynne Wyness, University of Plymouth, United Kingdom

This paper reports on the empirical findings of a research project that explored examples of current best practice in Entrepreneurship Education (EE) and Sustainability Education (ESD) in Higher Education in a national and international context, and asked what pedagogies work best in the cultivation of enterprising and sustainability-literate graduates in the respective fields. It argues that a dialogue between these two diverse educations would be beneficial, by inspiring and informing pedagogical innovations in each field that might support students in their acquisition of those 21st century skills, knowledge, and attitudes deemed essential for the creation of a more sustainable and socially just future.

Trust in government? Investigating trust and value orientations for environmental policy support

Presenting Author: Cecilia Lundholm, Stockholm University, Sweden

Co-Author: Tomas Tomblinsson, Stockholm University, Sweden

Co-Author: Niklas Harring, University of Gotenburg, Sweden

In this study we investigate how trust in the state and value orientations among Swedish students (N = 1,923) are related to their attitudes to different environmental policy instruments. A questionnaire with items measuring i) altruistic, biospheric and egoistic value orientation, ii) trust in the state, and iii) attitudes to environmental taxes, regulations and subsidies was answered by the students in the very beginning of their education. Statistical analyses revealed that biospheric value orientation was the strongest predictor of positive attitudes to all environmental policy instruments, but also, which we believe is important to highlight, that trust in the state is a moderating effect of biospheric value orientation on the level of support for environmental policy instruments. These findings underline that addressing societal trust may be an important aspect of environmental education.

Knowing ‘social dilemmas’ – effects on willingness to sacrifice and accept environmental regulation

Presenting Author: Niklas Harring, University of Gotenburg, Sweden

Co-Author: Cecilia Lundholm, Stockholm University, Sweden

There is a debate on whether education can be a way to generate more civic norms. Where some argue that higher education within disciplines such as economics and political science can have a negative effect on such norms. Lectures take as a point of departure concepts such as ‘tragedy of the commons”; “social dilemmas” or “collective action problems”, where societal problems, such as environmental degradation, are described in terms of coordination problems. Individuals are unable to coordinate themselves, since the (short-sighted) individual rationality is at odds with collective rationality. In this article we investigate what knowledge that actually does to students own willingness to make sacrifices for environmental protection? We make use of a unique dataset of Swedish college students, and surprisingly find that students with better knowledge about collective action problems are more prepared to make own sacrifices for environmental protection. They are also more likely to support an increased tax on carbon dioxide. We elaborate on why this may be the case and propose ideas for future research.

Session N 359

1 September 2017 15:45 - 17:15
Lyra - K103
Symposium
Learning and Special Education

Students’ Difficulties with Algebra: Causes and Solutions

Keywords: Cognitive development, Conceptual change, Developmental processes, Educational Psychology, Learning and developmental difficulties, Mathematics, Misconceptions, Primary education, Quantitative methods, Secondary education

Improving students’ understanding of rational numbers
Discussant: Jon Star, Harvard University, United States

Stumbling blocks in algebra: Difficulties with equivalence and negative number concepts

Presenting Author: Kelly Troscie, University of Melbourne, Australia

Co-Author: Robert Reeve, University of Melbourne, United Kingdom

An understanding of equivalence and negative numbers is crucial for algebraic reasoning. Surprisingly little research however has examined the ways in which different mathematical representations of these two concepts affect algebraic problem solving. We conducted three studies to better understand how variations in algebraic equation representation involving the two concepts affect the ability to solve equations. In each study, students solved five types of linear algebraic equations that differed in complexity with respect to the ‘structural’ properties of equations (i.e., $x+b=c$, $a+b=c$, $a=b+c$, $a+b-c$, $a-x=b-c$). Study 1 showed similar levels of algebraic abilities in 13- and 14-year-olds, with both ages experiencing difficulties with negative signs and equations with an increasing number of operations. Study 2 showed 14-year-olds’ algebraic problem solving abilities remained stable: their problem solving abilities did not change over the school year. Study 3 showed while 14-year-old’s had begun to acquire a more sophisticated understanding of equivalence, their understanding of the negative sign remained limited. Together, the three studies showed adolescent students do not improve in their ability to solve equations that demand a more detailed understanding of equivalence and the negative sign. The findings highlight students’ difficulties with two core algebraic concepts and the need for research to better understand the nature of these difficulties.

The Natural Number Bias Also Affects the Representational Form of Arithmetic Operation Results

Presenting Author: Konstantinos Christou, University of Western Macedonia, Greece

Most students face great difficulties understanding algebra. This often stems from inappropriate use of their knowledge of natural numbers when reasoning about non natural numbers, a phenomenon characterized as the Natural Number Bias. The current study focuses on a certain aspect of this bias, namely the way it influences students intuitions about the result of each arithmetic operation. All previous studies in this field focused exclusively on the size of the results of each operation and the main finding was students’ tendency to think that addition and multiplication result in numbers bigger than the initial numbers, while subtraction and division result in smaller numbers. The current study goes one step further to also investigate the kind of the result of the operations, meaning students’ tendency to expect results of the same number representation as the operand numbers, i.e., that operations on natural numbers should result in natural numbers, and operations on rational numbers should result in rationals. A paper-and-pencil test, was administered to 917th and 8th grade students, from a Greek public school. The results indicated a strong effect of the Natural Number Bias not only considering the size but also the kind of the results of operations. The students showed strong tendency to think that multiplication result in bigger numbers while division in smaller, and also, that operations on natural numbers result in natural numbers and operations on decimal numbers result in decimal numbers. The ways this phenomenon affects learning algebra will be discussed.

Confronting confusion of similar algebraic concepts by teaching multiplication before addition

Presenting Author: Esther Ziegler, ETH Zurich, Switzerland

Co-Author: Peter Edelbrunner, ETH Zurich, Switzerland

Co-Author: Jon Star, Harvard University, United States

A main difficulty in students’ algebra learning is the prevalent confusion of similar concepts, as for example addition and multiplication of expressions. The instructional order often follows the operation signs from addition to multiplication. Another frequent order is to follow complexity of concepts, before learning addition and subtraction. In arithmetic, addition is introduced before multiplication because it is the simpler concept. In algebra, introducing addition before multiplication is also the common order, but here the complexity is reversed. We examined whether reversing the complex-first order (addition before multiplication) to the counterintuitive order (multiplication before-addition) facilitates learning. We also examined a third condition of simultaneous introducing of addition and multiplication problems. A total of 138 sixth-graders participated and were randomly assigned to the conditions: complex-first, simple-first, and simultaneous. Differences were found between the results on the more complex and the simpler problems. On the more complex addition problems, the simultaneous and simple-first conditions performed equally well, but both better than the complex-first condition. On the simpler multiplication problems, differences were only found in the 3-month delay with an outperformance of simultaneous processing over both sequential conditions. Summarized, we have shown learning benefits of reversing the instructional order without changing instruction or material. To deal with complex concepts, two beneficial ways appear to exist: a simultaneous or simple-to-complex approach. To deal with simpler concepts, the key is contrasting, as it guides students’ attention to crucial points of material initially felt as being easy.

Individual Differences in Procedural and Conceptual Knowledge of Algebra

Presenting Author: Jaike McNamara, University of Turku, Finland

Co-Author: Erna Lehtinen, University of Turku, Finland

The debate surrounding the effects of procedural or conceptual knowledge on mathematical development has had a strong effect on the focal points and methods of mathematical education research. This large body of research has uncovered inconsistent findings about how procedural and conceptual knowledge impact mathematical development. Recent research on the learning of fractions has suggested that there may be inter-individual differences in the relative weight placed on procedural and conceptual knowledge, which may explain the inconsistencies in previous findings. In order to investigate the possibility of inter-individual differences in procedural and conceptual knowledge further, this present study applies this question to algebra learning. Results from 240 Finnish students in grades 7 to 9 indicate that there were indeed substantial individual differences in their relative strength of procedural and conceptual knowledge of algebra. A Latent Profile Analysis revealed that some students had relatively more procedural knowledge than conceptual (21%), others had relatively more conceptual knowledge than procedural (9%), while most students had fairly even levels of knowledge, many with lower levels (60%) and a few with higher levels (10%) of both procedural and conceptual knowledge. Group level differences revealed that at the intermediate level there was little difference between those students who relied more heavily on procedural knowledge and those who relied on conceptual knowledge on a test of their mathematics performance on a related topic.

Session N 360
This study examined the role of early adolescents’ temperament in their positive and negative emotions and psychophysiological reactions in achievement situations. The participants were 160 students. Parents rated their adolescents’ temperament in fall in grade 6. Adolescents participated in an experiment of challenging and non-challenging tasks in spring in grade 6. Adolescents reported on their positive and negative emotions during the orientation period before the tasks and directly after challenging and non-challenging achievement tasks of which difficulty level was adapted to their own skill level. Adolescents’ skin conductance was also recorded throughout the test session. The results showed that higher effortful control was related to lower level of negative emotions despite the task difficulty, after controlling for the effects of other temperament traits, gender, cognitive ability and order of the tasks. Higher effortful control was also related to higher levels of positive emotions during the orientation period. Furthermore, higher surgency/extraversion was related to fewer negative emotions during challenging tasks, whereas higher affiliation was related to fewer negative emotions in non-challenging tasks. Finally, higher surgency/extraversion and lower negative affectivity were related to higher skin conductance during the orientation period.

A motivated look into students’ affective response to an authentic examination experiences
Presenting Author: Idalis Villanueva, Utah State University, United States
Co-Author: Jennifer Husman, University of Oregon, United States
Co-Author: Katherine Chang, Arizona State University, United States

Prior work in motivation and emotion provides researchers with a roadmap for the types of beliefs and appraisals that support students’ management of their cognition and emotion. This research has focused on self-report as a way to identify the beliefs and thought processes the resulting optimal motivation. Self-report is a valuable tool; it has significant limitations which have impacted researchers’ ability to test aspects of existing motivational theories. Social desirability and self-image influence students’ responses, and cannot get at the processes and psychological states students do not understand or of which they are unaware. Advances in endocrinology and kinesiology provide an opportunity for researchers to observe students’ stress response and recovery in authentic performance environments, and understand the relationship between those responses and the beliefs and appraisals students bring to those environments. Findings from this work: (1) extend and build motivation and emotion theories of learning; and (2) create a foundation for the use of physiological and biological measures of arousal in studies of student performance.

Session N 362
1 September 2017 15:45 - 17:15
Vita - 109
Symposium
Educational Policy and Systems

Effects of early childhood education with high-risk-families: New directions for public policy
Presenting Author: Rosa Teepe, Radboud University Nijmegen, Netherlands
Co-Author: Inge Molenaar, Nijmegen, Netherlands
Co-Author: Ludovico Verhoeven, Radboud Universiteit Nijmegen, Netherlands
Co-Author: Ron Oostdam, University of Amsterdam, Netherlands

Aims
The aim is to investigate effects of a Dutch FLP on linguistically diverse children’s vocabulary, specifically curriculum-based and general vocabulary. Moreover, we investigate additional effects including technology-enhanced activities in a FLP.

Theoretical background
Vocabulary knowledge in preschool children is essential for expressing themselves and communicating with others, and is related to later academic success. At this young age, vocabulary develops mainly informally via parent-child interaction and both the quantity and the quality of this interaction are important for a rich vocabulary. Acknowledging the influence of parents, FLP’s aim to promote vocabulary of linguistically diverse children by supporting parent-child interaction. Nowadays, FLP’s also contain technology-enhanced activities that include real-time interaction support.

Method
Using a quasi-experimental pre-post test between subjects design, 223 preschool children (2:6-3:4 years of age) and their parents were followed over a school year. 145 parent-child dyads participated in the FLP and 78 dyads formed a no-treatment control group. 73 dyads in the FLP condition were additionally provided a technology-enhanced storytelling activity.

Findings
Preliminary analysis suggest that children in the FLP condition made greater curriculum-based vocabulary progress than children in the control condition. Technology enhanced storytelling activities did not lead to additional effects on vocabulary. However, large standard deviations indicate that the further planned multilevel analyses should pay attention to the diversity and complexity (multilingual, educational background) of the sample.

Conclusions for policy
When investing in family support, the government should consider that municipalities and families differ in their need and approach for support.

The prevention dilemma in early interventions: How to recruit and randomise at-risk families?
Presenting Author: Alex Neuhaus, University of Applied Sciences of Special Needs Education, Switzerland
Co-Author: Erich Ramsayer, PädBrom – University of Teacher Education, Switzerland
Co-Author: Simone Schaub, University of Applied Sciences of Special Needs Education, Switzerland
Co-Author: Susan, C.A. Bunkhardt, University of Applied Sciences of Special Needs Education, Switzerland
Co-Author: Andrea Lafranchi, University of Applied Sciences of Special Needs Education, Switzerland

Aims
Presentation of a concept for the recruitment of families in psychosocial at-risk situations in a randomised controlled trial (RCT) using the example of the Swiss ZEPPLEIN 0-3 project.

Theoretical background
It is often found that the targeted population group with a strong need for prevention, in particular families with a migration background, only rarely participate in early interventions. This prevention dilemma is especially obvious when it is unclear whether the family will get support or not by the time they give consent for participation – as in RCTs.

Methods
ZEPPLEIN is a longitudinal intervention study evaluating effects of the Parent as Teachers program (PAT) at three sites in the canton of Zurich, Switzerland. Families were recruited during one year and afterwards randomly assigned to the intervention (137 families) and control group (118 families) by stratified block randomisation. After baseline data collection, children’s outcomes were assessed annually until three years of age.

Findings
Results show that the targeted number of 252 recruited at-risk families was met. Randomisation was successful regarding crucial characteristics like sociodemographic characteristics or stress constellation. Moreover, several significant intervention effects were found, mainly on the learning environment at home and language development.

Educational significance of the research
ZEPPLEIN demonstrates how to realise a highly complex RCT intervention study with at-risk families – particularly with migration background.

Conclusions for policy
High standard evaluation studies in families with the highest need for prevention require a high effort, but are essential for policy decision making regarding educational opportunities.

Effects of the German NFP adaption “ProKind” on mothers and children: Policy implications?
Presenting Author: Andrea Lafranchi, University of Applied Sciences of Special Needs Education, Switzerland
Co-Author: Verena Daehne, University of Leipzig, Child and Adolescent Psychiatry, Psychotherapy, and Psychosomatics, Germany
Co-Author: Tanja Jungmann, University of Rostock, Germany
Co-Author: Tilmann Brand, Leibniz Institute for Prevention Research and Epidemiology – BIPS, Bremen, Germany

Aims: Evaluation results of an adapted version of the NFP program in Germany.

Theoretical background: The home visiting program “ProKind” offered support for socially and financially disadvantaged first-time mothers from pregnancy until the children’s second birthday in three German federal states.

Methods: A multi-centered, longitudinal randomised controlled trial (RCT) was conducted to assess program effectiveness. A total of 755 women with multiple risk factors were recruited, 394 received regular home visits (treatment group), while 361 only had access to standard community services (control group).

Findings: ANOVAs with repeated measures showed small benefits over time for the home-visited mothers regarding paternal self-efficacy, knowledge on child rearing, feelings of attachment, parenting style, and social support. No program effects on child development were detected. Positive changes over time in maternal feelings of attachment were associated with a better quality of the helping relationship, lower risk status, and younger age.

Educational significance of the research: In comparison to other rigorously evaluated programs with a home visiting component, “ProKind” is among those 50 % with an impact on at least one outcome domain. In line with most European NFP adaptations, our program effects were few and small in magnitude.

Conclusions for policy: In states offering liberal and high-quality public health insurance coverage for families, such as Germany, early interventions may not be able to produce large or various effects on mothers and children. Thus, home visitation should be linked with and adapted to existing social and health care services.

Generating evidence and informing policy: The Building Blocks trial of the FNP in England
Presenting Author: Michael Robling, Cardiff University, United Kingdom
Co-Author: Jula Sanders, Cardiff University, United Kingdom
Co-Author: Rebecca Cannings-John, School of Healthcare Sciences, Cardiff University, United Kingdom

Aims
To assess the effectiveness of a nurse-delivered home visiting programme in England.

Theoretical background
Supporting teenage mothers to achieve a healthy pregnancy, successful parenting and socio-economic stability is a policy priority. The Family Nurse Partnership (FNP) provides intensive support to young mothers in selected areas of England. FNP comprises up to 84 structured home visits by Family Nurses during pregnancy and until the child’s second birthday.

Methods
Building Blocks investigated the effectiveness of offering FNP in addition to usual care, at 18 sites. Participants were nulliparous, aged under 20 and recruited before 25 weeks gestation. Following randomisation data were collected from mothers at baseline, late pregnancy, and 6, 12, 18 and 24 months postpartum. Primary outcomes were tobacco use at late pregnancy, birth weight, second pregnancy by two years postpartum and emergency hospital episodes for the child. Secondary outcomes included measures of pregnancy and birth, child health and development, and parental life course.

Findings
1645 women were recruited. There were no group differences for any primary outcome with high rates of smoking at late pregnancy (56%) and of second pregnancy (66%) in both study arms. Some secondary outcomes suggested small positive programme impacts.

Educational significance of the research
In contrast to previous US-based evaluations, the short-term evidence provides only limited support for FNP in England.

Conclusions for policy
When an effective early years intervention is expanded into areas of different geography, culture or usual care provision, generalisability of benefit cannot be assumed. Instead further and longer-term evaluation is required.

Session N 363
1 September 2017 15:45 - 17:15
Main Building E - E301
Symposium
Teaching and Teacher Education
Professional learning communities in primary education: results from four (multiple) case studies
Presenting Author: Janett Dippenberg, Eindhoven University of Technology, Netherlands
Co-Author: Marina Iläns, Vrije Universiteit Amsterdam, Netherlands
Discussant: Seerét Devos, Ghent University, Belgium

Collaborative teacher learning: Individual and shared perceptions
Presenting Author: Jannet Dippenberg, Eindhoven University of Technology, Netherlands

This study aimed to obtain a detailed and diverse view of collaborative teacher learning during moments perceived by teachers as powerful for learning. A case study was conducted, within which primary school team meetings were observed across a period of eight months. In addition, questionnaires and interviews were conducted with participating teachers regarding the learning moments in the particular meetings. Results showed that the collaborative teacher learning processes varied depending on the collaborative activity observed and the degree of agreement and recognition between teachers with regard to the topic interacted on. Four types of interactions could be identified, with different interaction processes and different patterns of individual-learning processes. These patterns concerned both observable and non-observable activities as well as outcomes. Moreover, teachers’ individual-learning processes showed similarities as well as differences.

Teamwork as a tool for collaboration and professional development
Presenting Author: Bima Maria Svanþþmsdotr, University of Akureyri, Iceland

The main line of inquiry was on how school leaders and teachers used teamwork in developing a professional learning community (PLC) in a new compulsory school in Iceland. The emphasis in the school was to develop a school policy that focused on learning in all levels, involving students, teachers and paraprofessionals.

The research was developed in the form of a practical action research project for 3½ years, focusing on local practice in the school and designed in plan, do, reflect and act cycles. I became a critical friend with the school leaders as leadership has shown to be a strong driver for school improvement and they supported the staff. I reflected with them and collected all the data needed to explain and connect activities in the school to find out what contribution teamwork made to build up a PLC when school leaders provided support through their leadership.

Collaboration is a critical issue in school as it can improve practice that can support student achievement. Goal-oriented teamwork can be a useful tool in building a PLC as a forum for collaboration and shared practice. The main focus in the presentation is on how the school improved teamwork as a tool for collaboration and professional development towards a PLC.

Professional learning communities aiming to sustain the implementation of a family literacy program
Presenting Author: Esa Krijnen, Erasmus University Rotterdam, Netherlands
Co-Author: Roel Van Steensel, Erasmus University Rotterdam / VU University, Netherlands
Co-Author: Marijke Meeuwis, Erasmus University Rotterdam, Netherlands

Many schools encourage parents to support their children’s literacy development at home, with the aid of family literacy program (FLP). Research on whether and how schools sustain FLPs is scarce, though in establishing educational partnerships with parents sustainability is a crucial factor. It is assumed that sustainable innovation is easier to achieve in schools that function as so called professional learning
communities (PLCs), in which educational professionals work and learn together to improve pupils’ learning. In the current project, PLCs focusing on the implementation of a FLP are established in four schools, to improve sustainable implementation of the FLP. The current study investigated firstly whether characteristics of a PLC were observable in the intervention process after one year, secondly which elements of the school and the PLC-intervention facilitated and hindered the occurrence of these characteristics, and thirdly whether and how a sense of ownership of the FLP was observable in the PLCs. A cross-case study design was applied in which the PLC-interventions function as the units of analysis. Data consists of transcripts of meetings of the PLCs (n=27), meeting minutes, field notes and interview transcripts with PLC members (n=27). Data were coded and interpreted using a qualitative content analysis method (Schraer, 2012). Preliminary results show the occurrence of PLC-characteristics through the participation of parents, the crucial role of school factors in facilitating PLC-characteristics and the importance of a shared vision in the PLC on educational partnerships with parents to acquire ownership of the FLP in the school organization.

Professional learning communities with teachers and parents: supporting educational partnerships

Presenting Author: Marina Ilaa, Vrije Universiteit Amsterdam, Netherlands
Co-Author: Agnes Willieken, VU University Amsterdam, Netherlands
Co-Author: Marianke Dobber, VU University Amsterdam, Netherlands
Co-Author: Carl Schraer, VU University Amsterdam, Netherlands
Co-Author: Mirjam Costerman, VU University Amsterdam, Netherlands
Co-Author: Tineke Pels, VU University Amsterdam, Netherlands

It can be beneficial for children’s socio-emotional and cognitive development if parents and teachers form an educational partnership in which they support their child. Despite large investments, primary school teachers encounter difficulties in establishing and maintaining such partnerships in practice. Research suggests that a Professional Learning Community (PLC) in which parents and teachers cooperate could be beneficial for the formation and/or improvement of this partnership. This research examined how equality and diversity were beneficial for the PLC during discussions about educational partnership. Furthermore, this study examines to what extent participants were able to reflect on their opinions and practices. Lastly, the practical returns of the PLC for the schools were investigated. Four schools formed PLCs that consisted of kindergarten teachers and parents and met five times. Transcripts of these meetings were made and analyzed using a Thematic Coding Approach. Results showed that equal participation was expressed in several ways, e.g. in equality in communication and attention to individual experiences and differences became important topics. Depending on the school context, parents and teachers were able to reflect more or less thoroughly on their opinions and practices, especially regarding their communication. At each school practical returns from the PLC were translated into applications in the school. Differences between schools were discussed. Further research should determine whether these events lead to improved long-term educational partnerships that is anchored in the school policy.

Session N 364
1 September 2017 15:45 - 17:15
Main Building A - A05
Symposium
Teaching and Teacher Education

How teachers act: The development of professional classroom competencies

Keywords: In-service teacher education, Language (Foreign and second), Mathematics, Meta-analysis, Pre-service teacher education, Science education, Teacher Effectiveness, Teacher Professional Development
Interest group: SIG 11 - Teaching and Teacher Education
Discussant: Johanns König, University of Cologne, Germany

How regular elementary school teachers can boost their student’s conceptual knowledge in physics

Presenting Author: Ralph Schmucker, ETH Zurich, Switzerland
Co-Author: Peter Eidelbrunner, ETH Zurich, Switzerland
Co-Author: Leonard Schalk, ETH Zurich, Switzerland
Co-Author: Anne Dejzarmay, Swiss Federal Institute of Technology, Zurich, Switzerland
Co-Author: Elsbeth Starn, ETH Zurich - Research on Learning and Instruction, Switzerland

A main barrier to learning secondary school Physics is not so much what students lack, but what he or she has, namely, alternative conceptual frameworks. These alternative conceptual frameworks often work well in everyday life and are crucial building blocks for conceptual understanding. To overcome misconceptions at an early stage can therefore be considered a worthwhile approach to prepare future learning. However, the relevant expertise for teaching conceptual Physics knowledge cannot be acquired in regular elementary school teachers. We wanted to find out whether an intensive training on the use of four curricula for early Physics learning will enable regular elementary school teachers to boost their students’ understanding of Physics concepts. 87 elementary school teachers were trained to apply 60 lessons of inquiry-based instruction on the four topics Floating & Sinking, Air Pressure, Liquid, Sound & Spreading of Sound, and Stability of Bridges to third and fourth year students (N=1372 children). The instructed children made significant progress in their conceptual understanding from pre- to posttests on the four curricula (all p<1.0). Control groups of un instructed children did not spontaneously improve their understanding of physics concepts.

Teacher learning in Lesson Study: learning patterns, dialogue & teacher professional identity

Presenting Author: Jan Vermunt, University of Cambridge, United Kingdom
Co-Author: Maria Vekili, University of Cambridge, United Kingdom
Co-Author: Paul Warwick, University of Cambridge, United Kingdom
Co-Author: Neil Mercer, University of Cambridge, United Kingdom

This paper aims to investigate the development of teacher learning patterns in the context of Lesson Study (LS) and to understand the way teachers learn in relation to core personal and contextual factors. In LS teachers jointly plan and discuss lessons in small groups, with a focus on subject matter teaching and students learning. Primary and secondary Mathematics teachers formed LS groups within their schools. Twenty-one schools participated in the first year and 56 schools in the second year of the project. A survey was developed and administered at three time points. It consisted of two main parts in all three administrations: Perceptions of LS and Inventory of Teacher Learning. Moreover, survey 3 measured the following variables: quality of dialogue; support of school context; student learning outcomes; and teacher professional identity. The findings showed a large positive effect of time on meaning oriented learning and a large negative effect of time on problematic learning. The quality of teachers’ dialogue in LS discussions, the patterns in their learning, their professional identity and their observations of student learning outcomes proved to be all strongly interrelated. It was concluded that LS, with its focus on case studies and subject matter teaching, may provide a suitable platform for these development processes to take place. These findings contribute to the development of our theoretical understanding of teacher learning as they provide evidence of the impact of LS on teacher learning processes and student learning outcomes.

Accuracy of teachers’ judgments of students’ cognitive abilities: a meta-analysis

Presenting Author: Nils Macht, Institute for Psychologie of Learning and Instruction (IPL), Germany
Co-Author: Jens Möller, University of Kiel, Germany
Co-Author: Johanna Kaiser, University of Kiel, Germany
Co-Author: Caspar T. C. Schmier, Leibniz Institute for Science and Mathematics Education (IPN), Germany

We present a meta-analysis of the accuracy of teachers’ judgments of students’ cognitive abilities. The array of cognitive abilities includes intelligence, giftedness, other cognitive abilities, and creativity. The integration of 106 effect sizes from 33 studies with a meta-analytical multilevel approach led to a mean judgment accuracy of cognitive abilities of r = 0.43. Moderation analyses revealed moderate to large effects for intelligence: r = 0.50, other cognitive abilities: r = 0.42, giftedness: r = 0.36, and creativity: r = 0.34. Lower judgment accuracy was shown for preschooled samples and for judgments without eligible frames of reference. We discuss an academic achievement bias as selected studies revealed higher correlations between judgments of intelligence and academic achievement measures (r = 0.61) than between judgments of intelligence and measures of intelligence.

Influence of linguistic features in English essays on teachers’ assessments

Presenting Author: Stefan Keller, School of Teacher Education Basel, Switzerland
Co-Author: Cristina Voegelin, School of Education FHWW, Switzerland

This paper aims to examine the effect of two linguistic features in English essays – spelling and lexical complexity – on judgments by teachers of English as a foreign language (TEFL). It is part of the research project ASSET, which analyses the effects of student-, text- and teacher characteristics on teachers’ judgments of authentic English argumentative essays. Responding to students’ essays is one of the central competences in teaching English in higher education. From a formative perspective, teacher judgments (TJ) influence classroom activities, feedback and subsequent tasks which teachers might set their learners. From a summative perspective, assessing the outcome of learning processes adequately and objectively is a major aspect of fairness and equality in any educational system (Kronig, 2007). In the two studies reported in this paper, English teacher trainees in Switzerland and Germany were asked to assess four authentic English argumentative essays on a “holistic” and an “analytic” rubric. In each case, two texts representing “low” quality of writing and two representing “high” quality were chosen and the features “spelling” (study A) and “lexical complexity” (study B) were experimentally varied for each text. For study A, results show that the spelling quality of a text also influences teachers’ judgements in areas such as “quality of vocabulary” or ‘organisation’, hinting at distortion effects due to poor spelling. We expect similar effects for lexical complexity in study B, which will be presented at the conference.

Session N 365
1 September 2017 17:45 - 19:15
Main Building D - D04
Symposium
Higher Education

The Impact of Individual and Contextual Factors on the First Year in Higher Education

Keywords: Achievement, Competencies, Educational Psychology, Higher education, Motivation, Quantitative methods, Self-regulation, Student learning, Teaching approaches
Interest group: SIG 04 - Higher Education
Discussant: Edith Braun, University of Kassel, Germany

The Importance of Academic Adjustment for a Successful Transition to University

Presenting Author: Elis van Rooij, University of Groningen, Netherlands

Considering the pivotal role of academic adjustment for student success, it is important to gain more insight into how several motivational and behavioural factors affect academic adjustment as well as the extent to which academic adjustment influences student success. This empirical study investigated how academic motivation, academic self-efficacy, self-regulated study behaviour, and satisfaction with the
chosen degree programme influenced successful academic adjustment in university and how these variables and adjustment affected three important indicators of student success: grade point average (GPA), attainment of credits (ECTS), and intention to persist. The sample consisted of 243 first-year university students in the Netherlands. Structural equation modelling showed that academic adjustment was influenced by student motivation, self-regulated study behaviour, and degree programme satisfaction, which together explained 70% of the variance in adjustment. Motivational and behavioural variables did not influence GPA and ECTS directly but only through academic adjustment. Furthermore, only satisfaction with the degree programme predicted intention to persist. These results point to the importance of academic adjustment in predicting university GPA and ECTS and the pivotal role of satisfaction with the degree programme in predicting intention to persist. Universities could integrate the development of self-regulated study skills – the biggest contributor to academic adjustment – in the first-year programme. Moreover, looking into the importance of student satisfaction with the communication and collaboration between secondary schools and universities should be enhanced in order to help students to choose a university degree programme that matches their abilities, interests, and values.

Investigating the context-specificity of academic adjustment to higher education

Presenting Author: Mikhail De Clercq, Université catholique de Louvain (UCL), Belgium

The first year experience has been extensively documented in the literature. Many variables were identified as playing an important role in the students’ transition processes. Yet, contextual factors have often not been part of the investigation. The majority of studies assume similar effects in different programs. However, differences between institutions or programs could result in specific learning contexts leading to different adjustment processes. As an attempt to overcome this limitation, the present study investigates the impact of study programs on academic achievement through multifactorial multilevel analyses. 1173 first-year students from 27 study programs from a Belgian university participated in this study. The results highlight that achievement interclass variation is about 15%. Eight factors remain predictive in multivariate analysis namely, past performance, socioeconomic status, informed choice, self-efficacy beliefs, value, study time, extracurricular activities and teaching practices. Finally, significant slope variations were identified for gender, peer support, attendance and external engagement. These results indicate that the effects of these variables on academic adjustment significantly differ from one study program to another. The implications and limitations of this study are discussed in the conclusion.

The Interplay of Institutional Requirements and First-Year Students’ Academic Competence

Presenting Author: Miriam Barnat, University of Hamburg, Germany
Co-Author: Elke Bosse, University of Hamburg, Germany

The first-year experience is an important issue in German higher education (HE), because entry rates into university-level education have doubled over the last decade – while drop out shifted from end of studies to first year. As HE research appears to lack knowledge regarding the interactive effects of student characteristics and institutional context, the paper seeks to shed light on the nexus of first-year students’ academic competence and institutional requirements. It is based on the data of a longitudinal student survey currently conducted at four German HE institutions.

To examine academic competence, the survey includes individual factors such as self-concept, motivation and learning strategies, while using goal commitment and regulation as outcome variables in the first wave and adding self-perceived success measures (e.g., study progress) in the second. Apart from type of institution and study programme, contextual factors are examined in terms of institutional requirements identified in a previous study. Confirmatory Factor Analysis of the requirements tested 7 factors with acceptable fit. Academic competence in the first wave was analysed via structural equation modelling and latent profile analysis which will be complemented by latent transition analysis based on the second wave. First results indicate that the identified profiles of academic competence correspond with the perception of institutional requirements. The data of the second wave is expected to further provide insights into the interrelations of the development of academic competence and the learning context. The findings will be discussed with regard to implications for HE research and development.

The First Year in Higher Education: The Role of Individual Factors and the Learning Environment

Presenting Author: Hittegard Schaap, DZHW - German Centre for Higher Education Research and Science Studies, Germany

The transition to higher education and the initial phase of studying play a crucial role for future educational decisions and academic development. For this reason the study seeks to explain the outcomes of the first year in higher education and to assess the impact of a wide range of predictors. Referring to sociological or sociopsychological theories, which focus on structure and agency, we examine both individual and contextual factors regarding important outcome variables such as academic integration and dropout intention. We use data from a panel study that longitudinally observes a large sample of randomly selected first-year students of the winter term 2010. The study is part of the German National Educational Panel Study (NEPS). Almost 10,000 students participated in the first three waves on which our analyses are based. First, we will describe the results that student experiences during the initial phase of studying are contingent upon both individual characteristics and attributes of the context. However, we found interaction effects indicating that different students react differently to their learning environment. These results and the multicollinearity present in our data once again provide evidence for the fact that empirical findings are dependent on model specification. This calls for caution when comparing the findings from different studies and drawing conclusions for educational planning and practice in higher education.

Session N 366

1 September 2017 15:45 - 17:15
Master Class: ID 018
Symposium
Cognitive Science

Constructing situational and mathematical models of word problems: analysis and improvement

Keywords: Cognitive skills, Comprehension of text and graphics, Educational Psychology, Mathematics, Problem solving
Interest group:
Discussant: Bethany Rittle-Johnson, Vanderbilt University, United States

Using retelling data in the study of pupils’ representations of P-Items

Presenting Author: Wim Van Dooren, KU Leuven, Belgium
Co-Author: Lieven Verschaffel, KU Leuven, Belgium
Co-Author: Febe Goemans, KU LEUVEN, Belgium

Studies have amply shown that elementary school pupils have a tendency to neglect their everyday life knowledge when solving school mathematical word problems (Verschaffel et al., 2000). Most evidence comes from studies that confronted pupils with word problems that are problematic from a realistic point of view (so-called P-items). Wyers et al. (in press) tried to help pupils to solve such P-items more realistically by adding a warning sentence at the end of each problem emphasizing the realistic modelling complexity. The findings showed a modest but significant positive effect of such warnings about the realistic modelling complexity at the end of the problem text. In the present study, we used the retelling method to obtain further insight into this warning effect. 72 upper elementary school pupils were randomly divided into a warning or no-warning condition wherein they had to retell and solve five P-items that, respectively, did or did not contain a warning sentence. The retellings of almost half of the pupils from the warning condition did not refer to the realistic modelling complexity, but we found a strong relationship between the presence of a reference to the realistic modelling complexity in a pupil’s retelling and the realism of his or her reaction to the P-item. Theoretical, methodological and educational implications are discussed.

Dutch third to sixth graders’ word-problem solving: student and problem factors

Presenting Author: Marian Hiddonk, Leiden University, Netherlands

In contemporary mathematics education, word problems are very prevalent in instruction and assessment. Although many researchers assume that word problems are particularly difficult because they require representational steps before one can solve the ‘hidden’ arithmetic problem, others argue that word problems may instead facilitate problem solving because they activate real-world knowledge eliciting meaningful strategies. Two previous studies’ results (Hiddonk, 2013a, 2013b) suggested that the influence of problem presentation format (symbolic vs. standard word problem) diminished with more years of schooling, possibly because the results show that word-problem solving is influenced in well-developed cognitive schemas exemplifying the typical school arithmetic word problem. The current study aimed to investigate this interpretation empirically by (1) testing third to sixth graders, and (2) including more challenging problems by adding two-step arithmetic problems and non-standard word problems, the latter including an irrelevant number.

A sample of 444 Dutch third to sixth graders solved a total of 48 arithmetic problems, distributed over three presentation formats: symbolic (no context), standard word problems, and non-standard word problems. Results showed that the performance on standard word-problem solving was influenced by problem presentation format whereas solutions to word problems with two-step problem solving were more difficult than the other two problem types. Contrary to our expectations, these differences did not depend on the students’ grade. Furthermore, individual student factors (reading comprehension competence, working memory, and non-verbal intelligence) were all positively correlated with the performance on the different problems, but these relations hardly differed between the problem formats.

Measuring strategic knowledge about drawing for solving real-world problems

Presenting Author: Stanislaw Schukajlo, University of Münster, Germany
Co-Author: Johanna Rallersmann, University of Münster, Germany
Co-Author: Claudia Leopold, University of Fribourg, Switzerland

Strategic knowledge is an important precondition for strategy use and achievement. However, to date, instruments for measuring strategic knowledge with regard to one specific strategy and its execution are largely lacking. In this presentation, we will report on the construction and validation of an instrument that was designed to measure students’ strategic knowledge about drawing with respect to the solving of real-world problems: the Strategic Knowledge about Drawing Scale. We conducted both qualitative and quantitative evaluations of the instrument in a sample of ninth-grade students. The findings provide evidence for the scale’s reliability, content validity, internal validity, and external validity. Its use in future studies promises new insights into the role of strategic knowledge for the efficient use of self-generated drawings to solve real-world problems.
The percentage bar as visual strategy to solve word problems
Presenting Author: Timo Latu, University of Education Freiburg, Germany
Co-Author: Benjamin Thiede, University of Freiburg, Germany
Co-Author: Lars Holzapfel, University of Freiburg, Germany

Students of grades 7, 8 and 9 learn to apply different strategies to solve word problems that involve percentages (formula insertion, proportional calculation). However, in later years we encounter very low solution rates of percentage problems. This may be explained by the incapability to create a situation model as a first solution step using these strategies. A bar diagram, however, that visualizes the magnitudes and the respective percentages, which are involved in a typical percentage problem, is supposed to support students to create an appropriate situation model and thus increase solution rates. In a quasi-experimental design students are trained to use either a percentage bar as a visual strategy (which was unknown to them before) or to use a proportional calculation (as learned before) for one lesson in each case. Both groups showed increased solution rates compared to a control group with no treatment. Among the students who were trained with the percentage bar, those who actually use it perform better at more complex tasks than those who stick to their previously used strategy.

Session N 367
1 September 2017 15:45 - 17:15
Main Building A - A2A
Symposium
Learning and Social Interaction, Motivational, Social and Affective Processes

Teacher-student relationships in different phases of schooling
Keywords: Educational Psychology, Motivation, Qualitative methods, Quantitative methods, Social aspects of learning and teaching, Social interaction, Teacher Professional Development, Teaching / instruction, Teaching approaches
Interest group: SIG 08 : Motivation and Emotion
Organiser: Rebeca Lazarides, University of Potsdam, Germany
Discussant: Kerstin Holker, RWTH Aachen University, Germany

Teacher-class relationship – a new perspective on the relationship between teachers and students
Presenting Author: Julia Hüt, Psychology in the Learning Sciences, Germany
Co-Author: Anne Christine Frenzel, University of Munich, Germany

There is ample evidence that teacher-student relationships are highly relevant for the academic success and the personality development of students; while less is known about the relevance of teacher-student relationships for teachers’ performance and well-being. Based on the existing knowledge and instruments focusing on teacher-student relationships as a dyadic phenomenon, we developed an instrument that measures the teacher’s relationship with a whole class. The present study serves to validate this new instrument by the use of cognitive interviews with secondary teachers (so far n=8 out of targeted N=40) in Germany. Standard probes are used to elicit possible difficulties in the question-answer process of the items and to explore teachers’ associations with the given items. To capture the whole range of teachers’ interpretations, answers are analysed by combining deductive and inductive approaches to the coding process. Preliminary results show that teachers can easily describe the relationship with their class and refer to different characteristics of the interaction. By developing this instrument on the relationship between teachers and their classes, we hope to inspire interventions targeting the improvement of the quality of relationships in schools.

Inhibited students’ poorer math skills: the role of teachers' and students’ ability judgements
Presenting Author: Jaana Viijaranta, University of Eastern Finland, Finland
Co-Author: Kaisa Aurola, University of Jyväskylä, Finland
Co-Author: Sari Mulkos, University of Helsinki, Finland
Co-Author: Jan-Erik Nurmi, University of Jyväskylä, Finland

Even though there is a relatively well-known association between students’ temperamental inhibition and poor math performance, the mechanism behind this association is largely unknown. This study followed 156 Finnish children during the first grade of primary school to examine to what extent teachers’ judgement of students’ ability as a reason for their success, as well as students’ own self-concept of ability, mediated the negative effect of temperamental inhibition to the math skill development during the first grade. The results showed, first, that the more inhibited the students are, the less teachers think their success is because of their ability. Second, students showing more temperamental inhibition feel that they are less capable and competent in mathematics than less inhibited students. The preliminary results suggested some support for the mediating role of teachers’ judgements of students’ ability and students’ own self-concept of ability in the association between inhibition and poorer math performance, measured by standardized tests. These kinds of negative effects of temperamental inhibition to teachers’ judgements of students’ ability and to students’ self-concept and, via these, to students’ performance level at this early stage of schooling can be seen as detrimental in relation to further skill development, because math performance has been found to show both high stability and increasing variance over time. Therefore, the importance of beliefs related to shy and inhibited students’ abilities should be taken into account in everyday classroom interaction.

Manifestations of empathy: Teacher-student relationships among Australian Primary Teachers
Presenting Author: Paul Swan, Monash University, Clayton Campus, Australia
Co-Author: Philip Riley, Australian Catholic University, Australia

The aim was to explore how six Australian primary (elementary) teachers who were identified by their school principals as effective empathisers, draw on that quality to create supportive learning environments. Effective teacher empathy involves recognizing a student's mental state (intentions, beliefs, desires and emotions) and responding with an appropriate emotion based on care. Teacher reports of their relational goals and teaching style dimensions, together with student-rated parallel teaching style dimensions, complemented filmed classroom practice at two timepoints self-identified as positive ‘empathy interaction moments’ for analysis. These filmed vignettes and two ‘live’ lessons were coded for levels of emotional support using the Classroom Assessment Scoring System. Teachers’ perspectives of the actions in the filmed vignettes were further explored at a subsequent interview, and then thematically analysed using an interpretative phenomenological approach. High correlations were identified between CLASS emotional support dimensions, lesson observations and vignettes, and there was strong alignment between teachers’ and students’ perceptions of the teaching style dimensions. These nominated empathic teachers were highly motivated to connect with students, took a personal interest in them beyond the curriculum demands, displayed high levels of support, and regulated their teaching style to meet student needs. A practical development grounded in this data is an empathic process observation protocol, which may be used as a platform to enhance teachers’ empathetic engagement among primary school teachers.

Teacher-student relationships from the perspective of secondary students
Presenting Author: Gloria Gratacos, C.U. Villanueva, Spain
Co-Author: Ernesto López Gómez, Universidad Nacional de Educación a Distancia (UNED), Spain
Co-Author: Guimaro Nocito, C.U. Villanueva, Spain
Co-Author: Santiago SASTRE LORENTE, C.U. Villanueva, Spain

Social prestige of the teaching profession is an important factor to attract the best students to the profession. Research shows that student engagement and student achievement are influenced by teacher-student relationships. The aim of this contribution is to explore the perceptions of secondary school students about the characteristics of a good teacher in the framework of the teacher-student relationship. Group discussions with 200 upper secondary students were conducted by a faculty member to make students reflect about these features from the perspective of dialogue and deliberation. Group discussions were recorded and transcribed. Further analysis showed the importance of teachers having domain in the subject, a passion to teach, but they also emphasized the aspect of caring about the students. Different categories of meaning emerged from the secondary students’ perspective. Learning is possible when a school climate of respect and confidence is created as a result of a teacher student relationship based on a true interest on students; that is, when considering the other.

Session N 368
1 September 2017 17:15 - 18:45
Pinni A - A1081
Symposium
The role of play in advancing child learning and development
Keywords: Developmental processes, Early childhood education, Educational Psychology, Game-based learning
Interest group: SIG 05 : Learning and Development in Early Childhood
Discussant: David Whitebread, University of Cambridge, United Kingdom

Play as a prerequisite for scientific literacy
Presenting Author: Elke Hildbrandt, University of Education North-Western-Switzerland, Switzerland

This theoretical paper aims to work out the nexus between abstract and countercultural thinking in play, and the joy of play. In light of these, the paper examines the significance of specific types of play with regard to the development of scientific literacy.

Drawing upon research on young children’s scientific reasoning together with research on play the paper will outline play as a mode of activity involving skills that are prerequisite for scientific learning. These include the ability to think counter-to or beyond the immediate sensorial appearances of objects and situations in various forms of play, e.g. being able to form and convey different abstract
mental models of objects in meta-communication. Such ability is constitutive for construction play, role play/imagistic/fantasy play, and for scientific discourse. The paper will discuss not only the common elements of play that are prerequisite for scientific literacy, but also the differences between the two in formal or temporal dimensions.

To conclude, contrary to the widespread notion that during play children are absorbed and unaware of the counterfactual nature of play, we propose, that play requires awareness processes that are keys to both learning and joy of play. Regarding practical conclusions, the paper reviews the role of the play tutor as well as that of the schoolteacher, in terms of teaching styles, linking playful with experimental elements of knowledge.

Promoting the linear ruler representation by 4-year old children through playing number board games

Presenting Author: Bernhard Hauser, University of Education St.Gallen, Switzerland
Co-Author: Caroline Burmeister, Institute of research in teaching and learning, University of Education St. Gallen, Switzerland
Co-Author: Sara Simoes, Institute of research in teaching and learning, University of Education St. Gallen, Switzerland

Recent results of the development of numerical representations show that an adult and a child playing the linear number board game "the great race" in a one-to-one situation strongly enhances young children's numerical knowledge in the preschool years. In particular, this game is fostering the shift from a logarithmic to a linear representation of number, where the difference in magnitude between 3 and 4 is the same as the difference between 9 and 10.

In this study, we investigated, using the game "bunny race", an adapted version of the game "the great race" (i) whether younger children between 4 and 5 years are also able to make this shift towards linear representation, and (ii) whether it is possible for children to play this enhanced board game with less adult support than the original version of the game "the great race". The sample comprised 140 children (intervention group: 75; control group: 65) between 4 and 5 years, from 16 kindergarten classes in St. Gallen, Switzerland. The intervention was implemented in 4 sessions of 20 minutes each within 2 weeks. The tests (pretest, posttest and follow-up) included 4 diverse numerical tasks: numerical magnitude comparison, number line estimation, counting, and numeral identification.

Preliminary results show significantly greater learning gains for the intervention group.

The contribution presents the research findings, discusses the role of adult support and game features in play-based learning for early mathematics and highlights questions and consequences for further research.

Exploratory play as affordances-guided learning about the physical, social and symbolic world

Presenting Author: Paul Laseman, Utrecht University, Netherlands
Co-Author: Ora Oudegeest Piz, Utrecht University, Netherlands
Co-Author: Ben van Liempt, Utrecht University, Netherlands

In traditional play theories, play is conceived as a special activity of young children, intrinsically motivated by the joy that play generates. Play is separated from learning and in the field of early childhood education and care debates are ongoing about the appropriate balance between play and learning activities, leading to dissociated activity formats (e.g., circle time for instruction vs. free play for pleasure and social development). In the embodied-embedded cognition view, play is regarded as exploration, first of all of the spatial physical environment, but in later stages also of the social-symbolic environment. Exploration, in this view, is intrinsically motivated by the possibilities offered to act upon the environment and, thereby, to learn about the environment and to develop skills to act upon more complex situations in the environment. Data from two studies on possibilities to develop and test the theoretical model. Sobre uses a novel cognitive model of affordances and playful affordances for the introduction of educational affordances at younger age can be regarded as a developmental precursor of social in-depth play at older ages in which complex affordances are explored and integrated with language. Developmental progress is skill-based. The increasing skill in acting upon increasingly complex affordances provides the sensorimotor grounding of verbal concepts and reasoning.

Drawing facial expressions and understanding mixed-emotions

Presenting Author: Esther Adi-Japha, Bar-Ilan University, Israel
Co-Author: Naomi Nadler, Bar-Ilan University, Israel
Co-Author: Norman Freeman, Bristol university, United Kingdom

It is commonly agreed that transformation is a feature of play. Some types of drawing require children to transform a typical representation, thereby suggesting that drawing is viewed as a form of transformative play. Children's typical drawing of a facial expression is happy. Drawings of other facial expressions is described as a transformation of that typical drawing, e.g., the upward curve of the happy mouth being changed into a sad mouth in a sad moment. In contrast, the verbal expression of emotional expressions merely represents reality. Here, we tested the role of verbal and pictorial single-emotion expressions in explaining mixed-emotion understanding.

Ninety 4- to 6-year-olds were given executive function tests, including a self-regulation task and a cognitive-flexibility imaginative-drawing test. Next, the children heard eight single- and mixed-emotion scenarios, and they were asked to: (a) verbalize the protagonists’ emotions, (b) point to corresponding pictorial expressions, and (c) draw the protagonists’ facial expression. Mixed-emotion scores formed target data. Predictors were single-emotion scores in verbalizing, pointing, and drawing, plus executive-function scores.

The findings indicated that single-emotion drawing was more strongly associated with mixed-emotion scores than were executive-function scores. Additionally, drawing-flexibility was associated with mixed-emotion drawing. Therefore, general self-regulatory skills are insufficient for explaining mixed-emotion attributions, and one needs skill-specific abilities, which may be developed by means of playful drawing activity. Interestingly, the drawings of mixed emotions revealed that younger children drew two separate expressions, suggesting a developmental trend of awareness of two emotions concomitantly before merging their representations in mind.

Session N 369

1 September 2017 15:45 - 17:15
Virta - 114
Symposium

Diverse methodologies for investigating and supporting the development of historical reasoning

Keywords: Argumentation, History, Interdisciplinary, Reasoning
Interest group:
Discussants: Joumi-Matti Kuukkanen, University of Oulu, Finland

Historians’ epistemic aims: interviewing experts

Presenting Author: Mikko Kainulainen, University of Turku, Finland
Co-Author: Marjaana Pursiainen, University of Turku, Finland
Co-Author: Diak Chinn, Rutgers University, United States

Despite the vast amount of research on philosophy and theory of history, and the growing interest in training students to work with historical sources and historiography as historians do, there is still relatively little empirical evidence on historians’ epistemic authority. Thus, the present study targets professional historians’ considerations of the epistemic aims of their work. It is positioned at the intersection of historical theory, expertise research, and research on epistemic cognition. Twenty-six academic historians were interviewed about their work practices and understanding of historical research. Preliminary analysis of four historians’ interviews allowed the identification of considerable between-respondent variety in four different respects: type of end products, agency, source, and structure of epistemic aims. The theoretical triangulation of epistemic cognition, expertise research and historical theory will add to current understanding of the nature of expertise in this multifaceted domain and provide tools for planning further studies on experts’ historical reasoning. Our findings also provide further insights into how to support novices’ development in this respect. By detailing historians’ situated aims systems these results contribute significantly to future work on historical theory and education.

Reading, reasoning, and writing like a historian: what concurrent think-alouds reveal

Presenting Author: Michael Bolz, University of Illinois at Chicago, United States
Co-Author: Susan Goldman, University of Illinois at Chicago, United States

Historical essays that rely on students’ use of historical source documents have been a dominant means of assessing the presence and quality of high school students’ historical reasoning. However, a written essay constrains models of cognition for historical causal events as part of a historical thinking. Its primary use is as a reference tool to inform teachers on instruction and curriculum choices and students on the required knowledge, beliefs and skills they should develop in order to become better, causal thinkers in history. The creation of this model was based on relevant literature in the fields of historical theory and history instruction. Our model was tested in two experimental conditions consisting of historians, educational researchers and history teachers in secondary education. The feedback was then used to further develop the model. This approach resulted in a staged progression of three separate but intertwined dimensions of beliefs and knowledge and associated student behavior: an epistemic dimension, a fact-order knowledge dimension and a second-order knowledge dimension. This next step is to design formative assessment tasks that can measure (aspects of) historical causal reasoning based on our model. The design and testing of these tasks forms the subject of our current studies.

Understanding teacher growth in facilitating whole-class text-based discussions in history

Presenting Author: Abby Reisman, University of Pennsylvania, United States

The case for classroom discussion as a core method for subject matter learning stands on stable theoretical and empirical ground. Nevertheless, several decades of research on classroom discourse suggest that classroom discussion is exceedingly rare and varied by teacher-initiated evaluative questions. This study explores how four middle school history teachers who received professional development in a
document-based history curriculum develop in their practice of whole-class text-based discussion facilitation over the course of two years. Preliminary analyses reveal that all four teachers grew in their facilitation of text-based, whole-class discussion, albeit from different starting places and along varying trajectories. Although two of the teachers did not engage students in text-based historical discussion in Year 1, both teachers reported that although their understanding of the curriculum is not sufficient to facilitate discussion, it may be a necessary precondition before teachers can demonstrate flexibility and engage in deliberate practice. By exploring teacher development in the complex practice, the study contributes to our understanding of the dispositions and understandings required to support productive disciplinary engagement in history.

Session N 370
1. September 2017 15:45 - 17:15
Pinn A - Piazzo Koli
Symposium
Assessment and Evaluation

Innovative Applications of Technology-Based Assessment

Keywords: Artificial intelligence, Assessment methods and tools, At-risk students, Cognitive skills, Computer-assisted learning, Educational Technology, Inquiry learning, Learning and developmental difficulties, Reading comprehension, Reasoning, Technology

Interest group: SIS 01 - Assessment and Evaluation

Discussant: Samuel Greiff, University of Luxembourg, Luxembourg

Developing Online Diagnostic Instruments for Assessing Pupils’ Skills at the Beginning of Schooling

Presenting Author: Baró Csáti, University of Szeged, Hungary
Co-Author: Agnes Hödi, MTA-SZTE, Hungary
Co-Author: Renáta Kiss, MTA-SZTE Research Group on the Development of Competencies, Hungary
Co-Author: Attila Pásztor, MTA-SZTE Research Group on the Development of Competencies, Hungary
Co-Author: Attila Rausch, Eötvös Loránd University, Budapest, Hungary
Co-Author: Gyöngyösi Mohar, University of Szeged, Hungary

Further research is necessary to examine the predictive validity of these instruments and explore their usefulness in adjusting teaching and learning processes to students’ individual needs.

The assessments do not cause difficulties; time on task analyses indicated that students were motivated and attentive throughout the testing sessions. The tests proved to be highly reliable with good Cronbach’s alphas (.90, .89, .94, .90, respectively). Confirmatory factor analyses conducted were test the underlying measurement models for indicative reasoning, early literacy and early numeracy tests; they indicated good model fit in general.

The participants of the study were 5996 pupils drawn from the school entering population of Hungary. The instruments were four online tests: an early literacy and an early numeracy test, a test to assess pupils’ ability of following instructions and an indicative reasoning test. Pupils completed the tests in their own schools using the locally available computers in four sessions.

The first school years determine later achievements but teachers of these pupils face the difficulties that there are large developmental differences within the classrooms in a number of dimensions that are mostly invisible for simple observation. Without objective instruments to identify pupils’ deficiencies the possibilities of differentiated personalized teaching in heterogeneous classrooms are limited. The purposes of this study are to devise an easy-to-use online diagnostic test battery to assess pupils’ precursor skills relevant for successful learning, to examine its applicability in general educational settings and to explore its psychometric characteristics.

Previous studies show that language minority students (LMS) perform worse than native-speaking (NS) students, even socioeconomic and immigrant background are taken into account. However, this LMS-NS achievement gap is not related to language use per se, as for LMS students the frequency of native language use is not related to academic performance. Hence, LMS-NS achievement gap is probably mediated by other factors than language use. For instance, the gap varies considerably across different countries, and in some countries, there is no inequality. However, up to day, it is not clear whether this international variation depends on certain characteristics of educational systems. In other words, the design of the educational system might influence the inequality. In this study, we examine how different educational systems determine the size of the LMS-NS achievement gap. For this purpose, we use the PISA 2012 data and conduct three-level multilevel analysis. The preliminary results point that characteristics of educational systems are only marginally related to the LMS-NS achievement gap. The achievement gap is smaller in centralized educational systems and slightly smaller in countries with standardized exams. However, the significance and the strengths of the differences depends also on the given outcomes (math, science or reading). The implications are discussed.

Implementing linguistic diversity in Primary school education in Germany

Presenting Author: Jörn Kratzmann, Catholic University of Eichstätt-Ingolstadt, Germany
Co-Author: Samuel Jahrell, Catholic University of Eichstätt-Ingolstadt, Germany
Co-Author: Maren Frank, Catholic University of Eichstätt-Ingolstadt, Germany
Co-Author: Steffi Sachs, PH-Heidelberg, Germany

The acquisition of two or more languages is a special challenge for Dual Language Learners (DLLs) in early childhood. Given a high linguistic diversity caused by migration processes, concepts of integrating linguistic diversity in preschools are discussed in Germany. Using intensive in-house training and coaching, current recommendations for the integration of linguistic diversity in preschools are implemented within an intervention study. The study included 127 preschool teachers in 19 preschools and 254 bilingual children between the ages of 3 and 5 from 19 preschools with a high percentage of DLLs. The paper reports results of the first (pre-test) and second (interim assessment) measurement point concerning effects of the training measures on institutional and child level using a professionalization model. On the child level, L1 and L2 language skills are assessed. On the institutional level, knowledge and the attitudes of the preschool teachers as well as observations of pedagogical quality are included. Preliminary results indicate a significant improvement of preschool teachers’ knowledge about bilingualism in the intervention group compared to the control group. Nevertheless, preschool teachers need help to transfer their knowledge into practice.

Facilitating German Reading In Bilingual Primary School Children Through Peer-Learning

Presenting Author: Dominique Rauch, DIPF, Germany
Co-Author: Jasmin Decrietan, Goethe-University Frankfurt, DfE-Research Center, Germany
Co-Author: Valentina Reinachten, German Institute for International Educational Research (DIPF), DfE-Research Center, Germany
Co-Author: Martin Schassch, German Institute of International Educational Research (DIPF); DfE Research Center, Germany

This project explores ways of supporting German reading comprehension (RC) in Turkish-German bilingual primary school children using peer-learning(Turkish/German bilingual primary school students (mean age = 9.6 years, female = 50) were taught in 12 sessions in reading comprehension (50 students) or mathematics (49 students, control group). We postulate that the RC training will support German RC in bilingual children (hypothesis 1). We systematically varied the tandem composition with respect to the linguistic background (monolingual German and Turkish/German bilingual) and the language use during the trainings (German only vs. Turkish and German). A bilingual child who learns together with a monolingual child could benefit from the latter’s larger vocabulary and this could prompt RC. We thereby expect to increase the reading comprehension of bilingual children of monolingual/linguistic peer-tandem than in bilingual tandem children, who only speak German throughout the trainings (hypothesis 2). However, when allowed to use both common languages, two bilingual children might engage in code-switching and code-mixing. This could facilitate communication in PL and hence foster RC. We therefore expect that German RC within bilingual bilingual tandems will improve more when the children communicate in Turkish and German (hypothesis 3). We found that our reading training enhanced RC in bilingual children. Hypotheses 2 and 3 could not yet be tested due to small subgroup sample sizes of the preliminary dataset. The descriptive results of all reading groups hint at best-learning conditions when two bilinguals work together and speak German only, thus currently challenging the group differences stated in hypotheses 2 and 3.

Enhancing Learning of Multilingual Children from a Linguistic Minority

Presenting Author: Pascale Engel de Abru, University of Luxembourg, Luxembourg
Co-Author: aracne Ferrero Laff, University of Luxembourg, Luxembourg
Co-Author: Caroline Nakoado, University of Luxembourg, Luxembourg
Co-Author: Rute Cordeiro, University of Luxembourg, Luxembourg
Co-Author: Roman Martin, University of Luxembourg, Luxembourg

Luxembourg has three official languages (French, German, Portuguese). Portuguese immigrant children represent 22% of Luxembourg’s school population and are the most vulnerable group in terms of language and reading proficiency. They present language weaknesses in their school languages as well as their mother tongue Portuguese. Research suggests that children who start with well-established mother tongue are likely to develop strong abilities in their second languages. The aim of this project is to develop and evaluate the effectiveness of a mother tongue-based preschool language intervention on oral language and literacy outcomes of Portuguese language minority children. Within a randomised controlled study design, a 30-weeks long intervention was developed to target both oral language and phonological awareness skills. 186 Portuguese-speaking children from 16 preschools across Luxembourg were assessed in Portuguese and Luxembourghish and were randomly assigned to the intervention group or an active control condition. The question of how to implement a mother tongue oral language programme given existing socio-political and educational contexts will be discussed and preliminary data from the first 20 weeks of the intervention will be presented.

Session O 376
1. September 2017 17:30 - 19:00
Main Building A - A31
Workshop
Mixed methods in educational research

Keywords: Doctoral education, Mixed-method research, Qualitative methods, Quantitative methods
Interest group: SIG 17 - Methods in Learning Research
Chairperson: Miroslav Manderis, University of Turku, Finland

Mixed methods in educational research

Presenting Author: Judith Schoonenboom, University of Vienna, Austria

In the workshop, participants learn how to build their own mixed methods designs for educational research. A mixed methods design is a design for a study that involves the integration of data from several sources. Examples include the integration of data obtained through different methods, or the integration of answers to separate, but related research questions. We will start by examining some real-life examples from the participants’ research practice, and next discuss characteristcs, opportunities and pitfalls of mixed methods research in education. Participants will apply a strategy for the design of mixed methods research, developed by the workshop leader, to examples from their own research practice. This strategy involves various specific purposes of mixing, each related to a specific stage in the research process, and classified into three overall purposes of mixing: a distinction between a point of extension and a point of integration; and a method of visualizing cases of mixing.

Session O 377

1 September 2017 17:30 - 19:00
Linnà - K109
Workshop
Learning and Instructional Technology

Using VR technology to bring more learning opportunities in STEM courses

Keywords: Design based research, Educational Technology, Inquiry learning, Science education
Interest group: SIG 07 - Learning and Instruction with Computers
Chairperson: Marianne Vrinsou, University of Helsinki, Greece

Using VR technology to bring more learning opportunities in STEM courses

Presenting Author: Xiaole Yan, Beijing Normal University, China, China

Promoting STEM education has been explicitly emphasized in Chinese educational policy. However, there lacks competent teachers and resources to implement STEM into science classes in schools. And the imbalanced distributions of the educational resources within China further slows down the process of implementing STEM in schools. In response, the courses based on immersive VR technology were designed and expected to bring the equal opportunities to schools for carrying out STEM programs.

Based on the affordances of the VR technology, the researchers designed authentic STEM learning programmes for students. With the development of the VR technology, especially, the popular head-mounted VR devices enable the students to explore the contexts could not be explored in the real world (expanding the space and time zone; or the interesting places with different accesses). The students can conduct observations and even data collections within the virtual world. With other real-world science tools, the students can carry out the data analysis or experiments guided by the instructors. Then the students can create their own virtual worlds to present their study results or test their hypothesis. Based on initial empirical studies, it was found that by experience the nature of scientific inquiry in various virtual contexts, the secondary schools students in China indicated more positive attitudes towards the science. The further study is carried on, such as analyzing students’ academic achievement in a compared study.

Therefore, this workshop invites participants to experience the VR-supported STEM courses and discuss about the integration of VR technology and STEM courses.

Session O 378

1 September 2017 17:30 - 19:00
Panini B - B3108
Workshop

Causal Inference in Educational Research: A discussion about Statistical Methods

Keywords: Design based research, Experimental studies, Quantitative methods, Quasi-experimental research
Interest group: SIG 18 - Educational Effectiveness
Chairperson: Martijn Meeter, Vrije Universiteit Amsterdam, Netherlands

Causal Inference in Educational Research: A discussion about Statistical Methods

Presenting Author: Valentina Giacconi, University de Chile, Université Grenoble Alpes, France
Co-Author: Pascal Bressoux, Université Grenoble Alpes, France
Co-Author: Patricio Felmer, Universidad de Chile, Chile

Causal questions in education are extremely relevant. This kind of questions appears, for example, when we want to know what is the effect of a specific type of instruction or educational program. The gold standard to make causal inference are randomized studies, but in many situations, for ethical or feasibility issues, it is not possible to do it. Quasi-experimental research allows us to overcome this limitation through the use of statistical methods to control for confounding variables. In this workshop, we will analyze three techniques used in this framework: propensity score analysis, regression analysis and doubly robust estimation. Its advantages, differences and limitations will be discussed with real educational data examples in R and in SPSS.

Session O 379

1 September 2017 17:30 - 19:00
Main Building E - E222
ICT Demonstration

Increasing Equity and Challenging Disadvantage

Keywords: Computer-assisted learning, Learning Technologies, Mathematics, Multimedia learning
Interest group: SIG 07 - Learning and Instruction with Computers
Chairperson: Michael Bessere, Leuphana University of Lüneburg, Germany

Increasing Equity and Challenging Disadvantage

Presenting Author: Catalina Lomos, LISSER - Luxembourg Institute for Social Economic Research, Luxembourg
Co-Author: Arina Katihi Ali, Agency for Development of Quality in Schools, Ministry of National Education, Children and Youth, Luxembourg, Luxembourg

Equity in learning at school in Luxembourg is heavily influenced by the country’s multilingual tradition where two-thirds of students enrolling in schools at age four are more likely to struggle in learning, as they do not master any of the three languages actively used for instruction during compulsory education. In this session, participants will use their own mobile device or watch the demonstration to gain hands-on experience of exploring MathemaTIC, an innovative adaptive digital environment to enhance the learning of mathematics in a fairer manner. Created through a collaboration of expertise between Luxembourghish, French and Canadian practitioners, research, pedagogy and technology specialists, MathemaTIC enables primary school students to learn mathematics in German, French, Portuguese or English. Participants will try out the mathematical interactive, visual, audio and video mathematical forms and receive real-time feedback on their progress and achievement of the modules. Their experience will feed into a discussion about the benefits of this digital environment in tackling inequity and disadvantages in learning, in particular to exchange views on the extent to which the multilingual forms in this adaptive environment have so far served to directly motivate both students and teachers to view mathematical learning from another perspective and increase their chances of success.

Session O 380

1 September 2017 17:30 - 19:00
Main Building E - E350
Workshop
Higher Education

Exploring pedagogical and curricular decisions for research based activities across Europe.

Keywords: Higher education, Synergies between learning - teaching and research, Teacher Professional Development, Teaching approaches
Interest group: SIG 04 - Higher Education
Chairperson: Miriam Sarid, Israel

Exploring pedagogical and curricular decisions for research based activities across Europe.

Presenting Author: Eileen Lützke, Hamburger Zentrum für Universitäre Lehren und Lernen (HZUL), Germany
Co-Author: Anna Heudorfer, Hamburg Centre for University Teaching and Learning, Germany

Undergraduate research in higher education receives more and more attention. For both approaches there exist several models and typologies aiming to put different characteristics of research-based learning into order (e.g. Healey & Jenkins 2009, Brew 2013, Levy & Petrulis 2012; Huber 2014, Stang 2016). Angela Brew has criticized that most models do not differentiate between curriculum and pedagogy (Brew 2013). As a response to this critique Brew developed herself “a framework for curricular and pedagogical decision-making” (Brew 2013) that she claims to be holistic.
We have analyzed Brews model and developed it further to separate more clearly the curriculum and the pedagogy. Our new model will be the core element of the workshop. Through this workshop we want participants a) to become acquainted with a framework for pedagogical and curricular decision making on research-based learning based on the model by Angela Brew (2013) and further developed by Lübbeke, Reinmann & Heudorf (2016, unpublished), b) to discuss the “typical” level of autonomy given to students with regard to design and perform research in their respective countries, and c) to discuss the “typical” level of autonomy given to teachers in designing research-based learning activities in their respective countries.

Session O 381
1 September 2017 17:30 - 19:00
Vida's 15
Symposium
Teaching and Teacher Education

Becoming a teacher - Austrian, Estonian and Finnish teacher students’ perceptions

Keywords: Attitudes and beliefs, Comparative studies, Mixed-method research, Pre-service teacher education, Reflection, Teacher Professional Development

Interest group: SIG 11 - Teaching and Teacher Education

Discussant: Erika Löfström, University of Helsinki, Finland

Austrian student teachers’ beliefs about (good) teaching and learning as a part of their PPTs

Presenting Author: Eiva Kasa Hyy-Helhammer, University of Education Upper Austria, Austria

Co-Author: Petra Hecht, Pädagogische Hochschule Vorarlberg, Austria

Co-Author: Jan Boehm, University of Education Upper Austria, Germany

This paper focuses on Austrian student teachers’ beliefs about good teaching at the beginning of their teacher studies. Studies show that prospective teachers’ beliefs influence what is learned during their studies, but also that teacher education programs have an impact on student teachers’ beliefs about the qualities of good teaching (Levin, 2008). We ask, ‘What do these student teachers believe about good teaching and learning, and how do these beliefs inform their personal practical theories of teaching?’ The data consists of narrative interviews with 12 Austrian primary-school student teachers and 10 Austrian secondary-school student teachers. The students represent the diversity of student teachers in Austria with regard to age, gender, national background, and previous teaching experience. Following the narrative approach (Riessman, 2008), the aim is to listen to the student teachers’ “voices” (Elbaz-Luwisch, 2005) through their stories of personal experience. Methods of content analysis and narrative analysis (Riessman, 2008) are used to investigate student teachers’ beliefs about good teaching and learning.

Becoming a teacher in Estonia: perceptions of roles, beliefs and tensions in different programmes

Presenting Author: Tine Anspal, University of Tartu, Estonia

Co-Author: Ali Lejen, University of Tartu, Estonia

This paper draws on three different studies carried out in Estonian context that aimed to explore teacher identity development during teacher education - across different study years and study programmes. Teacher identity is researched through student teachers’ self-imagery as teachers, teachers’ role and beliefs. Also worries, gaps and tensions that arise in the dialogue between ideals and experiences were explored in the three studies that form the basis of this presentation. Combining the results of the studies indicate how the idealistic views of themselves as teachers and teachers’ role change with experiences during teaching practice. Worsens, fears and tensions increasingly enter to the picture as student teacher understand the difficulty in achieving their high ideals. Analysis of the worries and tensions indicate that time management issues should be addressed more during teacher education, especially in connection with teaching practice. Our data also suggest that subject teachers and primary teachers’ views and beliefs on teachers role tend to be different with primary teachers emphasising especially teachers’ role as pedagogue and didactics specialist and subject teachers emphasising the role of the teacher as subject specialist and didactic specialist.

Finnish teacher students’ beliefs: Case of University of Helsinki

Presenting Author: Kati Pihkari, University of Helsinki, Finland

Co-Author: Katarina Stenberg, University of Helsinki, Unknown

Co-Author: Liisa Karlsson, University of Eastern Finland, Finland

Co-Author: Harri Pitkäniemi, University of Eastern Finland, Finland

This study investigates teacher students’ personal practical theories in the University of Helsinki, Finland. The study combines data from first and fourth year teacher students. The students constructed their personal practical theories, which are defined in this study as pedagogical beliefs that guide their classroom actions, by writing statements indicating what is important to them in teaching. The first year students’ PPTs showed that when student teachers begin their teacher education, the majority of positions concern didactical issues, that is, how to promote pupils’ studying and learning processes. In the fourth year students’ PPTs three main categories were found: the foundations of good teaching, the teacher, and the teacher’s daily work. The analysis of the statements shows that the notions of good teaching are very idealistic. The role of teacher education is considered in the process of promoting development of student teachers’ teacher identity during their studies, and that it is good to have high aims and values for teaching, although in reality some of them might be difficult to achieve. We consider it important that the teachers are aware of their own values and beliefs, and they also need to be highly educated in order to be able to make their own pedagogical decisions and justify them.

Becoming a teacher - Austrian, Estonian and Finnish teacher students’ perceptions

Presenting Author: Tine Anspal, University of Tartu, Estonia

Co-Author: Katarina Stenberg, University of Helsinki, Unknown

Co-Author: Jan Boehm, University of Education Upper Austria, Germany

Co-Author: Petra Hecht, Pädagogische Hochschule Vorarlberg, Austria

During teacher education, student teachers have to develop their understanding of themselves as teachers, thus their teacher identities. Teacher identity can be explored through variety of theoretical and methodological perspectives. Our symposium focuses on the teachers’ beliefs about (good) teaching and learning and the development of teachers’ personal practical theories during the teacher education program.

The symposium papers are presented in the context of different teacher education programs in Austria, Estonia, and Finland. All papers focus on researching of how to become a teacher, but the methodological approaches are different. Our theoretical aim is to uncover differences as well as similar patterns of teacher students’ beliefs, role perceptions and personal practical theories across the three countries. Based on the results, the implications for teacher education are discussed in the papers and in the final discussion of the symposium.

Session O 382
1 September 2017 17:30 - 19:00
Main Building C - C7
Workshop
Motivational, Social and Affective Processes

Positive pedagogy as a tool in the digital communication between teachers and custodians

Keywords: Mixed-method research, Motivation, Primary education, Values education

Interest group: SIG 98 - Motivation and Emotion

Chairperson: Katrien Cuyvers, University of Antwerp, Belgium

Positive pedagogy as a tool in the digital communication between teachers and custodians

Presenting Author: Anne-Mari Kuisma, The University of Helsinki, Finland

Co-Author: Lotta Uusitalo-Malmivaara, University of Helsinki, Finland

Keywords: Mixed-method research, Primary school, Values education, Social interaction

This paper describes a positive pedagogy intervention in 7 primary school classrooms. The main focus is on teaching character strengths and highlight the positive and supportive communication between teachers and custodians. The Finnish educational reform of the national curriculum 2016 highlights the importance of active and positive collaboration between schools and custodians in order to support students. Positive communication is a key to co-operation with schools and families (Barge & Loges, 2003; Martin & Hagan-Burke, 2002). Schools and families should build trust, equality and mutual respect between one another in order to help students in the best possible way (Kumpulainen et al., 2014). Both, parents and teachers identify trust as a vital component of effective family-school relationship (Dunst, Johanson, Rounds, Thivelle, & Hamby, 1992) and effective communication is the requirement for building trust (Adams & Christenson, 2000).
According to new curriculum, schools should also confirm the capability of students by recognizing and using their strengths (Finnish National core curriculum 2014). Highlighting and communicating about strengths also creates a solid base in the collaboration between schools and parents (Sioutis, 2014).

Session 3 O38
1 September 2017 17:30 - 19:00
Pini B - B0039
Workshop
Learning and Instructional Technology
Quality of MOOCs: Results of research surveys and discussion of MOOC Quality Reference Framework
Keywords: E learning / Online learning, Instructional technology, Learning Technologies, Survey Research
Interest group: 3 - Learning and Instruction with Computers
Chairperson: Brigitte Rollet, Universität Wien, Austria
Quality of MOOCs: Results of research surveys and discussion of MOOC Quality Reference Framework
Presenting Author: Christian M. Straaks, Open University of the Netherlands, Netherlands

This interactive workshop addresses the quality of Massive Open Online Courses (MOOCs) and is organized by MOOCQ, the European Alliance for Quality of MOOCs. Main goals of the interactive MOOC workshop are: (1) the discussion of the results from the four online surveys, and (2) the presentation and discussion of the Quality Reference Framework (QRF) for MOOCs based on extensive desktop research and literature reviews and the results from the online surveys with four groups of target audiences: MOOC learners, designers, implementers, and providers.

Leading question is: How can the findings from the four online surveys and the new QRF improve future MOOCs? The interactive workshop of 90 minutes combines different methods: In the first short part, the results of the four online surveys are presented and discussed in a question and answer session. In the second part (60 minutes), the QRF developed by MOOCQ is briefly introduced and afterwards debated in different groups. The discussion results from the small groups on quality dimensions are presented and integrated in plenary. Finally, next steps towards future collaboration and activities are explored by all participants.

Intended audiences are all experts, practitioners and novices sharing interest in Open Education and the quality of MOOCs: Contributions by conference participants as well as by online participants commenting via twitter are most welcome and encouraged.

Session 3 O34
1 September 2017 17:30 - 19:00
Pini A - Paavo Kali
Invited Symposium
Motivational, Social and Affective Processes
Contextual influences on teachers’ career choice and development in the profession
Keywords: Motivation, Pre-service teacher education, Quantitative methods, Teacher Professional Development
Interest group: SIG 08 - Motivation and Emotion
Discussant: Fanni Laueramm, University of Bonn, Germany
Contextual Influences on Beginning Teachers’ Career Motivations and Career Choice Satisfaction
Presenting Author: Pau Richardson, Monash University, Australia
Co-Author: Helen Want, Monash University, Australia

Little is known about the malleability of initial teaching motivations in response to early career school contexts. In a longitudinal study (teacher education commencement until early career teaching), we examined how initial motivations changed, and their dependency on school contexts. Participants were 493 Australian primary/secondary school teachers from the FIT-Choice project. Self-report surveys tapped teaching motivations (both timepoints), and school contexts during early career. Highest initial motivations were intrinsic value, perceived teaching abilities, positive prior teaching and learning experiences, and “ultimistic” social utility values (Richardson & Watt, 2006). Other motivations included social influences, personal utility values (job security, time for family, job transferability) and teaching as a “fallback career.”

Motivations were moderately stable (median r=.43). Excessive demands during early career did not moderate stability. Other school context factors were considered through the lens of SDT, emphasising satisfaction of three basic needs (autonomy, competence, relatedness). Motivation change scores were correlated against each context factor. Most influenced motivations were the social utility subfactor “work with children/adolescents” (positively), and, “fallback career” (negatively). Satisfaction with a teaching career was also highly malleable (positively).

Given the previously identified influence of the positive motivation to work with children/adolescents, and, the negative motivation to teach as a fallback career, the formative role of school context during early career to support the former and reduce the latter, seem highly important. Other most positively influential teaching motivations, however (ability, intrinsic value, make social contribution), were robust to measured context factors, suggesting intrinsic sources and lower trainability.

Factors influencing early career teachers’ professional plans: a longitudinal study in Austria
Presenting Author: Johannes König, University of Cologne, Germany
Co-Author: Martin Roth, University of Siegen, Germany
Co-Author: Stefan Kleiman, University of Cologne, Germany
Co-Author: Sarantis Tachtisoglou, University of Cologne, Greece

Early career teaching is considered a crucial phase of teachers’ professional development. This is particularly true in Austria as the context of our study, where elementary/secondary teachers face this challenge after a short 3 years Bachelor teacher preparation program. Thus our research aims at analyzing factors that influence the professional plans they report after their transition from training into teaching. For this, we use the PECDA instrument developed by Watt and Richardson, comprising four subscales: planned effort, planned persistence, professional development aspirations, leadership aspirations. We hypothesize that factors from three areas can serve as predictors: contextual factors of their school (e.g., school climate), institutional factors of their teacher preparation career (e.g., practical learning opportunities they had been exposed to during preparation), and individual factors (e.g., motivational and cognitive dispositions of their professional competence). Longitudinal data of n=131 early career teachers is used from the EMW study comprising three time points conducted when the teachers entered their preparation program (1), when they were in their last year of teacher preparation (2) and when they had started their second year as in-service teacher (3). In the presentation we first report about the factor structure of the PECDA scales (German translation) which can be replicated for the Austrian sample. Inter-correlations are low showing subscales measure different facets of professional plans. Second, findings from regression analysis show that contextual, institutional, and individual predictors have different effects on the subscales. Implications of findings and suggestions for future research will be discussed.

Identity development in Swiss vocational education and training teachers
Presenting Author: Zoe Morris, Monash University, Australia
Co-Author: Louis Berger, Swiss Federal Institute for Vocational Education and Training (SVET), Switzerland

This presentation will investigate the evolution of vocational teachers’ professional identity in Switzerland based on the analyses of two survey studies. The first study (n=390 vocational teachers; cross-sectional research design) will allow examining the association between several components of identity (strength of identity as a teacher, perceived expertise, self-efficacy beliefs, task value and perceived cost) and teachers’ experience, career steps and certification. The second study (n=71 vocational teachers undertaking teacher education; longitudinal research design) will show how teachers’ professional identity evolves during a two-year teacher education program. In brief, the results reveal that a) the components of identity are non-linearly associated with teaching experience; b) teacher education impacts some components of identity such as perceived expertise in subject-matter and pedagogy and self-efficacy beliefs for instructional planning but not others (e.g., strength of identity as a teacher and self-efficacy beliefs for classroom management). Conjointly, the results of the two studies indicated that vocational teachers’ professional identity is dynamic and malleable. The studies shed light on the multiple factors influencing the various components and their differential effects on teacher professional identity.

Context influences on teachers’ motivation, self-efficacy & burnout: Do schools & principals matter?
Presenting Author: Ruth Butler, Hebrew University of Jerusalem, Israel
Co-Author: Limor Shibaz, The Hebrew University of Jerusalem, Israel

We applied an achievement goal approach to school leadership and a multi-level design to examine whether and how school contexts influence teachers’ professional motivation, self-efficacy, and burnout. The first objective was to examine the prediction that teachers’ achievement goals for teaching, self-efficacy, and burnout will differ significantly between schools. The second objective was to examine the proposal that school principals influence school-level teacher motivation and wellbeing. Extrapolating from achievement goal theory, we predicted that principals who exert pressure on teachers to achieve high student performance orient teachers to less adaptive ability and work avoidance goals for teaching and higher burnout, while principals who support teacher development will promote teacher mastery goals and self-efficacy and will reduce burnout. 650 teachers in 42 schools in Israel reported on their motivation and perceptions of the principal. Results confirmed that schools matter: there were significant school-level differences for all measures save mastery goals. They also confirmed that the principal matters. Principal performance pressure emerged as an important dimension of school leadership, with significant and adverse consequences for teacher motivation not only at the individual but importantly also at the school level. Principal support for teacher development predicted higher self-efficacy, and to some extent lower burnout, but not achievement goals. We discuss how findings contribute to understanding contextual influences on teacher motivation and challenge the motivational assumptions of accountability policy initiatives.
Session 0 385
1 September 2017 17:30 - 19:00
Vita - 113
Invited Symposium
Culture, Morality, Religion and Education

Migration and education for democratic citizenship

Keywords: Citizenship education, Cultural diversity in school, Culture, Informal learning, Instructional design, Morality, Multicultural education, Qualitative methods, Social interaction

Interest group: SIG 13 - Moral and Democratic Education

Organiser: Harman J. Aba, University of Duisburg-Essen, Germany
Organiser: Don't Alt, Kinneret College on the Sea of Galilee, Israel
Discussant: Karen Heinrichs, Otto-Friedrich-University Bamberg, Germany

Ethnic Differences in Citizenship Competences among Middle School Students

Presenting Author: Arike Munikrnska, University of Amsterdam, Netherlands

The current study examines (1) to what extent ethnic minority and majority students differ on three aspects of citizenship: social connectedness, norm-conform behavior, and out-group attitudes, and (2) whether aspects of informal citizenship education practices reduce or strengthen these group differences. Data come from The Arnhem School Study. 1219 students (from 63 classrooms within 12 middle schools) filled in questionnaires in fall, winter and spring of the first school year. Findings reveal that students become more socially connected during the first school year, out-group attitudes become less positive and they increasingly like behavior that is not norm-conform. The latter is particularly the case among ethnic minority students in classrooms where the numerical majority is native Dutch. These findings underscore the need for attention for students who might not fit in with their classmates. Furthermore, it signals that citizenship education is a challenging but yet important task for middle schools.

MANIFESTATIONS OF DEMOCRATIC VALUES IN LANGUAGE TEACHING FOR GROWN-UP REFUGEES AND IMMIGRANTS

Presenting Author: Audea Kristiansen, University of Agder, Norway

The study presented is aiming to investigate manifestations of democratic values in the teaching and interaction processes within the classrooms of a Norwegian second language training programme for refugees and students.

The focus in the study is on the values of student participations and on the worth of trust among the students and the teacher. It is assumed that a certain degree of trust is necessary for student’s willingness to share knowledge and experiences and to partake in different kinds of activities in the classroom. Teachers presume play a crucial role in building and establish trustworthy relationships. How can a climate of trust be established in the class of refugees and immigrant students? The main research question: 1) Which sort of student’s participation can be identified in class? 2) What are the characteristics of the participations and 3) Under which conditions does participation unfold? The data consists of two weeks of participant observations in two advanced classes, as well as and by follow-up interviews of the teacher and of students. Preliminary results show different sorts of student participations mostly initiated by the teachers, but not always. The degree of student involvement was influenced by different factors like how long they had been in the class, the actual topic and the student’s own attitudes on schooling from their homeland. The actual teacher’s ideas and attitudes seem to be of particular importance, besides their way of organizing teaching processes.

Migration and education for democratic citizenship. Experiences with VaKE

Presenting Author: Alfred Weinberger, Pädagogische Hochschule der Oberrhein-Linz, Austria
Co-Author: Jean Luc Patti, Universität Salzburg, Austria
Co-Author: Sigrid G. Weyniger, University of Salzburg, Austria

The purpose of this paper is to present a quasi-experimental study and a field report examining the constructivist teaching and learning approach VaKE (Values and Knowledge Education), which combines values and knowledge education, in the context of migration and education for democratic citizenship. The research question of the quasi-experimental study was whether learning with VaKE can change pre-service teachers’ traditional beliefs about values education in the context of migration. The experimental group (N = 85) learned according to VaKE while the control group (N = 36) learned according to a traditional dilemma discussion. Both groups discussed the same dilemma dealing with whether refugees should be punished for not taking part in values courses that aim to transmit values to the migrants.

Participants written arguments were content-analyzed for pre- and posttest. The research question of the field report was whether VaKE can be applied to promote democratic attitudes in refugees. Participants were ten adult refugees from different African countries who learned according to VaKE discussing a dilemma whether norms and rules in a fictive society should be determined by one leader or by discourse involving all persons. Oral discussions were analyzed in an unsystematic way. The results of the quasi-experimental study indicate that beliefs can be changed with VaKE towards a more advanced view while in the control group raw changes could be found. The results of the field report show that participant student's democratic attitudes could be influenced positively. Implications will be discussed.

Minority Youths’ Acculturation in the School Context and Education for Democratic Citizenship (EDC)

Presenting Author: Elena Makarova, University of Applied Sciences and Arts Northwestern Switzerland PH (FHNW), Switzerland
Co-Author: Dina Birman, University of Miami, United States

In multicultural schools, EDC is interrelated with the acculturation process that young people undergo through contacts with individuals from different cultural backgrounds. Individuals who favours an integration strategy face a conflict between the assimilation and who develop a bicultural identity are also more likely to be successfully adjusted to both cultural contexts and to possess socio-cultural competences in both cultures. In terms of EDC, a sense of multiple belongings and intercultural competences are desirable outcomes. Consequently, schools need to facilitate the cultural transition of minority youth by supporting students’ positive attitudes and orientation towards both their heritage culture and the majority culture. Moreover, schools are challenged to combat prejudice and discrimination against students from ethnic minority backgrounds, factors that negatively affect these students’ adaptation in the school context as well as the implementation of EDC goals. This paper presents the findings from an integrative review of 348 peer-reviewed articles on acculturation in the school context, focusing on characteristics offer context that can support or hamper the bicultural adjustment of minority youth. Moreover, our analysis sheds light on the characteristics of the school context that can facilitate or hinder the implementation of EDC approaches aiming at social cohesion, mutual understanding, intercultural dialogue, and solidarity.

Session 0 386
1 September 2017 17:30 - 19:00
Main Building C - C8
Invited Symposium
Learning and Social Interaction, Lifelong Learning

Development and learning in elderly people: A sociocultural approach

Keywords: Cultural psychology, Developmental processes, Learning approaches, Lifelong learning, Mixed-method research, Morality, Qualitative methods, Social interaction

Interest group: SIG 10 - Social Interaction in Learning and Instruction

Organiser: Michelle Grossen, University of Lausanne, Switzerland
Discussant: Asa Makialo, University of Gothenburg, Sweden

Toward sociocultural approach to learning in elderly people: Extending Vygotsky’s theory

Presenting Author: Aleksandra Baucal, University of Belgrade, Serbia

Learning and development in the “third age” is not a typical topic for Vygotsky’s theory. However, demographic changes have increased a need for a better understanding of elderly people’s life and for ensuring supports that would enable them to participate actively in social life. It is even more important if we consider various negative stereotypes about elderly people resulting in a lack of opportunities for meaningful aging and expanding learning and development. Most of the current studies dealing with learning and development in the third age are not based on an overarching theory. They are mostly focused on particular functions with a focus on losses and negative trends.

Here, I reflect what Vygotsky’s theory can provide this field of inquiry, but I also intend to show that the application of the theory to the issue of learning and development of elderly people can contribute to an improvement of the theory. In the first part of the paper, I will identify key assumptions and concepts of Vygotsky’s theory, whereas in the second part, I will focus on an analysis of critical differences with regard to learning and development in children and elderly people since Vygotsky’s theory has typically been applied to younger people. Finally, I will examine the possible contribution of Vygotsky’s theory for the study of learning and development in the third age, and explore what theoretical benefits could derive from the extension of this theory to a new field of inquiry.

Development, ageing and the hybrid mind: Growth and decline and ecologies of human functioning

Presenting Author: Roger Stål, Göteborg University, Sweden

The background of this paper is an interest in human development through the life span, and the methodological and theoretical assumptions that underpin such research. Such a research interest is important in its own right, since it provides knowledge about an important field, but also because it introduces significant dilemmas about how to conceive of changes in human habits and functioning in rapidly changing societies. But these kinds of inquiries into development through the life span are important also because of the wider social implications of the metaphors of development and ageing that research suggests and endorses.

It is argued that deterministic and unidirectional models of functioning have limited value in societies undergoing rapid transformations. In the paper, the idea is one of viewing human cognitive (and social) development within the framework of “a hybrid mind” suggested by Martin Donald. Here, human capacities are viewed in terms of their interconnectedness with the inputs, supports and resources provided by “the distributed cognitive system of culture” (2008, p. 192). This implies that claims about development cannot be made without adopting a “unit of analysis” which incorporates people, communities, activities
Creativity and continuity of self in the transition into the nursing home

Presenting Author: Tania Zittoun, University of Neuchâtel, Switzerland
Co-Author: Alexander Baulat, University of Belgrade, Serbia

The transition into the nursing home can be seen as one of the many occasions for learning and development in the Recourse of a person: it requires an adjustment to a new environment and challenges a person’s sense of continuity. Drawing on a sociocultural framework, we try to articulate symbolic and material elements with a person’s psychological activity involved in learning.

On an empirical level, it requires to study the person in context and to use qualitative methods that account for the psychosocial processes through which persons actively create their environment and keep a sense of continuity.

Consequently, this study is based on a one-year ethnographic field work in a nursery home and asks the following question: what material and symbolic resources do the residents use to keep a sense of continuity of self and, in Winncott’s words, to keep the feeling of a life which is worth living?

The study consists of three parts: (1) analysis of the written documentation produced by the institution and its context; interviews with the director, members of the personnel, and members of the residents’ family; (2) observation and mapping of the building; (3) observations of the residents’ daily activities and rooms; interviews with residents.

The results account for the institutions’ values, spaces and places, as well as the residents’ experiences and uses of symbolic and material resources. They show the creative processes through which the residents reconfigure their environment and keep a sense of continuity.

Personal wisdom as a mirror of lifespan development: Affordances of a mixed-method approach

Presenting Author: Jenise Radtke, University of Oslo, Norway
Co-Author: Aleksandar Bacicek, University of Belgrade, Serbia

This paper discusses the notion of wisdom from a viewpoint drawing on a sociocultural perspective. Firstly, we observe that wisdom develops out of life experiences that bring about fundamental change; secondly, that ‘wisdom’ may be enacted differently depending on the social settings and its locally embedded practices.

Drawing on these assumptions, this study aimed at grasping the concept of wisdom and personal wisdom within two age groups. The data were gathered within an international project concerning two age groups: 65 and above and 21 to 30 year olds (100 participants, balanced by age and sex). The study applied a two-stage mixed-method design. The first part included structured interviews based on the following instruments: Foundation Values Scale, 3-Dimensional Wisdom Scale and Satisfaction with Life Scale. In the second phase, some participants from the previous phase (balanced by age group and sex) were selected on the basis of their score on the 3-Dimensional Wisdom Scale and participated in a semi-structured interview on their personal life stories and notions of wisdom.

The analysis focuses on the life narratives collected in both the younger and the elderly group, depicting participants’ enactment and understanding of wisdom in everyday life and how the meaning of ‘being wise’ and ‘wisdom’ are shaped in different settings and life circumstances for the two groups. The affordances of the mixed-method design are discussed in the light of its contribution to the understanding of how wisdom is portrayed and put into practices in concrete situations.

Session D 387
1 September 2017 17:30 - 19:00
Main Building A - A32
Invited Symposium

Defining, measuring, and supporting central concepts in inquiry learning

Keywords: Inquiry learning, Knowledge creation, Learning approaches, Problem-based learning, Reasoning
Interest group: SIG 20 - Inquiry Learning
Organiser: Bram De Wever, Ghent University, Belgium
Organiser: Wouter R. van Joostinga, Utrecht University, Netherlands
Organiser: Annalies Raes, Ghent University, Belgium
Discussant: Wouter R. van Joostinga, Utrecht University, Netherlands

Reconceptualizing Engagement: How Embodied Interaction Can Support Collaborative Inquiry

Presenting Author: Andrea Gomori, Indiana University, United States
Co-Author: Cindy Himolo-Silver, Indiana University, United States
Co-Author: Erin Tolar, Indiana University, United States

As students engage in the complex work of collaborative inquiry, they construct shared meaning using resources available to them. In the research to be presented, we examine how this occurs for middle school students engaged in a human-centered robotics (HCR) experience. The robots that students design, build, and program in this inquiry-based curriculum are used to serve a need in their school and to connect with peers in remote contexts—using telepresence technology to make connections and spark curiosities across urban and rural classrooms in the US. Exploring what might pose challenges and provide support for the construction of shared meaning informs the design of learning environments and activities that can help learners to see themselves as capable STEM learners and practitioners. In past research, behavioral engagement and social engagement have been privileged as evidence of students’ collaborative inquiry and learning. This study aims to reconceptualize engagement in collaborative inquiry by situating the role of nonverbal engagement in problem solving for one small group. This work is a qualitative case study centered on the collaboration of four students in a human-centered robotics intervention. Tenets of discursive psychology are used to consider how this group’s nuanced discourse shaped their collaborative inquiry. We explore how discursive features including gaze, embodied gesture, the positioning of artifacts, and interaction with technology contributed to the problem solving process. This analysis draws implications for the future of iterations of inquiry-based curricula.

How do students deal with 2 different scripts for a collaborative inquiry scientific reasoning task

Presenting Author: Nore De Grez, Ghent University, Belgium
Co-Author: Bram De Wever, Ghent University, Belgium

This study illustrates the effects of two different script approaches (Vogel, Wecker, Kollar & Fischer, 2016) to scaffold students’ scientific reasoning abilities while being engaged in collaborative writing activities on their learning processes and outcomes within Web 2.0 environments in higher education. Three similar studies were set up for university students (N=88) in Germany (n=27), Belgium (n=43), and Finland (n=18). In the course of the study, the scripted task was the same in all settings, namely writing a recommendation paper on a specific subject. Students collaborated in small groups of three to four via Web 2.0 technology, i.e. a shared Google Document. In each course, groups were divided randomly over two scripted conditions: (a) phase-script: a script that segmented collaboration in different phases (based on a script used by De Wever et al. 2015) and (b) phase-plus-activities: an extended script that also provided learners with guidance on the specific activities to engage during each phase.

As dependent variables we measured students’ scientific reasoning (SR) ability with a performance and declarative test, their subjective knowledge acquisition (both with respect to content and SR ability) and their acceptance of the scripts. This presentation however focuses only on the latter. By qualitatively analyzing students’ reflection notes, we investigate how students perceived the scripts and whether and how students made use of the script. This is important in view of later analyses focusing on the differential impact of the script on students’ learning outcomes.

Performance-based assessment of scientific reasoning in children

Presenting Author: Ard Lazonder, University of Twente, Netherlands
Co-Author: Noortje Janssen, University of Twente, Netherlands

Recent longitudinal and cross-sectional studies have examined how scientific reasoning skills such as experimenting, making inferences and evaluating evidence develop in young science learners. Results, although informative, likely underestimate children’s true capabilities because data in these studies was collected by written tests. To circumvent this possible threat to predictive validity, a three-year project was launched to monitor children’s performance on observational inquiry tasks through time. Using a longitudinal design, 170 elementary schoolchildren aged 7-10 participate in three annual waves of data collection. Specifically, they undertake an investigation with physical materials under guidance of a test administrator, who captures their scientific reasoning processes by observing and eliciting explanations. Results of the first year demonstrate good psychometric qualities of this new performance-based assessment instrument, and a consistent linear increase in scientific reasoning proficiency across age. Overall, results indicate largely independent development of children’s language and math abilities. Although the level of individual skills varied that scientific reasoning develop asynchronously in children. The skills of experimenting and inferring were already performed quite well, predicting was more difficult, and evaluating data and ‘drawing conclusions’ were the least well-developed skills. The second wave of data collection takes place in February and March 2017; results will be analyzed within subject to find out to what extent children have improved in scientific reasoning and whether the five scientific reasoning skills develop at the same pace in same aged children.

How technology can support teacher and students to differentiate during web-based inquiry learning

Presenting Author: Hannestre Montieux, Ghent University, Belgium
Co-Author: Annelies Raes, Ghent University, Belgium
Co-Author: Elise Ameel, Ghent University, Belgium
Co-Author: Tammy Schellens, Ghent University, Belgium
Organizing differentiated instruction has always been a challenge. However, technology has opportunities to provide students with adaptive content tailored to their needs. Next, this technology does not only support student learning, but technology also the opportunity to provide real-time visualization of student activities with the aim of supporting instructors' orchestration. This study investigated the impact of four differentiated instruction conditions on science learning through a web-based collaborative inquiry project called 'High'. The project aimed to improve conceptual knowledge about the effect of drugs, as well as inquiry skills. Three experimental conditions (1. differentiation through adaptive content, 2. differentiation through teacher support based on the progress monitor, and 3. both types of...
differentiation combined) were compared with a control condition in a two-by-two factorial quasi-experimental design. The content-based differentiation was based on the theoretical framework of Tomlinson. In a four-week field study in secondary science education that involved 309 students from 20 secondary school classes, protest-posttest differences were measured. Findings reveal that students in all conditions make significant improvement in terms of conceptual knowledge and inquiry skills. However, analysis of covariates show that the conditions differ significantly on conceptual knowledge. Students from the condition provided with both types of differentiation outperform students from the conditions only provided with one mode of differentiation. These conditions however showed better results compared to the control condition. Next to the presentation of the main findings, we will discuss both the challenges of differentiated inquiry instruction and the opportunities of technology in this context.

Session O 388
1 September 2017 17:30 - 19:00
Main Building A - A2B
Invited Symposium
Culture, Morality, Religion and Education

The Moral Dimension of Religious Education
Keywords: Morality, Multicultural education, Religious studies, Teaching / Instruction
Interest group: SIS 19 - Religious and Spiritual Education
Discussant: Laura Hirsto, University of Eastern Finland, Finland

Value Learning Trajectories: Theory, Method, Context
Presenting Author: Lian Francis Giorio, University of Oxford, Unidad Kingdom
Co-Author: Amika Kuusisto, University of Helsinki & University of Warwick, Finland

The aim of this paper is to consolidate currently disparate efforts to understand how individuals develop values through a variety of learning experiences. Utilizing life history method and an ecological approach into value learning and individual agency in life course development, our research question is: what are the factors and mechanisms influencing the individual's value system construction and the role of agency on one hand, and socialization and education in the other? Our paper will provide some examples of this from two empirical data sets. First of all, we bring on some perspectives of religious minority youths' agency within the primary socialization setting of the home on one hand and their mainstream school context on the other. Secondly, we present some views of Finnish RE professionals on the aims of RE in the societal setting from the perspectives of their personal values and life trajectories.

Value education in RE: Competencies and success criteria
Presenting Author: Konstantin Lindner, Otto-Friedrich-University of Bamberg, Germany

Value education is a central topic in religious education throughout Germany. What is so specific about learning with and about values in this denominationally oriented subject, however? RE wants to provide students with knowledge of values, Christian or religious foundations of those values and following consequences for the students' personal conduct of life. At the same time RE aims at offering experiences requiring value based acting: In the framework of lessons, students are to be enabled to act in value based settings and to reflect their behavior, reasoning on the grounds of Christian or religious arguments amongst others. On the basis of these considerations, the presentation will explore which process and content oriented competencies are to be striven for in RE, it will also put criteria for measuring the success of value education in RE to a discussion.

Moral Dilemmas in Iranian schools identified by students
Presenting Author: Nasibeh Hedayati, University of Helsinki, Finland
Co-Author: Elina Kuusisto, University of Helsinki, Finland
Co-Author: Kiri Tiiri, University of Helsinki, Finland

This article examines moral dilemmas in the context of Iranian schools identified by students (N = 340). Iran is an Eastern country in which the educational system has been under the influence of spiritual and moral principles of Islam since the Islamic revolution in 1979. This dominance of religious-political ideology of Islamic Republic makes Iran a unique context to study moral dilemmas.

The data was gathered from one female and one male lower secondary school in Tehran in 206. The students (female n=175, male n=165) were 12 to 16 years of age who wrote about unfair situations they had experienced at school. Students’ moral dilemmas were analyzed with deductive content analysis in which Tiiri’s (1998, 1999) four categories were utilized as an analytical framework.

The empirical findings reveal that moral dilemmas identified by Iranian female students have five main themes: 1) Harassing, 2) Punishment, 3) Professional responsibility, 4) Peer relations, and 5) Religious matters. These main themes were also categorized according to whether unfair (1 Teacher, 2 Staff, 3 Group and 4 Other (parish school bus driver)). The boys and girls show differences regarding their moral concerns. Physical punishments were more common among male students than female. Instead, religious moral dilemmas were only identified by female students. The paper discusses main categories and subcategories and how boys and girls are different in their moral concerns.

Beliefs In Afterlife: The Role of the Religious Background
Presenting Author: Dimitris Pneumatikos, University of Western Macedonia, Greece
Co-Author: Panayiota Gagatsidou, University of Western Macedonia, Greece

Although children grasp the essential aspects of the death concept very early, a significant number of children and adults continue to attribute certain capacities to dead agents, indicating the continuation of the existence. The continuation of the existence might lead to a representation of the dead agents as conscious entities. The present study aimed to investigate this hypothesis examining whether individuals attribute to the dead agents aspects of the human consciousness (James, 1905), and what is the role of the immediate religious context on the emergence of these beliefs. One hundred sixty six children and young adults (80 females), divided equally into four age groups from six to 12 years old and a group of young adults participated in the study. Half of the participants in each age group were religiously interviewed. Participants interviewed individually with a vignette and a questionnaire that explored the endorsement of perceptual, psychological and emotional capacities, desires, and communication aspects of a dead agent as well as the dead agent’s personal consciousness and control of these states. Moreover, participants were asked to provide a justification for their answers. A Two-Step Cluster Analysis identified three clusters that could indicate three distinct concepts of the afterlife. The clusters’ profiles are further analyzed from a developmental perspective and with regard to participants’ religiosity.

Session O 389
1 September 2017 17:30 - 19:00
Main Building D - D11
Invited Symposium
Instructional Design, Learning and Instructional Technology

Motivation, Affect, and Body in Instructional Design: Current Research
Keywords: Artificial intelligence, Comprehension of text and graphs, Computer-assisted learning, Educational Psychology, Educational Technology, Emotion and affect, Instructional design, Learning Technologies
Organiser: SIG 07 - Learning and Instruction with Computers
Organiser: Anne Dietmayer, Swiss Federal Institute of Technology, Zurich, Switzerland
Organiser: Steffi Zander, Bauhaus-Universität Weimar, Germany
Co-Author: Paul Ginn, University of Sydney, Australia

Assessment of Bodily Expression as an Indicator of Emotional Experience during Serious Gaming
Presenting Author: Valentin Riemer, Ulm University, Germany
Co-Author: Julian Frommat, Ulm University, Germany
Co-Author: Claudia Schrader, Ulm University, Germany

A study is presented that investigates the predictive value of analyzing bodily expression to identify the experience of emotions during playing a serious game. Severity undergraduates played a serious game on practical money skills. Their bodily expressions of the upper body and the head were recorded during gameplay using a Microsoft Kinect camera. Further, participants reported their experienced enjoyment, boredom, and frustration on five predefined occasions during the game. Using Generalized Estimated Equations, bodily expression features that significantly predicted the self-reported emotions could be identified. For enjoyment and frustration, pose features pertaining to the posture of the head emerged as significant predictors. In addition, frustration was predicted by a position of the upper body closer to the screen. Conversely, an increased activity of the hand appeared to indicate higher boredom experienced during the game. The findings can assist researchers and developers in their efforts to investigate and develop automatic emotion recognition systems for multimedia learning environments.

The role of speech technology in affective modelling and adaptive feedback
Presenting Author: Nikol Rummel, Ruhr University Bochum, Institute of Educational Research, Germany
Co-Author: Manolis Marvulis, University College London, United Kingdom
Co-Author: Beate Grawemeyer, Birkbeck College, United Kingdom

The talk2learn adaptive digital learning platform employs speech technology to provide input to affect modelling and adaptive feedback components. We summarise the design methodology that helped us develop a better understanding of, and take design decisions on, how to integrate speech technology from a pedagogical and human-computer interaction point of view. We also present results, part of a larger research study, focusing on the role of speech in contributing to the predictive accuracy of students’ affective states. At the conference we will conclude with the theoretical and educational significance of this work and point to future research and challenges.

Does (Non-)meaningful Sensori-motor Engagement Promote Learning with Animated Physical Systems?
Presenting Author: Gerjant Rop, Erasmus University Rotterdam, Netherlands
Co-Author: Charly Elierts, Erasmus University Rotterdam, Netherlands
Previous research indicates that sensorimotor experience with physical systems can have a positive effect on learning. However, it is not clear whether this effect is caused by mere bodily engagement or the intrinsically meaningful information that such interaction affords in performing the learning task. We investigated (N = 74), through the use of a Wii Balance Board, whether different forms of physical engagement was either meaningfully, non-meaningfully or minimally related to the learning content would be beneficial (or detrimental) to learning about the workings of seesaws from instructional animations. The results were inconclusive, indicating that motoric competency on lever problem solving did not significantly differ between conditions, nor were response speed and transfer performance affected. These findings suggest that adult’s implicit and explicit knowledge about physical systems is stable and not easily affected by (contradictory) sensori-motor experiences.

Strategies Used by Primary School Students During Physical Touch-Based Rotation
Presenting Author: Sven Borli, Flensburg University of Applied Sciences, Germany
Co-Author: Stolatne Wietzel, Bauhaus-Universität Weimar, Germany

Good spatial abilities are important for performance in many tasks. We present a novel method for deriving strategies that students employ when solving rotation tasks. Our work has implications not only for better understanding mental and physical rotation, but also lays grounds for the development of novel app-based diagnostic and adaptive training tools for spatial skills. Based on data gathered during a study on manual and physical rotation with primary school students between the ages of 8 and 11, process-based findings were derived through an analysis of how angular disparity between stimuli changed over time. Students used touch-based input on our iOS app Rotate It to control physical rotation. Data on qualitative changes of angular disparity was used in the construction of Markov models for correctly and incorrectly solved tasks. The models were used to generate synthetic angular disparity time courses, based on which three distinct, dominant, successful rotation-based solution strategies could be identified.

Session O 390
1 September 2017 17:30 - 19:00
Pinni B - B3116
Invited Symposium
Teaching and Teacher Education

Science with and for societies in Horizon 2020: What are the implications for writing research?
Keywords: Design based research, Mixed-method research, Synergies between learning - teaching and research, Teacher Professional Development, Teaching / instruction, Teaching approaches, Writing / Literacy
Interest group: SIG 12 - Writing
Organiser: Montserrat Castillo, Universitat Ramon Llull, Spain
Organiser: Eva Lindgren, Umeå University, Sweden
Discussant: Debra Myhill, University of Exeter, United Kingdom

Writing research with and for schools Perspectives from the Norm project
Presenting Author: Synneke Mirts, NTNU, Norway
Co-Author: Rand Solheim, NTNU, Faculty of Social and Educational Sciences, Norway

This presentation reports from a large-scale intervention project on writing education and assessment, with extensive practitioner involvement. We focus on design and methodological elements relevant in discussions of teachers’ professional development and students’ learning within local learning ecologies – drawing lines between writing research and school practice. In the first stage of the project, norms for expected writing proficiency were developed in close cooperation between teachers and researchers. In the second stage, running over two years, teachers at 20 primary schools participated in a professional development program focusing on the project’s functional construct of writing, the norms of expectation and analytical and formative assessment. Based on their new, shared knowledge, the teachers implemented various resources in their writing classrooms, adapted to work in different subjects. Writing tasks, student texts, teacher ratings and assessment discussions, teacher interviews and observation data were collected and analysed using quantitative and qualitative approaches. Findings indicate that the students altogether improved their writing competence considerably during the project period, while the teachers gained assessment competence. However, there is a great variation among schools, classes and individual students. The study does not primarily point to “what works”, rather offering theoretical and practical perspectives. It highlights the importance of a defined and shared construct of writing (cf. construct validity) as a basis for both research and knowledge development among teachers. Further, it points to the teachers as active agents in their own professional development – and to the long perspectives of building knowledge and practice from below and over time.

The grammar-writing interplay: Exploring teachers’ concepts for educational change
Presenting Author: Xavier Forníchi, Universitat Autònoma de Barcelona, Spain

GREAL research group has fruitfully developed a model for teaching grammar and writing in collaboration with teachers, with whom the basic tenets of a sociocultural approach are shared, specially with regard to the importance of fostering students’ metalinguistic activity; these teachers have been involved in discussion groups for a number of years and are keen to bring interventions into the arena meant to be conjointly put under scrutiny. The current focus of interest is how to transfer the outcomes of this kind of research to teachers less familiar with a sociocultural approach to teaching grammar and writing. A study is conducted to explore teachers’ concepts (n=6), after identifying 4 profiles in a cohort of 90 teachers with regards the role attributed to classroom interaction and the explicit/implicit approach to instruction. Concepts are seen as statements that guide classroom practices and therefore as a domain of utmost importance for fostering educational change. Exploring concepts may allow us disentangling how teachers can undergo a coherent evolution inspired by the outcomes of research. Oral data are collected through interviews, focus group sessions, and classroom observation over a span of 8 months. Results suggest that these teachers’ concepts are clearly dominated by the explicit/implicit dichotomy, although teachers show increasing awareness of the importance to engaging students in processes of metalinguistic activity. Nonetheless, classroom intervention analysis shows the difficulties teachers encounter in promoting meaningful metalinguistic activity in the classroom. This suggests the necessity to implement programs that engage teachers in longer periods of sustained reflection.

Supporting elementary teachers in the implementation of Tekstar, a strategy-focused writing program
Presenting Author: Renéke Bouver, University of Antwerp, Belgium
Co-Author: Monica Koster, Free University, Amsterdam, Netherlands

To improve students’ writing performance at the end of elementary school, we developed Tekstar, a comprehensive program targeting the focus of instruction (what is taught) and the mode of instruction (how it is taught). The effectiveness of Tekstar was examined in a large-scale experiment with 1346 students and 68 teachers from 25 schools. The program was executed by teachers themselves, as we aimed to impact teachers’ educational practices beyond the intervention. To ensure that teachers possessed the necessary skills and knowledge to implement Tekstar as intended, they participated in a professional development (PD) program. For this PD program we applied a teachers-training-teachers approach in which half of the teachers (N=30) were trained by experts, and subsequently these teacher-trainers trained one or more colleagues (N=38), which allowed us to examine the spillover effect and transferability of the PD program. Results show that the four-month writing program significantly improved students’ writing in both teacher groups (ES = 0.55). Fidelity data from logbooks, classroom observations and interviews revealed that both trainers and trainees easily adapted the focus of instruction. The teachers-training-teachers approach appeared to be less suitable to change the mode of instruction: trainers devoted little attention to the mode of instruction during the collegial training sessions. This study shows that a teachers-training-teachers approach is a promising approach to change teachers’ focus of instruction, but that to induce change in their mode of instruction teachers need more support.

Educational space approaches to solving problems of practice in writing in New Zealand
Presenting Author: Judy M. Parr, University of Auckland, Faculty of Education and Social Work, New Zealand
Co-Author: Rebecca Jessen, University of Auckland, New Zealand

The idea of addressing and solving problems of practice, through various forms of collaborative partnerships of researchers and professionals, has featured in recent professional learning literature. Research-informed approaches to educational issues, using what might be broadly termed ‘educational science’ (McNaughton, 2011), is a form of research that has operated for a significant time in New Zealand, arguably, in response to distinctive features of the local educational context. These features include autonomous self-governing schools; a broad, non-prescriptive curriculum; no mandated high stakes testing until the end of compulsory schooling and, perhaps most importantly, a view of teaching as inquiry. Teachers, as professionals, iteratively and collaboratively inquire into their practice in relation to the needs of their students, using systematic means to interrogate data around achievement and practice and research-informed means to devise and evaluate solutions to issues of practice. The partnering with research and researchers guides and complements such inquiry. The features and outcomes of two major instantiations of educational science are considered in relation to a significant and ongoing issue in literacy
achievement, that of high performance, low equity outcomes in literacy whereby particular groups, notably, Indigenous Maori and students from the Pacific, are disproportionately represented in the lower quartile of achievement. Further, writing achievement lags markedly behind that of reading and mathematics. In this paper, we analyse the features of the learning schools model and the inquiry learning model in relation to enhancing children's writing and accelerating progress for students in writing.

**Session O 391**

1 September 2017 17:30 - 19:00
Pinni B - B189E
Invited Symposium

**More + more? Methodological challenges of process measures**

**Keywords:** Arts; E-learning / Online learning, Experimental studies, Learning analytics, Motivation and emotion, Multimedia learning, Professions and applied sciences, Quantitative methods, Self-regulation, Social interaction, Technology

**Interest group:** SIG 27 - Online Measures of Learning Processes

**Organiser:** Håska Maria Jaroszka, Open University, Netherlands

**Discussant:** Els Bobeldijk, Open University, Netherlands

**Innovating “looking ahead” during music reading: Rethinks and realizations**

**Presenting Author:** Marjana Puurunen, University of Turku, Finland

Music reading is an intriguing domain for investigating the development of visual motor skills because of the temporal restrictions imposed upon the reading taskmusicians constantly have to select what, when and how long to target their gaza while proceeding within a given tempo. When reading a musical score, the music reader’s gaze moves slightly ahead of the current point of performance, and this gap then allows the performer to prepare for the upcoming motoric responses. However, the interplay of factors involved in this “look-ahead” behavior is still not properly understood. This paper presents three studies that exemplify the steps we have taken in our work on this topic. We will point out how we have come to alter our views on how best explain the various components affecting this specific act, and discuss how this rethink has made us also to reconsider how we, in fact, should measure the “looking ahead” during music reading.

**Measuring motivation and emotion regulation on-line**

**Presenting Author:** Hanna Javengo, University of Oulu, Finland

**Co-Author:** Sanna Järvelä, University of Oulu, Finland

**Co-Author:** Jonna Malmborg, University of Oulu, Finland

**Co-Author:** Kristina Kunki, University of Oulu, Finland

In our research on self-regulated learning we have focused on situational and contextual variation of regulated learning to explain regulatory processes in social, interactive, and technology enriched learning. We have engaged in research that employs on-line measures and technological tools to conceptualize and empirically capture multiple layers of regulated learning ‘on the fly’ in social contexts. In this presentation we will describe the progress in our research about the methodological and emotional aspects of regulated learning. Analyzing on-line process data of regulated learning poses a variety of challenges, such as variation in the granularity of different data sources, problems that emerge when we are unable to control the complexity of different contextual and situational aspect of the real-life learning situations, or currently, the use of big data and learning analytics. In addition, there are features that are characteristic particularly for the research on motivation and emotions during the regulated learning process. Motivation and emotions are difficult to capture due to its invisible, silent and internal nature as against to the cognitive processes that are often more visible, easier to externalize, recognize and interpret. Still, motivation and emotions are critical for learning and achievement. This has led us to employ multiple process oriented methods that include both subjective and objective data sources including situation specific self-reports, video, and recently, also physiological data. We have gradually moved forward from in-depth case studies into attempts to develop a systematic, process oriented approach without losing the situational features of the regulated learning process.

**Using Event Sequence Analysis to Uncover Self-Regulatory Behaviour: Towards Design Guidelines**

**Presenting Author:** Jan Elen, KU Leuven, Belgium

**Co-Author:** Björn Van Laer, KU Leuven, Belgium

The analysis of behavioural data provides new avenues for investigating the sequential nature of self-regulation. This contribution describes the data-driven approach used in a study that aimed to identify the relationship between learners’ characteristics and their self-regulatory behaviour by performing event sequence analysis on log files extracted from ecologically valid online learning environments. In the first phase of the study, we described the functional context as an external condition in order to map any aspects that might support self-regulation. We collected data on relevant learner characteristics as internal conditions and extracted timestamped log-file data as indicators of learners’ self-regulatory behaviour. Next, the data was cleaned and recorded using an action library. The third phase focused on discovering event patterns using the TrafficMiner package in R to identify frequent sub-sequences (Levenshtein distance) (Galaburda, Rischard, Studer, & Miller, 2009). Finally, significant discriminant sub-sequences were described in relation to various learner characteristics (Pearson’s Chi-square test). The results demonstrate how the design of an online learning environment triggers different event sequences — and hence different self-regulatory behaviour — in learners with different characteristics. The study offers a starting point for discussing sequence analysis of log files extracted from ecologically valid environments, as well as the conceptual and methodological issues related to this type of research.

**Combining eye-tracking with EEG data analysis: Potentials and methodological challenges**

**Presenting Author:** Schäringen Christian, Leibniz-Institut für Wissensmedien (IWiM), Germany

Although working memory (WM) is hypothesized to play an important role in learning from multiple information sources like learning from multimedia material, to date WM load has been rarely assessed directly during learning using eye tracking and an EEG system and the relationship between WM and WM load and the frequency band power of the Electroencephalogram (EEG) may be used to assess WM load directly (i.e., may serve as online process measures). The combination of eye tracking and EEG allows analyzing the EEG data fixation-related and thus may allow measuring WM load in free, natural viewing situations of complex textual and pictorial task materials. We will present promising results of initial studies using this methodology in research on hypertext reading, web search result page evaluation, and for picture integration, and will discuss methodological challenges.

**Session O 392**

1 September 2017 17:30 - 19:00
Pinni B - B189E
Invited Symposium

**Higher Education**

**Higher education teachers and teaching**

**Keywords:** Higher education, Mixed-method research, Student learning, Synergies between learning - teaching and research, Teacher Professional Development, Teaching / instruction, Teaching approaches

**Interest group:** SIG 54 - Higher Education

**Organiser:** Liisa Postareff, University of Helsinki, Finland

**Organiser:** Robert Kordts-Freudiger, Paderborn University, Germany

**Organiser:** Rike Bron, University of Twente, Netherlands

**Discussant:** Simon Barrie, Australia

**Innovating pedagogical designs for student-centered learning: teachers’ approaches and challenges**

**Presenting Author:** Cinia Dansæ, University of Oslo, Norway

**Co-Author:** Monika Nætland, University of Oslo, Norway

**Co-Author:** Rachelle Esterfay, University of Oslo, Norway

**Co-Author:** Heidi Hyllebæk, University of Helsinki, Finland

**Co-Author:** Sari Lindblom, University of Helsinki, Finland

Pedagogies for student-centered learning have gained strong support in recent years. Still, little is known about the teachers’ efforts and challenges when (re-)designing courses aimed to support active engagement and participation in learning activities. This contribution discusses findings from a mixed-methods study in four higher education courses in two Nordic countries, in the fields of biology, engineering and legal education. By way of interviews with teachers and students, observations of teaching and learning activities and a questionnaire to students, the study explored a) the teachers’ approaches to innovate pedagogical course designs for student-centered learning and their experiences thereof and b) the students’ experiences with the pedagogical design implemented in the courses. The findings indicate that the teachers were set out to support students in developing in-depth understanding of the domain knowledge, by outlining demanding activities and assignments. This was accompanied by experienced learning gains by students but also challenges. The complexity of the learning situation required increased guidance and support, as the students reported, and adjustments of the envisioned design, according to the teachers. Overall, the study provides relevant insights into pedagogical design aspects that matter for a meaningful learning experience, challenges experienced by both teachers and students, and implications for the educational research and practice.

**Pedagogical training, use of engaging teaching methods and conceptions of scientific thinking**

**Presenting Author:** Mari Murtonen, University of Turku, Finland

**Co-Author:** Heidi Salmens, University of Turku, Finland

The aim of this research was to examine what kind of conceptions university professors have about the development of scientific thinking of their students and how these conceptions are connected to the amount of pedagogical training that the teachers have participated, and to the reported amount of use of engaging teaching methods in their teaching. The sample consisted of 101 teachers of one Finnish university, representing four faculties. The subjects were sent a questionnaire by paper mail, consisting of a question about their pedagogical training, 5 Likert-scale questions about use of engaging teaching methods and 36 questions concerning the development of scientific thinking in students. Data showed that 43.9% of the teachers had taken part in pedagogical training while 56.1% did not have pedagogical training.
The findings show that the teachers who had pedagogical training reported using more activating teaching methods (73.8%) than those teachers without pedagogical training (37.7%). A factor analysis was conducted on conceptions of the development of scientific thinking, revealing five sum variables, named: 1) Flexible thinking, 2) Mechanistic thinking, 3) Objectivist thinking, 4) Methodological thinking, and 5) Expert thinking. There were statistically significant differences in teachers’ conceptions of the development of scientific thinking when we looked at the groups who reported using plenty of engaging teaching methods and those not using so much engaging methods. Teachers who reported engaging their students much on lectures thought that scientific thinking is flexible and that understanding the process of science, e.g. research methods, is crucial for the development of scientific thinking.

Mid-Career Faculty: Trends, Barriers, and Possibilities
Presenting Author: Aviela Welch, Ball State University, United States
Co-Author: Daniel Reardon, Missouri University of Science and Technology, United States
Co-Author: Jocelyn Bolin, Ball State University, United States

The purpose of this study is to examine an often overlooked period of academic life—that of the post-tenure mid-career faculty. Based on data from the NSOPF, mid-career faculty, those with 12-20 years of teaching in higher education, comprise the largest segment of the academic profession. Although recent scholarship on this topic (e.g. Baldwin, Lunceford, & Vanderlinden, 2005; Austin, 2002; Boice, 2000) has identified numerous practices designed to aid the transition from pre-tenure to post tenure appointment, including mentoring, parental leave policies, and sabbaticals, scant comparable empirical evidence for the polices and practices related to post-tenure mid-career faculty can be found. What is known is that the largest and most important population of academia has been largely ignored by both researchers and policymakers. Therefore, the aim of this study is to deepen our understanding of the lives of mid-career faculty, with special focus on their productivity, and to suggest implications for future research on the subject. This study identifies factors related to the academic life of post-tenure mid-career faculty by analyzing trends and predicative patterns. This analysis will thus identify barriers to academic productivity and professional satisfaction. Our results indicate that productivity varies by career stage, and that the amount of scholarly productivity follows a downward trend beginning in mid-career. Overall job satisfaction declines during the mid-career period. Our study is significant in that it provides a base of information that can be used by faculty leaders, administration, and policymakers to transform their cultures and reexamine policies related to mid-career faculty.

Student’s experiences of small-group teaching: ‘Meeting of minds’ in reaching personal understanding
Presenting Author: Noel Entwistle, The University of Edinburgh, United Kingdom
Co-Author: Evangelia Karagiannopoulou, University of Ioannina, Greece

This study investigates students' perceptions of the teaching, experienced in small-group final-year classes in Greece, developing the idea of a 'meeting of minds' suggested in previous work (Karagiannopoulou & Entwistle, 2013). Twenty semi-structured interviews were carried out to investigate their perceptions of the teaching. Three categories were identified, one of which described a 'meeting of minds' in the learning relationship with the tutor. The second category saw teaching as encouraging understanding in other ways, while the final category described more pragmatic teaching. Preparing students for the exam. Differing learning intentions were also found, again categorised into three groups, differing in the strength of the intention to understand for themselves. The study showed the powerful effect of experiencing a 'meeting of minds' in developing a personal academic understanding, but also indicated that this experience varied according to the students’ learning intentions. The implications for quality of university teaching were then considered.

Session O 393
1 September 2017 17:30 - 19:00
Pinn 8 - 81100
Invited Symposium
Motivational, Social and Affective Processes

Peer relations within schools: Associations with students’ motivation and academic achievement
Keynote: Achievement, Educational Psychology, Emotion and effect, Goal orientation, Motivation, Peer Interaction, Primary education, Reading comprehension, Social aspects of learning and teaching
Interest group: SIG 08 - Motivation and Emotion
Discussant: Jan-Erik Nurmi, University of Jyväskylä, Finland

Associations between friends, academic emotions and achievement
Presenting Author: Angku Marian Reinecke, University of Augsburg, Germany
Co-Author: Maria Tullia, University of Augsburg, Austria
Co-Author: Markus Dreisel, University of Augsburg, Germany

Based on emotional contagion theory, this study focuses on the effects of best friends' domain-specific academic emotions (enjoyment and boredom) on students' academic emotions, and their subsequent achievement. Based on a sample of 556 German students, structural equation models showed a positive effect of best friends' enjoyment on students' enjoyment. Best friends' enjoyment indirectly influenced achievement through students' enjoyment (indirect effect), whereas best friends' boredom had no effect on students' boredom and achievement. The results were consistent over two subjects (mathematics and English as a foreign language). Results will be discussed of increasing influence of friends as role models during puberty and whether the best friend can be identified as a resource or as a risk factor.

Peer Selection and Influence in Children’s Reading Skills: A Social Network Approach
Presenting Author: Nozomi Kuro, University of Jyväskylä, Finland
Co-Author: Dawn DeLay, Arizona State University, United States
Co-Author: Brett Laursen, Florida Atlantic University, United States
Co-Author: William Burk, Radboud University Nijmegen, Netherlands
Co-Author: Marja-Kristiina Lenkkaren, University of Jyväskylä, Finland
Co-Author: Anna-Maja Pulkkies, University of Jyväskylä, Finland
Co-Author: Jan-Erik Nurmi, University of Jyväskylä, Finland

This longitudinal study investigated (a) the extent to which children select new peers based on similarity in reading skills, and (b) the extent to which children are influenced by their peers’ reading skills. The sample consisted of 1,003 Finnish children in Grades 1 to 4, for whom reading fluency and text comprehension were assessed. The same children were interviewed with respect to their self-concept of ability in reading at the end of kindergarten. The results of social network analysis showed that children had a tendency to choose new friends based on earlier similarity in reading fluency, but not in reading comprehension. Furthermore, children became more similar across time to their friends on reading fluency and reading comprehension. Children with both high self-concept of ability in reading and high reading fluency were particularly prone to positive peer influence in regards to their reading fluency.

The Contribution of “Bonding” and “Bridging” Peer Relations to Students’ Academic Achievement
Presenting Author: Kari Makara, University of Glasgow, United Kingdom
Co-Author: Stuart Karabenick, University of Michigan, United States

Peer relationships are an important component of the school context that impact students’ academic development. Using social network analysis, we examined how bonding (banding together in a close-knit group) and bridging (having social connections across groups) dimensions of students’ peer relations: (a) predict academic achievement and (b) are predicted by students’ social goals. Three measures of students’ centrality in the school peer social network (degree, eigenvector centrality, and betweenness) were used to capture different dimensions of students’ peer relations. Social goals were conceptualized by Achievement Goal Theory, specifically social development, demonstration-approach, and demonstration-avoidance goals. 852 students were surveyed three times during a school year in order to assess their social goals, peer social networks, and academic achievement. Path-analytic models were used to estimate the longitudinal relations between social goals, the three dimensions of peer relations, and academic achievement. The results indicate that both bonding and bridging elements of peer relations positively predicted students’ academic achievement at the end of the year. There was consistent support for the benefits of social development goals on academic achievement, partially mediated through the dimensions of students’ peer relations, and a maladaptive effect of demonstration-avoidance goals on achievement, fully mediated by lower centrality in the peer network. Strengths of the study include the longitudinal design among the variables and the multiple indicators of students’ centrality within the school network to capture some of the complexity in peer relations. Theoretical and educational implications will be discussed.

Judging students’ peer-networks in class: A new facet of teacher diagnostic competence?
Presenting Author: Marvin Hanks, Freie Universität Berlin, Germany
Co-Author: Lysan Zander, Freie Universität Berlin, Germany
Co-Author: Bettina Hannover, Freie Universität Berlin, Germany

Accuracy in teachers’ judgment of students’ competence is an important facet of teacher competence. We investigated an additional dimension of diagnostic competence: the extent to which teachers adjective Perceive their students’ connectedness in the peer network of the classroom. Teachers who are aware of how well individual students are integrated should be better at preventing social exclusion and at making use of the central position of highly connected students to foster cooperation and a positive learning climate. Actual peer-networks were measured using sociometric data, with every student indicating the peers he or she likes most. Teachers were asked to answer the same question for all students of their class (teacher perceived peer-network). Students’ were additionally asked to nominate peers who are liked most by others (student perceived peer-network). Besides the actual peer-network data, several motivation-related characteristics of the individual students were used as predictors of teacher and student perceived peer-networks. Teachers’ perceptions were strongly predicted by actual peer-networks. In addition, teachers perceived students the more connected the stronger their grades were and the more effort they invested at school. Students’ perceptions were also most strongly predicted by actual peer-networks. In addition, students’ perceived their peers to be the more connected the better their grades were and the more importance they assigned to good looks. Results suggest that teachers are quite good at judging students’ connectedness and that their diagnostic competence could be further enhanced if they knew about factors influencing (appearance) or not influencing (effort investment) students’ perceptions of peer-networks.
Learning with dynamic media in formal and informal contexts

Keywords: Communities of learners, Comprehension of text and graphics, Computer-assisted learning, E-learning / Online learning, Experimental studies, Informal learning, Instructional design, Multimedia learning, Self-efficacy

Interest group: SIG 02 - Comprehension of Text and Graphics
Organiser: Mireille Betracourt, University of Geneva, Switzerland
Chairperson: Juliete Diederik, University of Geneva, Switzerland
Discussant: Hub Tabbers, Erasmus University Rotterdam, Netherlands

Investigating the effectiveness of Demonstration-Based Training (DBT) videos for Chinese students

Presenting Author: Hans van der Meij, Twente University, Netherlands

The present study investigated a Demonstration-Based Training (DBT) approach for constructing a video tutorial for software training. DBT attempts to optimize learning, by enhancing a model of task performance with instructional features that are linked to observational processes. There were two conditions in the experiment. In the control condition, the videos consisted of DBT-enhanced demonstrations of task performances. In the experimental condition, these were preceded by concise dynamic summaries (i.e., previews). The study assessed the development of the participants’ self-efficacy (the belief in one’s ability to perform the task) and the participants’ task performance success. Participants were 61 students (11.8 years) from a middle school in Shanghai, China. Self-efficacy was measured with a questionnaire administered before and after training. Task performance was measured with four similar tests (i.e., pre-test, practice during training, immediate and delayed post-test). The findings revealed that training raised the participants’ self-efficacy. No effect of condition was found. Task performances significantly improved from pre-test to training, dropped on the immediate post-test (but remained higher than on the pre-test) and raised significantly again on the delayed post-test. Comparisons between conditions revealed a significant effect of condition for the gain scores from pre-test to practice and from pre-test to delayed post-test. The discussion draws attention to issues of audience characteristics, post-test findings and review effects.

Does the frequency of pauses in videos affect learning?

Presenting Author: Martin Merkt, Leibniz-Institut für Wissensmedien, Germany
Co-Author: Stephan Schwan, Leibniz - Institut für Wissensmedien, Germany

Various studies demonstrated the beneficial effects of pauses in videos on learning. On the backdrop of the Event Horizon Model (Radavskys, 2012), this experiment tested whether the frequency of pauses affects learning by providing more segmented learning materials while keeping the overall duration of the pauses constant. Seventy- three participants were randomly assigned to watch an educational video about acoustics either with 24 (many pauses, 12 (few), or no pauses. The hypothesis that more pauses result in superior learning outcomes was neither confirmed for retention, nor for transfer. We discuss these findings focusing on the format of our knowledge test as well as on the characteristics of the learning materials.

Demonstration as an aid to learning from animation

Presenting Author: Richard Lowe, Curtin University, Australia
Co-Author: Jean-Michel Bouchéville, University of Dijon, LEAD-CNRS, France

The effectiveness of requiring learners to generate operational demonstrations while viewing an animation of a working mechanism was explored as a means of improving their animation processing. We assumed that the demonstration requirement would enhance learner extraction of key dynamic information needed for building a high quality mental model. It is expected that compared with note-taking controls, those in the demonstration group will give more attention to the spatiotemporal relationships amongst the mechanism’s components. This would result in these participants exhibiting superior scores on a test of mental model quality were attributed to the effect on their animation processing of having to ‘act out’ of the mechanism's dynamics.

Complementing theoretical frames for understanding global how-to-video-sharing

Presenting Author: Erica de Vries, Univ. Grenoble Alpes, France

Nowadays, upon encountering a problem, more and more people search for instructional videos on the internet. By typing the words “how to” in a search engine, followed by “install”, “do”, “use”, “fix”, “make”, or “learn”, a wealth of videos comes up for a variety of computer and motor tasks. This contribution to the Invited Symposium presents a number of different complementary theoretical frames which can be used to shed light on this contemporary phenomenon. These frames focus on the type of 1) knowledge, 2) media, 3) learning, 4) instruction, and 5) cultural transmission involved in global how-to-video-sharing.

We then explore opportunities for cross-fertilization in the study of global how-to-video sharing.

Session D 395
1 September 2017 17:30 - 19:00
Main Building B - A3
Invited Symposium

Measuring and supporting students’ self-regulated learning in adaptive educational technologies

Keywords: Artificial intelligence, Educational Technology, Learning analytics, Learning Technologies, Metacognition, Motivation, Self-regulation

Interest group:
Organiser: Roger Azevedo, North Carolina State University, United States
Organiser: Sienna Järvelä, University of Oulu, Finland
Organiser: Maria Barnert, Technical University of Munich, Germany
Discussant: Dragan Gasevic, The University of Edinburgh, United Kingdom

Multimodal data to measure students’ cognitive, metacognitive and motivation during learning

Presenting Author: Sienna Järvelä, University of Oulu, Finland

The members of the EICIR all collect different data channels to measure students’ cognitive, metacognitive, emotions and motivation during learning. First, physiological data indicate students’ bodily responses during learning. Examples are students’ heart rate (BII), Electro-Dermal Activity (EDA), Blood Volume Pulse (BVP), and skin Temperature. Second, students’ eye movements indicating what students focus on during learning. These data can be used to detect reading behavior, as use of multimedia sources and tools in online learning environments. Additional, wearable eye trackers are used to assess students’ interaction with physical objects and social interaction during learning. Moreover, students’ pupil dilation can be used as indicator of students’ effort and cognitive load. Thirdly, the students’ face during learning can captured and used to analyze facial expressions. These are used to automatically detect the presence and intensity of expressions, such as happy, sad and angry. Finally, students’ clicking, typing and browsing behavior are captured in logs. During the panel, members of the EICIR will present the different data collected and the value of the different data streams to investigate students’ cognitive, metacognitive, emotions and motivation during learning.

Combining and analyzing multimodal data

Presenting Author: Maria Barnert, Technical University of Munich, Germany

Barnart and colleagues are using process mining techniques to analyse verbal protocols collected during self-regulated learning. Especially, they are interested if instructional scaffolds affect not only the amount of different SRL activities but also the temporal structure of learning events corresponds with different dimensions of learning performance. Molemaa’s group studies time and order in self and socially regulated learning used using single or multiple data streams. Recently, this group has begun to analyze logs of adaptive technologies to assess students’ regulation of effort and learning over extended time periods. Azevedo and colleagues’ research has specifically, the overarching research goal has been to understand the complex interactions between humans and intelligent learning systems. Järvelä and colleagues have been exploring what multimodal data can tell us about SRL processes in authentic collaborative learning tasks. They have investigated how multi-channel data can be used for identifying markers that characterize successful SRL and learning progress and help in understanding. Finally, Gasevic and his colleagues have been working on analytical methods for the theory-informed study of self-regulated learning. Their work involves a broad range of methods for analysis of clickstream, discourse, and more recently psychophysiological data. The methods are based on unsupervised and supervised machine learning, sequence and process mining, automated text analysis, and social and epistemic network analysis. During the panel EICIR members will elaborate on their research results.

Challenges analyzing multimodal data

Presenting Author: Dragan Gasevic, The University of Edinburgh, United Kingdom

Even though the multimodality trace data can enhance our understanding of students’ processes during learning, we need to increase our methodological and theoretical understanding to properly analyse these data (Azevedo, 2014). This demands for a concerted interdisciplinary dialogue combining findings from psychology and educational sciences with advances in computer sciences and artificial intelligence. The participants in this E-ICIR are leading international researchers who have articulated different emerging perspectives and methodologies to measure cognition, metacognition, motivation and emotions during learning. The participants recognize the need for intensive collaboration to accelerate progress with new interdisciplinary methods to overcome challenges of analysing multimodal data. The combination of these insights is needed to accelerate progress with new interdisciplinary methods to understand how multiple data streams can support the measurement of SRL. During the panel discussion different challenges of analyzing multimodal data will be addressed.

Applications of multimodal data for instructional decision making

Presenting Author: Roger Azevedo, North Carolina State University, United States

Session E 400
1 September 2017 17:30 - 19:00
Main Building C - E6
Invited Symposium

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Challenges analyzing multimodal data

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Applications of multimodal data for instructional decision making

Presenting Author: Roger Azevedo, North Carolina State University, United States
Session O 396
1 September 2017 17:30 - 19:00
Lirna - Vihlīn Lirna (K104)
Invited Symposium
Teaching and Teacher Education
Up-To-Date Approaches for Practice Related Opportunities to Learn in Teacher Education
Interest group: SIG 11 - Teaching and Teacher Education
Organiser: Arne Köller, Switzerland
Organiser: Lena Seifert, Technische Universität München (TUM), Germany
Discussant: Paulien Meijer, Radboud University Nijmegen, Netherlands
Peer-to-Peer-Mentoring in communities of practice: A partnership of pre-service and mentor teachers
Presenting Author: Urban Fraafelt, University of Applied Sciences Northwestern Switzerland, Switzerland
Co-Author: Kerstin Bauernfeind, University of Applied Sciences Northwestern Switzerland, School of Teacher Education, Switzerland
Co-Author: Nils Bernhardt-Laros, University of Applied Sciences Northwestern Switzerland, School of Teacher Education, Switzerland
Co-Author: Sebastian Jünger, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland
The intervention study “Partner schools for professional development” considers pre-service and mentor teachers as peers who work and learn together in local communities of practice and thus deepen and expand their knowledge and increase their professionalisation. Instead of focusing on mentor teachers’ evaluative guidance of pre-service teachers, the approach supports collaborative learning while coping with real problems of everyday working life. Our findings indicate that an intensified cooperation among peers comes about (1) with a greater willingness from student teachers to activate and to link knowledge resources, (2) with higher quality teaching while co-teaching, (3) with opportunities to further professional development in mentor teachers.
What’s going on in a Teacher’s Mind? How Teachers Processes Difficult Classroom Scenarios
Presenting Author: Lisa Kim, University of York, United Kingdom
Co-Author: Robert Klassen, University of York, United Kingdom
Teachers are confronted with challenging situations at school everyday. With years of experience, teachers become more effective in responding to these situations. However, the developmental trajectory by which they cognitively process these situations is relatively unknown although this information can inform professional developmental practices and teacher education program selection practices. Our three-part mixed methods studies use a think-aloud methodology, whereby participants verbalise their thoughts as they determine how they would respond in difficult classroom scenarios. Studies 1 and 2 examine the cognitive processing differences between expert, beginning, and novice teachers without and with pre-existing response options, respectively. Study 3 examines the cognitive processing differences between East Asian and British students to determine the cross-cultural generalizability of the findings from Studies 1 and 2. Quantitative analyses indicate that teachers at different stages of their career do not differ in their confidence of the accuracy of their responses. However, qualitative analyses indicate that the three groups differ in their cognitive strategies, content, and scope. Furthermore, East Asian students seemed to slightly differ in their approaches in processing the scenarios than British students. These three studies indicate that teachers develop in their cognitive processing over their career, which can hence be used to inform culturally contextualised teacher professional developmental and selection practices.
Teachers’ Gaze Recording: An Opportunity to Improve Teachers’ Instructional Support Strategies
Presenting Author: Anja von Suchodolski, New York University Abu Dhabi, United Arab Emirates
Co-Author: Irene Skulaball, New York University Abu Dhabi, United States
Teachers across all grade levels struggle with providing high-quality instructional support. Teachers’ gaze behavior may provide a potential informative pathway to reflect on teaching practices. The study aims to test a practice-related approach to kindergarten teacher professional development by including gaze behavior into coaching. Teachers are assigned to one of two conditions. Instructional Support Strategies with Coaching (ISS plus C) or Instructional Support Strategies without Coaching (ISS w/o C). We expect to pre-/post-intervention increases in instructional support, favoring teachers in the ISS plus C condition. Participants are 25 kindergarten teachers, randomly assigned to the conditions. Pre- and post-intervention data include measures of instructional quality (assessed with the CLASS Pre-K) and gaze recordings in natural classroom settings. Pre-intervention data suggests substantial variability in instructional support across classrooms. On average, the level of instructional support in the sample was low (M = 2.52, SD = 0.83). Results will be discussed with regard to innovative strategies to support teachers in reflecting on classroom interactions and enhancing skills needed to provide intentional and effective instructional activities that in turn will result in positive student outcomes.
Characteristics of Spontaneous Co-Planning vs Content-Focused Peer Coaching Between Student Teachers
Presenting Author: Annikke Kreis, Teacher Professional Development, Switzerland
Co-Author: Stefanie Schnabel, University of Tübingen, Institute of Education, Germany
Expert-novice mentoring is a traditional element in designing intentional opportunities to learn during field placements, and has been shown as fruitful for student teacher learning. Additionally, structured peer coaching can be expected to offer further opportunities to learn (OTL). In an interdisciplinary, mixed-methods, and bi-national project, we studied the outcomes of an intervention with Content-focused Peer Coaching (CPC) on student teacher interaction, learning and competence. CPC aims to foster a mode of co-constructive interaction, elaboration, and the content in lesson planning dialogues between peers. This study explores, whether and how an ecologically valid training for CPC can enrich planning dialogues in comparison with spontaneous peer coaching. Student teachers of an intervention group (N=65) were trained for CPC as part of their regular study courses. After the training they were asked to plan a Biology lesson with a colleague. Participants of the control group (N=54) were assigned the same task, but did not have a CPC training beforehand. Planning dialogues were videotaped, transcribed, and analyzed with pragma-linguistic discourse analysis. Results show that teacher students of the intervention group adopted the core features of CPC such as co-constructive elaboration. They discuss a broader variety of issues, and spend more time doing so than their colleagues of the control group. The study gives insights into possible processes, gains and limitations of structured/spontaneous peer coaching as a complementary OTL during school based initial teacher education.
Session O 397
1 September 2017 17:30 - 19:00
Lirna - K103
Invited Symposium
Assessment and Evaluation
Navigating the interpersonal eddies of peer assessment
Keywords: Assessment methods and tools. Collaborative Learning. Peer interaction. Social aspects of learning and teaching
Interest group: SIG 01 - Assessment and Evaluation
Organiser: Jan Willem Brlob, University of Groningen, Netherlands
Organiser: Ernesto Panadero, Universidad Autonoma de Madrid, Spain
Discussant: Marieke van der Schaf, Utrecht University, Netherlands
Reviewing the interpersonal variables that play a role in peer assessment
Presenting Author: Ernesto Panadero, Universidad Autonoma de Madrid, Spain
This narrative review analyzes the evidence on the interpersonal factors that influence peer assessment. All the evidence published since the first review on the topic, (van Gennip, Sengers & Tillorna, 2009) was included, a total of 26 articles. Searches in PsycINFO were conducted using the following combinations of key terms: PA + interpersonal; + motivation; + emotion; + psychological safety; + friendliness; + value diversity; + value congruence. Studies needed to fulfill three inclusion criterions: (1) empirical evidence of the effect of PA on social or human factors or vice versa had to be available; (2) the study had to be published and peer-reviewed, including doctoral dissertations; and (3) articles had to be available in English. From the reviewed empirical evidence, ten themes covered by previous research on interpersonal PA factors emerged: motivation, emotion, social factors, friendship, trust in the self as assessor, trust in the other as assessor, fairness/discomfort, psychological safety, value diversity/congruence, and interdependence. These themes were further grouped into three categories namely: intra-individual factors, interpersonal aspects and cognitive aspects. There are two main conclusions. First, formative uses of PA decrease the interpersonal problems that PA elicit in students. Second, PA should not be implemented as a “side activity” but needs to be central to the curriculum to fulfill formative purposes if these were to be central to the teachers’ pedagogical intentions.
Anonymity as instructional scaffold in peer assessment: Effects on peer feedback quality
Presenting Author: Tjip Rosaux, Ghent University, Belgium
Although previous research has indicated that providing anonymity is effective to create a safe peer assessment (PA) setting, continuously ensuring anonymity prevents students from experiencing genuine two-way interactive feedback dialogues. The present study investigates how fading anonymity over time can overcome this problem. 46 Bachelor students in Educational Studies participated in multiple PA cycles in which groups of students assessed each other’s work. In this study students’ evolution in peer feedback (PF) quality was measured. The content analysis of the PF messages revealed that the quality of the PF increases in the anonymous phase and that over time the PF quality in the consecutive non-anonymous sessions was of similar quality. Findings suggest that anonymity can be used as a valuable scaffold to ease students’ importance level towards anonymity and their associated need for practice.

Infering individual scores from group scores via peer assessment: Part 1 – Methodological review

Presenting Author: Jan-Willem Strijbos, University of Groningen, Netherlands
Co-Author: Dominique Sluijsmans, Zuyt Hogeschool, Netherlands
Co-Author: Karsten Stegmann, Ludewig Maximilians-Universität (LMU), Germany

When asked about their experiences with Collaborative Learning (CL), students typically mention (a) unequal participation by students—up to free-riding, and (b) dissatisfaction with the assessment of CL. In fact, as inequality of participation increases – especially when there is a free-rider in a group – the call for diversified assessment intensifies. The topic of assessment has remained implicit in most research on CL, whereas it received some attention in research on Assessment and Evaluation. This contribution focuses on the challenge of juggling group-level and individual-level assessment information. More specifically, we conducted a methodological review on the use of Peer Assessment (PA) to infer individual scores from group scores. Twenty-eight studies were analysed with respect to the PA practices and formulae used. The findings reveal that (a) most studies reported the use of ‘group mean centering’ and some suggested revisions by considering PA accuracy or cheating, (b) most studies used a rating format but these varied strongly in number of categories, levels and values, (c) most articles concerned an empirical study or included empirical data in addition to a formula or methodological critique, (d) although contested in the literature more than half of the articles included SA in the computation, and (e) all articles reflected a lack of flexibility in terms of relative weighting of criteria.

Infering individual scores from group scores via peer assessment: Part 2 – A simulation study

Presenting Author: Jan-Willem Strijbos, University of Groningen, Netherlands
Co-Author: Karsten Stegmann, Ludewig Maximilians-Universität (LMU), Germany
Co-Author: Dominique Sluijsmans, Zuyt Hogeschool, Netherlands

Despite considerable research on instructional techniques to facilitate equal contribution to Collaborative Learning (CL), students regularly complain about a lack of effort by one or more group members and as a result students call for differentiated assessment – in particular in the case when only a group score is awarded. Peer Assessment (PA) is a specific form of collaboration, aligns quite naturally with CL and can enhance positive interdependence by confirming and/or enabling (re)alignment of the shared goal and individual accountability by making members’ below, mean or above average contribution to CL visible. However, PA can simultaneously be an additional source of bias. Interpersonal variables (e.g., trust in the other, psychological safety, cooperativeness, reliability, etc.) and interpersonal relations (e.g., friendship, anonymity, etc.) can (a) mediate/moderate the CL processes, and thereby (b) act as another source of bias and reduce reliability and validity. Despite a considerable number of studies that applied PA for this purpose, the methodological review in Part 1 also highlighted serious limitations. This contribution discussed an attempt to revise the formula, while also incorporating the refinements that were suggested by various authors. A simulation study is reported to illustrate the robustness of the revised formula.

Session O 398
1 September 2017 17:30 - 19:00
Main Building D - D108
Invited Symposium
Teaching and Teacher Education

Practice-based practitioner research in education

Keywords: Action research, Culture, In-service teacher education, Interdisciplinary, Knowledge creation, Mixed-method research, Peer interaction, Pre-service teacher education, Professions and applied sciences, Social interaction, Synergies between learning - teaching and research, Teacher Professional Development, Teaching / instruction

Interest group:
Organiser: Siiri Laitinen-Väätänen, JAMK University of Applied Sciences, Finland
Discussant: Filip Dochy, KU LEUVEN, Belgium

The role of research in teacher education

Presenting Author: Karl Smith, Norwegian University of Science and Technology (NTNU), Norway

Research is a wide and complex concept and a major question concerns the purpose of research and its value in contributing to the development of local knowledge. Research in teacher education should be mainly (not only) practice-oriented research. Practice-oriented is not the same as practice-based, the latter can be perceived that all research is based in practice. Practice-oriented research on the other hand, is what is relevant for the practice field. Practice-oriented research is research that aims at supporting decisions or at developing new knowledge that contribute to solving a practical problem (Bjømanger et al., 2011). In practice-oriented research the researchers are often, yet not always, the practitioners themselves, either they are teacher educators, teachers in school or students of teaching, and there are close links between practice-oriented and practitioner research. Common characteristics for practitioner research are according to Cochran-Smith & Lytle (2009, 39) that the practitioner is the researcher, and it is assumed that there are close links between knowledge, knowing and knowing. The contexts for study are professional practice, which frames communities of practice and collaboration, and as such there are sometimes blurred boundaries between inquiry and practice. Practitioner research differs from positivistic research in that it has to develop new conceptions of validity and generalizability, but the rigour related to systematic data collection and analysis cannot be questioned. Finally, according to Cochran-Smith & Lytle (2009), practitioner research needs to be published beyond the local contexts and become subject to public and academic critique.

Educators’ professional development in Flanders: Practitioner research, a promising strategy

Presenting Author: Ruben Vanderlinde, Ghent University, Belgium
Co-Author: Hanne Tack, Ghent University, Belgium

Given the specific nature of teacher educators’ work and the clearly related demand of developing one’s role as a teacher educator-researcher (Lunenberg et al., 2014), practitioner research is often promoted as a promising strategy. Practitioner research – the systematic and intentional study into one’s own practice (Cochran-Smith & Lytle, 2009) – has the twofold goal of (1) improving one’s practice and knowledge about teacher education, and (2) contributing to the broader knowledge base on teacher education. Addressing the need for research on the relationship between professional development activities and learning outcomes of teacher educators, this presentation discusses the impact of an intervention on teacher educators’ professional development. The study fits within an intervention mixed method framework (Creswell, 2003). Twenty-five Flemish teacher educators participated in a one-year intervention on practitioner research. Quantitative and qualitative data were collected to explore the impact of the intervention on teacher educators’ professional development, conceptualized as the development of a researcherly disposition (Tack & Vanderlinde, 2014; 2016a, 2016b). After participation, teacher educators indicate that they now consider research not only their own and colleagues teaching practices, that they now conduct research into their own practices. Moreover, they also value their role as a researcher more positively, and are now able to assess their own capabilities as a teacher educator-researcher more accurately. Finally, most participants already believed in the importance of research in general, but the specific need of practitioner research to improve their own practice as a teacher educator, only emerged at the end of the intervention.

Practice-based and practitioner research in social science e.g. education is of a different nature

Presenting Author: Frank de Jong, Aens University of Applied Sciences Wageningen, Netherlands

Practice based or oriented research aims at improving practice in collective co-creating knowledge with practitioners, contributing to their wisdom inspired by the ecology of the practice and being aware of the narrativity of the research and the researcher. Developing knowledge is understanding the interconnected relations between phenomena. Science is thoroughly a social activity and a process of meaning making by ‘actanten’ (Latour, 2005). Also Heikkonen, de Jong, & Vanderlinde (2016) made a distinction between episteme (the spectators knowledge), technic and praxis (practitioners knowledge) as different types of social constructed knowledge. Concluded was that practitioner research needs different methodology in the endless process of meaning making and negotiation (validation process in practitioner and social sciences) versus the corresponding between fact and ‘outside world’ (validity process in the natural sciences). Practice oriented and Practitioner research takes distance to research that aims to find the truth. A truth which is mostly determined by the question/hypothesis and its subsequent evidence (Foucault, Referred by Fendler, 2010). Practitioners research moves towards Foucault’s inquiring of the inter-relation between subject, object and truth, how they implicate each other and the analysis of the implicit power relations. Theory however is not reality. We present a research concerning ‘learning in and with the region’ as a pedagogical school approach of three schools in the North of the Netherlands. We try to show the narrativity how we tried to realize co-creation in finding the interrelation between subject, object and ‘truth’, and our role as researchers in this process.

Interaction as the locus (for the observation) of practice - an example

Presenting Author: Gadrum Ziegler, multi-LEARN Institute, Luxembourg
In order to investigate development, learning or teaching, various settings for analysis can be have been defined. Yet, actual interaction and the in-depth in situ observation of such interactions is key to understanding practices, in terms of professional action (e.g. teachers, agents) but also in terms of learning as practice (Lave/Wenger, 1995). Following these lines of thought, the project "teopart [takepart] — "Luxembourg: your country - my country: using participative technology to construct mutual images of Luxembourg" puts interactions between newcomers and Luxembourgish youngerst at the center of the research. More specifically, the project aims at letting young people (age: 14 to 18) (re-)discover, share, discuss and construct sites within Luxembourg (e.g. geographical, historical, cultural) via technological mediation, i.e. ipads. The observation, re-discussion and objects of interaction are key to the project as they allow for analysing the practices which are deployed by the participants in the project. In the detail, three levels are assessed (cf. transformation); firstly, the level of action and mutual engagement is documented and analyzed in terms of quality of interactions, type of interaction (e.g. verbal, gesture, facial) and quantification of efforts to engage in cooperation in terms of (efficient) mutual creation (i.e., result of jointly produced images); secondly, the level sharedness is assessed as regards concrete vs. abstract level of explanations, presentations and communications on a partnering teachers ideas, formulations and imagery; finally, the project aims at describing for the transformation of the individual, the group and the society at large.

Session O 399
1 September 2017 17:30 - 19:00
Pinto A - A1081
Invited Symposium

Closing the gaps? Differential Educational Effectiveness as a road to school improvement

Keywords: Educational attainment, Quantitative methods, School effectiveness, Teacher Effectiveness
Interest group: SIG 18 - Educational Effectiveness
Organiser: Sigrid Blomoke, University of Oslo, Norway
Discussant: Ronny Scherer, University of Oslo, Germany
Discussant: Trude Nilsen, University of Oslo, Norway

Differential Teacher and School Effectiveness Research: Implications for Promoting Equity

Presenting Author: Leonidas Kyriakides, University of Cyprus, Cyprus
Co-Author: Boris Habitutis P. M Cremer, University of Groningen / GION, Netherlands

This paper provides a review of research investigating quality and equity in education within the field of Educational Effectiveness Research (EER). This review shows that EER gradually moved to giving more emphasis on the quality dimension with the argument that by promoting quality, equity may also be achieved. During the last decade, an emphasis to investigating differential teacher and school effectiveness was given and the extent to which this strand of research can be used to explore the relation between quality and equity is discussed. The paper presents the results of two effectiveness studies conducted to test the validity of the dynamic model of educational effectiveness. These studies were concerned with effectiveness in different phases of schooling (pre-primary and primary education) and revealed that teacher- and school-level factors of the model can explain variation in student achievement in two different subjects (Mathematics and Language). It was also found that the socioeconomic gap in student achievement tends to be smaller in classrooms and schools which are more effective than others in promoting student learning outcomes. Such relation was not identified when searching for differential effectiveness in terms of gender and ethnicity. Implications for research on promoting quality and equity are drawn.

Evaluating teaching quality: The validity of differentiating performance using multiple measures

Co-Author: Sandy Taut, Pontificia Universidad Católica de Chile, Germany
Co-Author: Daniela Jiménez, Pontificia Universidad Católica de Chile, Chile
Co-Author: Jorge Manzi, Pontificia Universidad Católica de Chile, Chile
Co-Author: Diego Palacios, Pontificia Universidad Católica de Chile, Chile

Evaluating the quality of teaching has been an important focus of educational research and improvement efforts. While identifying teachers at the extreme ends of the performance distribution is possible at relatively high levels of validity and reliability, arriving at accurate distinctions between teachers in the middle of the distribution constitutes an important challenge. The present study addressed this issue in the context of the Chilean national teacher evaluation system, which has already been subject to extensive validation. A non-random sample of mathematics teachers – N=29 evaluated as “competent” and N=22 as “basic”, constituting the two adjacent middle performance evaluation categories – and their students (N=1781), were examined in the following ways: (a) teaching practices using three videotaped lessons coded with the Classroom Assessment Scoring System for Secondary School (CLASS-S), (b) student learning on standardized grade-level and specific unit tests, (c) students’ perceptions of their teachers, and (d) teachers’ self-perceived practices and self-efficacy beliefs. Although “competent” teachers outperform “basic” teachers on almost all criterion variables, the majority of these differences did not reach significance. However, we found medium effects sizes in favor of teachers evaluated as competent regarding a number of CLASS-S dimensions, student achievement on a unit-specific test, as well as for student perceptions regarding constructivist teaching practices and pedagogical support. Implications for educational research and teacher evaluation policies are discussed.

Combating Disadvantage in the Early Years: Evaluating the Impact of Children’s Centres

Presenting Author: Pamela Simmons, University of Oxford, United Kingdom
Co-Author: James Hall, University of Oxford, United Kingdom
Co-Author: Rebecca Smeees, University of Oxford, United Kingdom
Co-Author: Jenny Goff, University of Oxford, United Kingdom
Co-Author: Kathy Sylva, University of Oxford, United Kingdom

Children’s centres are supported to families with young children in disadvantaged communities in England. They are intended provide integrated and high quality family services and opportunities for children’s play and be locally responsive to neighbourhood need. The Evaluation of Children’s Centres in England (ECCE 2009-2015) provides evidence about the delivery of services and families’ use of children’s centres between 2011 and 2013. The paper focuses on the Impact strand of the evaluation which investigated the effects of families engagement with Children’s Centres and their services.

The evaluation used a mixed methods design and the Impact strand adopted quantitative approaches (including multilevel modelling) to investigate changes in a range of child, parent and family outcomes across three time points. The study involved over 2600 families and 117 Children’s centres. It addressed two overarching research questions (ROs).

Does engagement with children’s centres improve child, parent and family outcomes?

Which aspects of children’s centres promote better child, parent and family outcomes?

Engagement with children’s centres was linked to better outcomes especially in terms of family functioning, including improvements in the quality of the early home learning environment.Analyses by level of family disadvantage (High and Medium versus Low disadvantage groups) indicate children’s centres have the potential to lessen the effects of social disadvantage and promote equity.

Does (re)n collaboration work? Evidence on school-to-school collaboration as a strategy

Presenting Author: Wolfram Rollett, University of Education Freiburg, Germany
Co-Author: Daniel Muys, University of Southampton, United Kingdom

Increasingly, policymakers across the world are looking to school-to-school collaboration as a means of improving schools that is neither top-down, nor leaves school improvement at the mercy of individual schools. In a number of countries in Europe and beyond, including the UK, Belgium, the Netherlands and Spain, government initiatives have promoted the development of networks of schools intended to foster collaboration. This of course does beg the question of the extent to which such approaches actually work. In this paper, we will therefore explore the impact of collaboration on school improvement, using analysis from a range of research and evaluation studies carried out in England between 2008 and 2016. These 7 studies have used quantitative and mixed methods approaches approaches to look at the relationship between collaboration and school improvement, as well as at factors that may explain any relationship (or lack therefor). All have used propensity score matching to create a quasi-experimental design, using existing secondary data sources, in some cases combined with surveys and case studies. Findings show differential effects, in that some studies showed a positive relationship between school-to-school collaboration and pupil attainment, while others showed no relationship. The studies did, however, point to a number of factors that could explain this differential effectiveness, which are linked to theories of school improvement and school effectiveness.

Session O 400
1 September 2017 17:30 - 19:00
Vitra - 109
Invited Symposium

Cognitive Science

Broadening the Scope of Conceptual Change: Conceptual Change Meets other Disciplines

Keywords: Attitudes and beliefs, Conceptual change, Mathematics, Science education
Interest group: SIG 03 - Conceptual Change
Organiser: Konstantinos Christou, University of Western Macedonia , Greece
Organiser: Ham Eshach, Ben Gurion University of the Negev, Israel
Discussant: Stella Vosniadou, National and Kapodistrian University of Athens, Greece

Conceptual change within the individual collective

Presenting Author: Haim Eshach, Ben Gurion University of the Negev, Israel

Cognitive constructivism has led conceptual change literature to focus mainly on the solo cognitive approach, which sees the group of students that makes up a class as a collection of individuals. Inspired by social constructivism, I argue that to gain a broader understanding of how concepts change it is not enough to examine only how individuals change their concepts, but also how concepts change at the level of a group of students - what I call the individual collective. Any teacher who has conducted a full-class dialogic discussion will probably recall that even if they teach the same topic to different classes, the concepts that emerge in each, as well as the flow (the movement from one concept to another as the lesson progresses), may be absolutely different. This is because the two classes constitute different individual collectives.

Understanding conceptual flow patterns (CFP) (i.e. the way concepts emerge and change within the individual collective), as these are manifested in the whole-class dialogic discussion, may help educators design better learning environments that can lead students more successfully to meaningful learning. In my presentation I will introduce a series of studies based in learning environments that employ various
strategies, like circus tricks and physics texts that are visually designed like the Talmud pages, and the CFPs that arise within them. I will also present a study describing the process of teaching teachers how to conduct dialogic discussions, focusing on the cultural difficulties associated with conducting whole-class dialogic discussions with rich CFPs.

Conceptual change and threshold concepts in economics: learning to see like an economist?

Presenting Author: Peter Davies, University of Birmingham, United Kingdom

This paper considers what, if anything, might be distinctive about conceptual change in learning economics in the final years of secondary school and the early years of an undergraduate education. This focus introduces two dimensions: students’ prior experience of the discipline (as opposed to their prior experience of phenomena investigated by the discipline) and the nature of the discipline itself. Assumptions about actors’ beliefs and motivations are embedded in social scientific conceptions and this could make conceptual change in these disciplines somewhat distinctive. The argument of the paper is developed through a review of evidence and commentary on students’ learning. Whilst there is a large literature on teaching economics and measured outcomes from that teaching, there have been relatively few investigations of students’ conceptions and the challenges that students face in their learning. Many of those studies which have focused on the learning of economics have used ‘threshold concepts’ to describe the change which researchers believe they observe. This raises a question about whether it is fruitful to regard this language as identifying a particular kind of conceptual change in particular kinds of subject which is helpful for the design of teaching.

Conceptual change research in mathematics: Looking back and looking forward

Presenting Author: Xania Vamvakoussi, University of Ioannina, Greece

The conceptual change approach to learning was initially associated with science learning and had minimal impact on research on mathematics learning. The systematic attempt to take a conceptual change perspective on mathematics learning is a more recent development. This paper looks back to a more than one decade long effort to apply the framework theory approach to conceptual change to the case of mathematics and sketches directions for further research including: a) more basic research in content areas other than number, b) more educationally-relevant research, and c) constructive dialogue with different theoretical perspectives, particularly those that put forward continuity in the development of mathematical concepts.

Dual Processes theory implications for conceptual change: A review

Presenting Author: Margarita Limon, University Autonoma de Madrid, Spain

Resistance to change individual’s beliefs/knowledge has been a repeated result obtained in conceptual change research. Difficulties to change have been especially experienced when knowledge-beliefs are highly entrenched. This result has been found in different domains (Limon & Mason, 2002; Sinatra & Pintrich, 2003; Vosniadou, 2013). Up to now a full explanation of why individuals are so reluctant to change is not available yet. I consider that making alternative questions and using different approaches might contribute to provide complementary data and ideas helpful for promoting and achieving conceptual change in the classroom. Both in social cognition and thinking research, the dual-processing theory (e.g. Evans, 2008; 2010; Evans & Frankish, 2009; Stanovich & West, 2000; Frederick, 2005; Kahneman, 2011; Stanovich, 2011) is currently used to give account of results. This theory proposed the existence of two types of processes: Type 1 (fast automatic unconscious processes) and type 2 (slow controlled conscious processes). Often these two types of processes are described as the intuitive mind (type 1) and the reflective mind (type 2). This paper intends to provide an integrative review of the main results obtained recently, either in the field of social cognition and attitude change or in the field of the psychology of thinking that focus on how information (arguments) should be presented in order to facilitate conceptual change in different disciplines. Research data will be presented to illustrate some points of the review, and particularly, the influence of intuition and reflective thinking processes in promoting conceptual change.

Session O 401

1 September 2017 17:30 - 19:00
Main Building A - A4
Invited Symposium
Learning and Social Interaction
Towards citizenship with deliberative argumentation and technologies for new political education

Keywords: Argumentation, Artificial intelligence, Citizenship education, Collaborative Learning, Educational Technology, Emotion and affect, History, Inquiry learning, Learning Technologies, Peer interaction, Social aspects of learning and teaching, Social interaction, Technology

Interest group: SIS 28 - Argumentation, Dialogue and Reasoning
Organiser: Baruch Schwarz, Hebrew University, Israel
Discussant: Armin Weimberger, Saarland University, Germany

Argumentation and Technology: Educational Tools or Civic Goals?

Presenting Author: Aviv Cohen, The Hebrew University of Jerusalem, Israel

Civic education continues to raise numerous questions and pose ongoing challenges in countries across the globe. Each key attribute of this field, whose recognition may assist in navigating this convoluted nature of questions, lies in the concept of philosophical conceptions that guide practice. Reflecting this approach, throughout this mainly theoretical presentation, several models of civic education will be used in order to better understand the underlying educational and civic assumptions that influence the elements of argumentation and technologies as part of the civic education process. The main argument to be presented is that because these two elements may be seen as pedagogical tools, aimed toward larger educational ends, such an approach promotes a traditional conception of citizenship in which students are seen as passive consumers of knowledge. In contrast, when prioritising political deliberation and critical media literacy as the goals of civic education, this process holds the potential to promote active and reflective conceptions of citizenship. This distinct distinction sheds light on the question of content as part of this educational process. Thus, as will be discussed, these notions hold important pedagogical implications for teachers and practitioners.

Computer-Supported deliberation about hot issues in a multi-cultural context

Presenting Author: Baruch Schwarz, Hebrew University, Israel
Co-Author: Benzi Slakmon, Ben Gurion University of the Negev, Israel

Formal educational frameworks have traditionally avoided involvement in strong emotions. The overt policy has always been to avoid the burst of emotions stirred by identities (ethnic, political, ideological) in learning tasks. We will show that the burst of emotions is gradually tolerated in educational frameworks moved by progressive pedagogies, mainly as a motivational instrument, as a way to engage students in learning activities and boost learning gains. We review new educational approaches that see emotional work in sensitive issues as part of their mission and propose a more radical approach to emotional use in discussions and contend that the gradual, deliberate triggering of hot discussions should become a suitable context for promoting education to cultural diversity. We describe a university course based on the implementation of consecutive hot discussions, and analyze some manifestations that combine the emotional and the idealistic. Through the analysis of these manifestations, we both articulate some criteria for the promotion of education to cultural diversity, and evaluate the success of the university course. In particular, we stress that the expression of strong emotions while complying with rules for collective reasoning, deliberative argumentation or rules of exploratory talk realizes the promotion of cultural diversity.

Agent Based Support for Collaborative Discourse

Presenting Author: Carolyn Rise, Carnegie Mellon University, United States
Co-Author: Keith Mikl, Carnegie Mellon University, United States
Co-Author: Michael Miller, Carnegie Mellon University, United States
Co-Author: Yohan Jo, Carnegie Mellon University, United States

Collaborative discourse needs support to be productive. This talk shows how automated dynamic support has the ability to model collaborative actions that occur in running discourse. Structured probabilistic models of text induce role based behavior profiles so that it is possible to identify how participants in discussions take up these roles, how these roles contribute to outcomes of the conversation, and where participants shift in their positioning with respect to these roles over time. With these insights, it is possible to view the collaborative process as it unfold, identify more or less functional role taking patterns, and use this assessment to trigger support. The example of English Wikipedia pages on the Israeli-Palestinian conflict, a deeply entrenched conflict with multiple, complex perspectives is considered to exemplify the role of AI techniques for automated dynamic support.

How to Change Minds through Scaffolding Argumentation in Social Media

Presenting Author: Armin Weimberger, Saarland University, Germany
Co-Author: Andreas Dreyer, Saarland University, Germany
Co-Author: Thomas Puhl, Saarland University, Germany
Co-Author: Malte Judele, Saarland University, Germany

Social networking sites (SNS) such as Facebook allow for participation in debates on socially and politically relevant issues, but mainly seem to reinforce one’s own political and social attitudes and beliefs. How can we facilitate deliberative argumentation in social media? This contribution provides an overview of the effects of Facebook-apps designed to orchestrate and scaffold the construction of arguments on online discourse and development of attitudes and beliefs in the context of a German-Israeli research program. The apps build on current instructional approaches, 1) scripting how participants classify their contributions as argument components, 2) making participants aware about how attitudes are distributed within their group and that participants’ arguments will be evaluated by a group of peers, and 3) orchestrating individual and collaborative construction of arguments. Results show how argumentation scripts can facilitate discussion and development of attitudes and beliefs, awareness tools may have mixed effects, and individual preparation can have negative impact on transactional argumentation.

Session O 402

1 September 2017 17:30 - 19:00
Pent II - B3107
Invited Symposium
Meet the EARLI Journal’s Editors
Learning and Instruction

Presenting Author: Jan Vermunt, University of Cambridge, United Kingdom

As an international, multi-disciplinary, peer-refereed journal, Learning and Instruction provides a platform for the publication of the most advanced research in the areas of learning, development, instruction and teaching. The journal welcomes original empirical investigations. The papers may represent a variety of theoretical perspectives and different methodological approaches. They may refer to any area of research into learning and to a diversity of learning and instructional settings, from laboratory experiments to field studies. The major criteria in the review and the selection process concern the significance of the contribution to the area of learning and instruction. This is an audience-initiated session and participants are invited to raise any question or issue they feel pertinent.

Educational Research Review

Presenting Author: David Gijbels, University of Antwerp, Belgium

Educational Research Review is an international peer-refereed journal aimed at researchers and various agencies interested to review studies in education and instruction at any level. The journal welcomes different types of systematic review studies, theoretical contributions and shorter forum - papers but does not publish original empirical investigations.

Frontline Learning Research

Presenting Author: Ermo Lehlinen, University of Turku, Finland

Early decided to found a new journal in order to open more publishing opportunities for high level manuscripts. The particular aim was to explore open access publishing and emphasize innovative and risk-taking research in the field of learning and instruction. Frontline Learning Research (FLR) is an open-access electronic-only journal that publishes articles on issues and trends occurring internationally in research on learning and educational sciences. FLR is a forum for multidisciplinary research on learning and learning environments and it aims at enhancing new theoretical and methodological approaches in learning sciences. FLR also welcomes commentaries aimed at triggering discussion about important theoretical and methodological questions about the published articles. In the Conference we will discuss more deeply about the guiding principles of FLR and help participants to recognize what features make manuscripts innovative and risk-taking.

EARLI Book Series New perspectives on Learning and Instruction

Presenting Author: Men Siegers, Maastricht University, Belgium

Co-Author: Isabel Raemdonck, Université Catholique de Louvain, Belgium

New Perspectives on Learning and Instruction is the international, multidisciplinary book series of the European Association for Research in Learning and Instruction (EARLI) and is published by Routledge.

The aim of the series is to present to the scholarly community high quality, theoretically-driven research on a specific theme in the domain of learning and instruction. Books that are published in the series are innovative, attempting to forge new conceptions of the field. Originality, scientific merit, and significance for the field are what guide the series. Both edited collections and sole-authored texts that meet these criteria are considered for publication.

In addition, in 2017, the EARLI Book Series will start with the publication of state-of-the-art edited books. They provide an essential introduction to the state of the art in a specific field in the domain of Learning and Instruction. These fields are represented by the Special Interest Groups of EARLI and Emergent Field Groups. The main structure of each state-of-the art book is as follows. First, each book begins with an outline of the field’s relevant historical, conceptual and theoretical backgrounds. Second, each book presents an up-to-date series of high-quality original empirical articles representing the main research topics in the specific field. Third and finally, it presents new directions for research.

The focus of the EARLI Book Series is on European work, however, contributions from non-European researchers and non-members of the European Association for Research in Learning and Instruction are invited.

The series is designed to appeal to a wide audience of researchers and post-graduate students in education and psychology.


Session P 403

2 September 2017 08:45 - 10:15
Pent B - B1097

Single Paper

Teaching and Teacher Education

Paper Presentation: Teacher Education and Teaching

Keywords: Attitudes and beliefs, Cognitive skills, Conceptual change, Educational Psychology, Higher education, Instructional design, Integrated learning, Meta-analysis, Misconceptions, Pre-service teacher education, Quantitative methods, Secondary education, Teaching / instruction

Interest group: SIG 11 - Teaching and Teacher Education

Chairperson: Janna Teitmann, Germany

Student teachers’ proactive strategies and learning environment for reducing study-related burnout

Keywords: Educational Psychology, Higher education, Pre-service teacher education, Quantitative methods

Presenting Author: Sienna Väldsinen, University of Eastern Finland, Finland

Co-Author: Janne Piisipää, University of Eastern Finland, Finland

Co-Author: Kris Pihlaj, University of Oulu, University of Helsinki, Finland

Co-Author: Auli Toom, University of Helsinki, Finland

Co-Author: Taina Somi-Ikene, University of Tampere, Finland

The study aims to gain better understanding of the interaction and the development of student teachers’ proactive coping strategies, perceived learning environment and study-related burnout. Longitudinal data with three annual measurements, from the beginning of the studies until the end of bachelor studies, were utilized in exploring the consistency and stability of the proactive strategies, i.e. self- and co-regulation. Firstly, perceived learning environment and experienced study-related burnout. Altogether, 270 primary school student teachers completed the survey. This data was analyzed by using SEM. Results showed that the self-regulation strategy adopted by student teachers promoted the use of co-regulative strategy, which in turn contributed the perceived fit between the student teacher and learning environment and further, consistency reduced study-related burnout. Moreover, the self-regulative strategy directly buffered the study-related burnout. The results imply that the use of proactive strategies contributed not only the perceived fit between the student teachers and learning environment, but also reduce the study-related burnout, and further, enabled student teachers to cope with the challenges faced in entering to the working life.

Measuring teachers’ attitudes toward teaching integrated STEM: instrument development and validation

Keywords: Attitudes and beliefs, Integrated learning, Secondary education, Teaching / instruction

Presenting Author: Lieve Thibaut, KU LEUVEN, Belgium

Co-Author: Heidi Knippert, KU LEUVEN, Belgium

Co-Author: Wim Dehaene, KU LEUVEN, Belgium

Co-Author: Filip Depaepe, KU LEUVEN, Belgium

The shortage of graduates in Science, Technology, Engineering and Mathematics (STEM), has led to numerous attempts to increase students’ interest in STEM by providing learning experiences called ‘Integrated STEM’. This is an overarching term for all learning environments that involve teams of students in relevant, authentic problems that integrate content from multiple STEM disciplines. However, often teachers’ instructional practices seem to not alter, due to a lack of change in their attitudes toward teaching integrated STEM. Therefore, a close examination of these attitudes is necessary. This paper attempts to contribute to this challenge by proposing a framework for the measurement of secondary teachers’ attitudes toward teaching integrated STEM. To achieve this, the concepts of ‘integrated STEM’ and ‘attitudes’ were thoroughly operationalized and combined. Integrated STEM was defined by means of five STEM-principles: integration of STEM content, problem-centered learning, Inquiry learning, design-based learning and cooperative learning. Moreover, the concept of attitude was divided in five subdimensions: Perceived Difficulty, Perceived Relevance, Anxiety, Enjoyment and Self-Efficacy. In order to find clarification for this framework, a questionnaire was developed and validated in a pilot study with 130 secondary school teachers in Flanders. The results of this pilot study indicate that the questionnaire is a valid and reliable instrument and therefore confirm the proposed theoretical framework.
Pre-Requisite Knowledge for Learning-Strategy Judgement is Fragmentary and Misconceptual

Keywords: Cognitive skills, Conceptual change, Misconceptions, pre-service teacher education

Presenting Author: Inga Bogler-Frey, University of Freiburg, Institute of Psychology, Germany

Co-Author: Marcus Deutscher, University of Freiburg, Germany

Co-Author: Alexander Renik, University of Freiburg, Germany

One student skill relevant for (life-long) learning refers to comprehension-oriented learning strategies. Teachers, however, seem to have deficits in instructing their students how to apply such strategies. A reason could be suboptimal knowledge about these strategies. Similarly as in the case of other kinds of teachers’ pedagogical knowledge, we hypothesized that (student) teachers show intuitive knowledge about learning strategies in the form of ‘knowledge-in-pieces’, that is, sub-optimally structured, fragmented knowledge. For example, a number of student teachers think of certain teaching strategies as being learning strategies. An important characteristic of knowledge-in-pieces is its context-sensitive activation. We therefore first investigated whether the activated learning-strategy knowledge of student teachers differs depending on the context provided. We secondly related knowledge measures to learning-strategy judgements referring to authentic student products. In a within-subject experiment we varied whether a question about learning-strategy application referred to a context that was (A) student- or (B) teacher-focused. While the context differed, the same strategies could be mentioned as a correct answer. All 47 participating student teachers answered all questions (design: ABABAB). Afterwards, all student teachers received a 60-minute computer-based training on learning-strategy judgement followed by six judgement tasks. We found large differences in the activated knowledge depending on contexts. Thus, student teachers showed knowledge-in-pieces in the domain of learning strategies. Accordingly, instructional methods adopted from the conceptual change literature are recommended for teacher training. In addition, we found significant relations between measures of knowledge and quality of learning-strategy judgement on the basis of student products.

Program Development in Teacher Education: A systematic, configurative literature review

Keywords: Higher education, Instructional design, Meta-analysis, Pre-service teacher education

Presenting Author: Hege Hermansen, Department of Teacher Education and School Research, Norway

This paper presents the results of a systematic, configurative literature review of program development in teacher education. More specifically, the review focuses on empirical studies of program development that included teacher educators as informants. Teacher educators’ role in program development has received relatively little attention from researchers, compared to studies that feature student teachers and/or student samples of work as the main data sources. The review describes the thematic and methodological characteristics of the research field, combined with a conceptual analysis of how ‘program development’ manifests itself in the literature. The review is based on an analysis of 125 peer reviewed articles retrieved through ERIC and Web of Knowledge. The paper concludes by discussing the implications for our potential as researchers to support and inform teacher education practice and policies. The role of systematic reviews in informing educational policy more broadly is also addressed.

Session P 404

2 September 2017 08:45 - 10:15
Virtua - 120
Single Paper

Learning and Instructional Technology, Learning and Social Interaction

Paper Presentation: Learning with Computers

Keywords: Computer-supported collaborative learning, Cooperative / collaborative-learning, Design based research, E-learning / Online learning, Educational Technology, Informal learning, Learning analytics, Learning Technologies, Multimedia learning, Peer interaction, Social interaction, Vocational education

Interest group: SIG 07 - Learning and Instruction with Computers

Chairperson: Cristina Nuru, University of Turku, Romania

Evidence from multiple field experiments in VET with different hypervideo-based learning scenarios

Keywords: Design based research, Learning Technologies, Vocational education, Multimedia learning

Presenator: Sara Calcatino, Swiss Federal Institute of Vocational Education and Training (SVI/NET), Switzerland

In recent years hypervideo is more and more used for educational purposes and its role in fostering learning thanks to its interactive features is progressively more recognized. This holds particularly true for vocational education and training, where hypervideo can support both procedural and declarative knowledge. However, this strategy is often limited to individual settings, where students use hypervideo alone. Other uses of hypervideo for learning, as well as their implementation in authentic classrooms have been poorly investigated so far. This study aims to put together several studies (N=527 students) where hypervideo has been integrated in different instructional scenarios in vocational school contexts in order to measure learning acquisition, perceived usefulness, satisfaction, and motivation. Students from the sample represent different VET curricula and they have been randomly assigned to one out of five different conditions: hypervideo used in plenary lesson, used individually, used in couples, designed in groups, and no use of hypervideo (control group). Results show that concerning learning there is not an effect of the condition, and that there is mixed evidence concerning perceived usefulness, satisfaction, and motivation.

A Theoretical Framework for Student-Created Digital Conceptual Artefacts in CSCL

Keywords: Computer-supported collaborative learning, Cooperative / collaborative-learning, Educational Technology, Learning analytics

Presenting Author: Heesewon Jeong, Hallym University, Korea, Republic of

Co-Author: Kris Lund, University of Lyon, France

In this contribution, we propose that student-created artefacts mediate three different knowledge construction processes in CSCL: (1) Artefacts mediate individual learning and they help individual learners to construct new knowledge, (2) they mediate co-construction as they help learners to co-create knowledge in small groups, and (3) they mediate collective knowledge construction in the communities. These roles emerge as a function of how artefacts are created (i.e., unit of contribution) and shared in groups and communities. An important future research topic for CSCL is to understand how various CSCL artefacts may mediate individual, collaborative, and collective knowledge construction processes. The details about how different artefacts mediate the knowledge construction processes is not well-understood yet, but we hope that the conceptual framework presented in this contribution can be used to guide future research efforts, including automated analyses of artefact-mediated learning processes.

„To be aware or not to be aware – that is the question.“ - Development of an Awareness Taxonomy

Keywords: Computer-supported collaborative learning, E-learning / Online learning, Peer interaction, Social interaction

Presenting Author: Anne Mox, University of Duisburg-Essen, Germany

Co-Author: Daniel Bodamer, University of Duisburg-Essen, Germany

Social media have become an integral part of formal learning settings. To some extent the possibilities of social media for opening (academic) classrooms are already used. Through this opening of learning environments new situation stimuli arise, e.g. social exchange. But what happens when more and more individuals can partake in the social exchange? Are these new exchange partners perceived? And implies “more exchange partners” greater “learning success at the same time?"

To find answers to these questions, a theoretically derived awareness taxonomy was developed, which was tested in a first experimental setting. The results of the study provide evidence that learners in open learning settings perceive the new available exchange partners. The other dimensions of the taxonomy, perspective and group awareness, also contribute significantly to the findings. This article outlines the theoretical derivation of an awareness taxonomy, summarises the key findings and provides impetus for further studies.

We need High Drop-out Rates in MOOCs: Evaluation and Personalization for Quality of Open Education

Keywords: Online learning, Educational Technology, Learning, Learning Technologies

Presenting Author: Christian M. Straack, Open University of the Netherlands, Netherlands

This paper presents the current status of open education and Massive Open Online Courses (MOOCs) and discusses their quality following the main question: How can we introduce new evaluation and personalization strategies to improve the learning quality of Open Education? Currently there is lack of evaluation instruments for MOOCs grounded on the long-term experiences, research and methods of quality development. The adaptation of the three generic dimensions of quality development to Open Education supports design improvements and personalization of MOOCs with focus on personal goals and evaluation methods. Based on a literature review and results from a pre-survey it is argued why we need to change the design and evaluation of MOOCs. The traditional assessment by the completion rate is not fitting as well as not considering the diversity of MOOC learners and their personal goals. The traditional drop-out rate for the MOOC evaluation is to be replaced by fulfillment of individual intentions. Finally the question is explored whether Open Education is the next revolution and how it contributes and impacts the whole society.

Session P 405

2 September 2017 08:45 - 10:15
Pinni B - B417
Single Paper

Assessment and Evaluation, Cognitive Science

Paper Presentation: Cognitive Skills

Keywords: Achievement, Biology, Cognitive skills, Early childhood education, Educational Psychology, Experimental studies, Interdisciplinary, Learning and developmental difficulties, Mathematics, Misconceptions, Primary education, Quantitative methods, Self-regulation, Writing / Literary

Interest group: SIG 17 - Methods in Learning Research, SIG 22 - Neuroscience and Education

Chairperson: Sigal Eden, Bar Ilan University, Israel
Children in the elementary grades are expected to solve equations to demonstrate pre-algebraic proficiency. Pre-algebraic differences may emerge based equation type (i.e., standard versus nonstandard), the operation shown or required for solution (i.e., addition or subtraction), and the position of the unknown. Pre-algebraic differences may also be influenced based on arithmetic proficiency. We evaluated the performance of 1,796 4th, and 2nd-grade children on a measure of standard and nonstandard equations to learn whether arithmetic fluency predicts pre-algebraic performance, which characteristics of pre-algebraic items determine item difficulty, and whether certain demographic variables contribute to pre-algebraic performance. Results indicate pre-algebraic differences by grade level and season (i.e., fall or spring) of administration. Arithmetic influences pre-algebraic performance, and nonstandard equations that require a relational understanding of the equal sign are most difficult for young children.

The power of writing hands: Logical memory performance after handwriting and typing tasks

Keywords: Experimental studies, Interdisciplinary, Quantitative methods, Writing / Literacy

Presenting Author: Satu-Maarit Frangou, University of Lapland, Finland

Information and communications technologies have generated a multilevel metamorphose not only of the educational field, but also of the usage of hands. The shift from handwriting to typing is bringing about a change in the ways people learn to recognize and recollect letters and words, read and write. This study investigates how different writing methods affect memory retrieval. The aim is to understand how the memory performances compare after handwriting and typing tasks, and how the factor of time or age affects recollection. The Wechsler Memory Scale Revised Edition (WMS-R) was used with experimental within-subjects research design to measure memory functions of 31 University of Lapland students in 2016. Participants wrote down a dictated story with a pencil, computer keyboard, and a touch screen keyboard. Consequently, the degree of recollection of each writing task was measured and analysed with repeated measures analysis of variance.

Additionally, this thesis deliberates the embodied cognition theory, as learning and memorizing are not simply information processing in nothingness. Experiences, actions and senses all play part in learning, as well as in writing process with the harmonious co-operation of brain, mind and body.

The results of this study indicate that writing modalities have statistically significant effect on recollection, handwriting receiving the highest scores. These results are of interest due to the constant increase of digitalization of learning environments. Moreover, these results can be reflected upon when evaluating the impending changes in the Finnish curriculum, from which cursive handwriting isremoved in autumn 2016.

Cardiac vagal tone and inhibitory control predict pre-schoolers’ listening comprehension

Keywords: Biology, Cognitive skills, Early childhood education, Self-regulation

Presenting Author: Sara Scrinin, University of Padua, Italy

Co-Author: Lucia Mason, University of Padova, Italy

This study investigated the role of inhibitory control and basal cardiac activity at the beginning of the school year in predicting oral text comprehension at the end of the year in pre-schoolers. Forty-four, 4-year-olds participated in the study. At the beginning of the school year children’s electrocardiogram (ECG) at rest was registered followed by the assessment of inhibitory abilities as well as verbal working memory skills and verbal ability. At the end of the year all children were administered a listening comprehension ability measure. Results showed a main effect of basal cardiac vagal tone, that is a physiological correlate of self-regulation, in predicting listening comprehension together with verbal working memory and verbal abilities. Furthermore, when considering the interaction between inhibitory control and cardiac vagal tone, both direct and interactive effects of main predictors emerged. These results are among the first to show the predictive role of basal cardiac vagal tone and inhibitory control in pre-schoolers’ oral text comprehension, and offer new insight into the association between autonomic regulation of the heart, inhibitory control, and cognitive activity at a young age.

Exploring the relations between physical fitness, executive functioning and low academic achievement

Keywords: Cognitive skills, Educational Psychology, Learning and developmental difficulties, Primary education

Presenting Author: Anne de Bruin, University of Groningen, Netherlands

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Physical fitness has been related to children’s academic performance and executive functioning. It has been suggested that executive functioning mediates the relation between physical fitness and academic performance. This assumption is highly relevant when considering low academic achievers, a population at risk for hampered cognitive development and school drop-out. Improvements in physical fitness, by improving executive functioning, could be beneficial for their academic performance as well. The present study examined whether physical fitness and executive functioning were predictive of low achievement in mathematics and spelling, and whether the relation between physical fitness and low achievement was mediated by specific executive functions. Three-hundred-ninety-one primary school students were classified as low (< 25%) or average-to-high (> 75%) achievers in mathematics and spelling. Multi-level structural equation models were built with direct paths between physical fitness and academic achievement, and added indirect paths via categories of executive functioning: inhibition, verbal working memory, visuospatial working memory and shifting. Low achievement in mathematics was predicted by poorer verbal and visuospatial working memory and shifting. Physical fitness was directly and positively related to mathematics achievement, but also indirectly via verbal and visuospatial working memory. Low achievement in spelling was predicted by poorer verbal working memory and shifting. Physical fitness was only indirectly and positively related to spelling achievement via verbal working memory. The relation between physical fitness and academic achievement level seems to be mediated by specific executive functions, depending on the academic domain involved.

Session P 406

2 September 2017 08:45 - 10:15

Virta - 109

Single Paper

Cognitive Science, Developmental Aspects of Instruction, Teaching and Teacher Education

Paper Presentation: Educational Effectiveness and Learning with Computers

Keywords: Achievement, Cognitive development, Cognitive skills, Computer-assisted learning, Early childhood education, Educational Psychology, Educational Technology, Numeracy, Parental involvement in learning, Pre-service teacher education, Teacher Effectiveness, Teacher Professional Development, Technology, Video analysis

Interest group: SIG 07 - Learning and Instruction with Computers, SIG 18 - Educational Effectiveness

Chairperson: Guy Durden, Institute of Education, United Kingdom

Emotion regulation during severe classroom disruptions

Keywords: Educational Psychology, Pre-service teacher education, Teacher Effectiveness, Video analysis

Presenting Author: Inna Rosa Krumholz, FB Erziehungswissenschaft und Psychologie, Germany

Co-Author: Valentina Piekow, Freie Universität Berlin, Germany

Co-Author: Felicitas Thiel, Freie Universität Berlin, Germany

Abstract: Currently, little is known about factors that influence teachers’ emotion regulation in the context of teaching. Using an experimental design, we studied if a cognitive reappraisal of experienced emotions (Gross & John, 2003) in severely disrupted classroom situations could be induced by presenting the students’ emotional responses. We assume that teachers who are aware of the student’s perspective use reappraisal more often than teachers who do not take this perspective into account. In order to test this hypothesis, we presented several video cases that illustrated a disrupted and problematic classroom situation to preschoolers. In addition, we presented a supplementary video to the experimental group, in which the student, who caused the disruption, reflected on his/her behavior by commenting on the teaching situation. In contrast, the video solely depicting the disruption was shown in the control group. Following a thorough stimulus evaluation check (both groups showed comparable emotional evaluation of the video cases), it could be demonstrated that the experimental group showed significantly more reappraisal than the control group.

The Effects of Nine-Week Summer Vacation on Austrian Students in Lower Secondary Education

Keywords: Achievement, Cognitive development, Educational Psychology, Parental involvement in learning

Presenting Author: Manuela Pacheter, University of Graz, Austria

Co-Author: Silke Lutterbürger, University of Teacher Education Sibiu, Austria

Co-Author: Ioana Popaouec, University of Graz, Austria

Co-Author: Elisabeth Weiss, University of Graz, Austria

Co-Author: Sigrd Wimmer, University of Graz, Austria

Co-Author: Andreas Fink, University of Graz, Austria

Summer vacations interrupt the rhythm of learning and may result in a loss of knowledge and skills. In a meta-analysis with US-American studies, summer learning losses amounted to one tenth of a test score standard deviation, which is equivalent to about one month of schooling (Cooper et al., 1996). Despite its overall importance, the phenomenon of summer learning loss has nearly exclusively been investigated in the USA. Research in Europe is merely at its beginning. Against this background, the present study investigates in an Austrian sample of 110 students in lower secondary education to what degree students’ knowledge and skills may suffer from a nine-week summer break and to what degree changes are moderated by socio-economic and family-related variables.
The results show losses as well as gains. Students experienced losses in arithmetic problem solving, intelligence measures, and spelling, but gains in reading. Losses or gains in a knowledge domain appear to depend on the degree of practice during the summer vacation. Contrary to US-American studies, students could make up for their losses within nine weeks following the re-start of school. Socio-economic variables such as parents’ educational background had a small impact on summer learning losses in arithmetic problem solving. The study has implications for teachers and parents. Teachers cannot rely on their students’ knowledge from the previous school year, but instead need to identify students’ ability levels and start the new school year with an individualized review of last year’s learning contents.

Integrated SFON enhancement with computerized arithmetic training

**Keywords:** Cognitive skills, Computer-assisted learning, Early childhood education, Numeracy

**Presenting Author:** Minna M Hannula-Sundman, University of Turku, Finland
**Co-Author:** Emo Lehtinen, University of Turku, Finland

This study is based on previous studies demonstrating substantial individual differences in children’s own spontaneous focusing on numerosity (SFON) (e.g., Hannula & Lehtinen, 2005). Providing deliberate variation in the aspect of number occurring in everyday surroundings can be an effective way of enhancing children’s focusing on numerosity and subsequent development of numerical skills (Hannula, Mattinen & Lehtinen, 2006). The body experience of numbers and number combinations has been successfully promoted in a computer game “Fingit”, which aims at developing children’s awareness of arithmetical combinations of numbers from one to ten (Lindström et al., 2012).

In the current study, we tested an integrated model of SFON enhancement and early arithmetic training with iPad game aimed at supporting transfer of arithmetical skills. We created activities that bridge the skills trained in the computer game with children’s everyday activities and investigate whether children’s arithmetical skills and their SFON tendency develop as a result of a four-week intensive playing of Fingit iPad game integrated with everyday activities and SFON enhancement. A quasi-experimental design with a 4-week training and “business as usual” control group and pre-, post-, and delayed post-tests following the training after three months was used. The results show a clear developmental advantage for the training group over the control group in arithmetical skills. An intensive period of SFON enhancement integrated with arithmetic training in a computer game and everyday activities may be a promising and motivating mathematics learning environment for kindergartners.

**Differences Among Pre-Service Teachers’ TPACK**

**Keywords:** Educational Technology, Pre-service teacher education, Teacher Professional Development, Technology

**Presenting Author:** Teemu Valtonen, University of Eastern Finland, Finland
**Co-Author:** Sevi Kontkanen, University of Eastern Finland, Finland
**Co-Author:** Wout Kokkonen, University of Eastern Finland, Finland

Currently there is a lot of research focusing on pre-service teachers as users of the Information and Communication Technology (ICT). One actively used theoretical framework for studying the topic is the Technological Pedagogical Content Knowledge (TPACK). Challenge with TPACK studies is that they typically treat (pre-service) teachers as one homogeneous group, both in studies conducted quantitatively and qualitatively. This research provides a seldom used perspective for TPACK research by focusing on differences among pre-service teachers using both quantitative and qualitative methods. Results indicate that instead of assuming pre-service teachers as a one homogenous group, different subgroups can be identified with differences among the areas of TPACK. These differences need to be considered in order to better support pre-service teachers with different abilities of using ICT in education. In addition, the aim is to provide insights into possibilities and characteristics of different research methods within TPACK content.

**Session P 407**

2 September 2017 08:45 - 10:15
Pini B - 83116
Single Paper

**Learning and Social Interaction, Teaching and Teacher Education**

**Paper Presentation: Teaching and Instruction - B**

**Keywords:** Collaborative Learning, Communities of learners, Communities of practice, Computer-supported collaborative learning, Mixed-method research, Motivation, Quantitative methods, School effectiveness, Social interaction, Teacher Professional Development, Teaching / instruction, Teaching approaches, Video analysis

**Interest group:** SIG 11 - Teaching and Teacher Education

**Chairperson:** Tesi Rogat, Purdue University, United States

**Teacher motivation and instructional behavior – Does the school make a difference?**

**Keywords:** Motivation, Quantitative methods, School effectiveness, Teaching / instruction

**Presenting Author:** Doris Holtberger, Technical University of Munich, TUM School of Education, Germany

Teachers’ motivational orientations have already been related to teachers’ instructional behavior. So far, this research is dominated by a teacher-oriented perspective, investigating individual teachers, and not taking into account school characteristics. School characteristics, however, can be assumed to not only determine teachers’ motivational development (cf. Self-Determination Theory) but also to interact with teachers’ motivational orientation when predicting instructional behavior (cf. Person-Environment-Interaction). Therefore, the present study examines whether teachers’ motivational orientations, their instructional behavior as well as their relationship, differ systematically between schools. PISA 2003 data were re-analyzed, where 1,959 mathematics and science teachers from 196 schools rated their level of engagement as well as the teacher-student relationship, the maximalized time use, and the quality of feedback. Multi-level analyses revealed low to medium intra-class correlations for teachers’ engagement and instructional behavior. The analyses of random-slopes showed that the regression coefficients for the relationships between teachers’ engagement and the three subscales of instructional behavior differ across schools. The present investigation extends previous research by addressing the nested structure of teachers grouped into schools and by examining whether systematic differences can be found for schools. Therewith, it contributes to the discussion on how school, teacher, and teaching characteristics interact with each other.

**Scaffolding in the open classroom. Are there different patterns in teachers’ supportive behaviours?**

**Keywords:** Mixed-method research, Teaching / instruction, Teaching approaches, Video analysis

**Presenting Author:** Antonia Schoikmann, University of Hamburg, Germany
**Co-Author:** Jens Siena, University of Hamburg, Germany
**Co-Author:** Tekla Paulsen, University of Hamburg, Germany

Open learning phases are pivotal in many up-to-date instructional formats, such as inquiry-based or problem-based learning. However, little is known about how teachers actually support the processes students go through in these phases, and which patterns of supportive behaviour might or might not be beneficial for self-directed successful learning. In the present study, a total of 23 teachers from vocational education were videotaped in naturalistic classroom situations in secondary and vocational-educational classes whilst supporting open learning. A total of 2,199 supportive events were coded. Additionally, teachers were surveyed for their approaches to teaching. Patterns of behaviours were inferred via visual inspection as well as with sequential analysis. Results show that most teachers tend to have stable patterns of supportive behaviours associated with their approaches to teaching, which partly differ strongly from the average behaviours. However, some teachers also show variations in their supportive behaviour patterns across lessons they teach, thus demonstrating the flexibility to adapt to situational demands.

**Teachers’ experiences of mixed peer-mentoring groups of in-service and pre-service teachers**

**Keywords:** Collaborative Learning, Communities of learners, Communities of practice, Teacher Professional Development

**Presenting Author:** Ulla Kiviniemi, University of Jyväskylä, Finland
**Co-Author:** Päivi Tylylä, University of Jyväskylä, Finland
**Co-Author:** Hanna Helkkilä, University of Jyväskylä, Finland

This study examines teachers’ perspective the experiences of mixed peer-mentoring groups of in and pre-service teachers. The research project started in 2014 along with a Comenius Multilateral Project called PAIDEIA (2013-16), funded by the European Commission. The PAIDEIA project aimed to develop new practices for integrating teacher studies and working life and enhancing collaboration between schools and teacher education. The research is a preparatory case study for a larger data collection. The data was collected in 2015-2016 by interviews (N=8) and was analysed qualitatively by thematic analysis. Eight themes were identified describing the experiences of the teachers: 1) Expectations of systematic procedures, 2) Relaxation and unwinding, 3) Sense of community, 4) Memories of early career, 5) Practical benefits, 6) Professional reflection, 7) Empowerment and 8) Adapting a role of teacher educator.

**Technology-enhanced learning: Content and prosodic features of teacher–student interactions**

**Keywords:** Computer-supported collaborative learning, Social interaction, Teaching / instruction, Teaching approaches

**Presenting Author:** Raja Hamalainen, University of Jyväskylä, Finland
**Co-Author:** Teija Waaramaa, University of Tampere, Finland
The recent developments in the technological landscape have an important influence on teacher-student interaction. Computer-supported collaborative learning (CSCL) research on teacher-student interaction has often concentrated more on opening up the context of discussions during an interaction than on understanding the meaning of prosodic features of interaction. However, although the context of a conversation is crucial to understanding interaction in learning, the way the message is conveyed is also important. Therefore, we argue that prosodic aspects (features of speech such as intonation, volume and pace) of interactions are important in CSCL classrooms. The aim of this multidisciplinary study was to combine content and prosodic perspectives to delve into the features of teacher-orchestrated classroom interactions (a teacher with 27 students) during two months' technology-enhanced physics lessons at a secondary school. This presentation reveals a new understanding of the speech prosody of teacher-student interactions. Our results indicate that prosodic aspects of teacher-student interactions are important (e.g. a teacher's raising intonation in signalling supportiveness). The findings indicated that teachers applied different voice prosody in their discussion activities regarding disputational, cumulative and explanatory talk (see, Mercer & Wegerif, 1999) as well as teacher presentation, group organising and "other" talk. We illustrate how the teacher's intonation varies depending on the situation and the dialogic of the speech. Furthermore, we illustrate prosodic challenges that emerged when teachers act in authentic classroom. In the future, better understanding of prosodic and content features of teacher-student interaction may open up novel ways for orchestrating technology-enhanced learning.

Session P 408
2 September 2017 08:45 - 10:15
Main Building E - E530
Single Paper
Learning and Social Interaction

Paper Presentation: Social Interaction in Learning and Instruction - C
Keywords: Computer-supported collaborative learning, Conversation / Discourse analysis, Cooperative / collaborative learning, Educational Psychology, Informal learning, Inquiry learning, Literacy, Mathematics, Science education. Secondary data analysis, Social interaction, Teaching / instruction
Interest group: SIG 10 - Social Interaction in Learning and Instruction
Co-Author: Susanne Riis, University of Agder, Norway
The effects of multimodal representations and discourse on students during inquiry science
Keywords: Cooperative / collaborative learning, Educational Psychology, Inquiry learning, Science education
Presenting Author: Rodney Gilles, The University of Queensland, Australia
Co-Author: Berrie Bafour, The University of Queensland, Australia
The study sought to determine the effects of teacher-introduced multimodal representations and discourse on students' task engagement and scientific language during cooperative, inquiry-based science. The study involved eight Year 6 teachers in two conditions (4 very effective teachers & 4 effective teachers) who taught two units of inquiry-based science across two school terms. The results show that the very effective teachers spent significantly more time engaged in using embodied representations to illustrate points or communicate information. They also spent significantly more time engaged in interrogating students' understandings and scaffolding and challenging their thinking than the effective teachers. In turn, the students in the very effective teachers' classes spent significantly more time on task and used significantly more relevant and scientific language to explain the phenomena they were investigating than their peers in the effective teachers' classes. These are behaviours and language that are associated with successful learning in science.

Sibling effects on achievement test scores in large scale assessments
Keywords: Informal learning, Literacy, Mathematics. Secondary data analysis
Presenting Author: Christine Schröder, German Institute for International Educational Research (DIPF), Germany
That siblings do have an effect on achievement test scores in large scale assessments is less an issue of debate than the explanation of such effects. Two concurrent models can be pointed out, the parental dilution explanation and the confluence model. In the presentation the characteristics of both models in predicting age-specific achievement test score patterns by number of children and birth order will be carved out. The comparison of the predicted patterns with the empirical patterns in German and Austrian national samples of TIMSS, PIRLS, and PISA speaks for the validity of the confluence model, as well as for the tutoring effect, as a part of this model. This is especially true as the only child handicap, which is a unique feature of the confluence model, remained significant under control of SES, migration background, sex, and the appraisal in a single-parent or a stepfamily family. The last mentioned factors stand for alternative explanations for the only child handicap, representing the so-called admissible hypothesis. However, more profound tests of the only child handicap, or a more direct tests of the tutoring effect, which within the framework of the confluence model is assumed to cause the only child handicap, are needed. Such evidence for the tutoring effect could underdine the argumentation for and acceptance of learning settings, where tutoring behavior by a more competent interaction partner is part of the setting.

Exploring whole class dialogues in computer-supported science learning settings
Keywords: Computer-supported collaborative learning, Conversation / Discourse analysis, Science education, Teaching / instruction
Presenting Author: Ainniken Forberg, University of Oslo, Norway
Co-Author: Kenneth Sliath, University College of Southeast Norway, Norway
This paper reports on a study of consolidation activities in whole class settings, i.e. activities where the teacher-student dialogues intend to share, summarize and thematizes the experiences made by student during exploratory group work activities. Previous research has shown that, the teacher frequently acts as an important resource, providing various forms of help during students' learning activities. This study aimed at exploring the dialogic sequences in whole class settings taking place prior to and after group work settings where students solves small scale, and often explorative tasks designed by the teacher. By analyzing the interactions between secondary school students and their teacher during a science project, the current study provides insight into the dialogic achievements within whole class activities. The analyses suggest that the teacher provided valuable support in the form of procedural regulation and elicitation of students conceptual understandings and conceptual elaborations. Most importantly however, the teacher provided support by directing students' orientations away from a focus on how to solve the tasks and towards a focus involving development of conceptual understanding on a more general level. The paper is detailing the discursive strategies used by the teacher.

Supporting students' conceptual sense-making with multimodal representations in science learning
Keywords: Computer-supported collaborative learning, Science education, Social interaction, Teaching / instruction
Presenting Author: Line Ingulseth, University of Oslo, Norway
This paper reports on a study exploring how multimodal representations are aimed at visualizing scientific principles and phenomena can be used as conceptual sense-making resources in computer-supported science activities. More specifically, the paper scrutinizes how multimodal representations become structuring resources in teacher-student interactions taking place within dialogic whole-class and group work settings. Taking a socio-cultural perspective, multimodal representations are seen as cultural artifacts that mediate actions and activities in the social practices that constitute teaching and learning. The empirical basis of the study is a science project about climate change and sustainable development, where various forms of multimodal representations constituted the very core of the activities taking place. By means of micro-analyses of teacher-student interactions, we demonstrate how multimodal representations become productive social and cognitive resources in teacher-student interactions both in whole-class and group work settings. The analyses show how the meaning potentials of multimodal representations are shared and negotiated within and across classroom settings. Furthermore, the study demonstrates the crucial role of teacher guidance to engage students in conceptually oriented talk. The findings will be discussed according to possible implications for teaching and learning with representations and design of instruction.

Session P 409
2 September 2017 08:45 - 10:15
Virta - 113
Single Paper
Higher Education, Instructional Design

Paper Presentation: Comprehension of Text and Graphics - B
Keywords: Argumentation, Comprehension of text and graphics, Educational Psychology, Instructional design, Literacy, Multimedia learning, Quantitative methods, Reading comprehension, Reasoning Interest group: SIG 02 - Comprehension of Text and Graphics
Chairperson: Janet van Drie, University of Amsterdam, Netherlands
What degree of instructional support is helpful for learner-generated drawing?
Keywords: Comprehension of text and graphics, Educational Psychology, Quantitative methods, Multimedia learning
Presenting Author: Steffen Schmidgall, Leibniz Institut für Wissensmedien (IWi), Germany
Co-Author: Alexander Ettel, University of Freiburg, Institute of Psychology, Germany
Co-Author: Katharina Schiele, Leibniz Institut für Wissensmedien, Germany
Learner-generated drawing may be a task that is too demanding when learners draw on blank paper and receive no support. Therefore, we investigated the role of support on drawing, contrasting three drawing groups with different degrees of support (no vs. low vs. high support) with a non-drawing control group. N=156 university students read a text about human swimming behavior and then took three learning outcome tests. In line with our hypotheses, we found a beneficial effect of drawing on higher-order knowledge (transfer and visual/spatial knowledge tests). Unexpectedly, the low and high support groups did not outperform the no support group. Participants in the high support condition might have engaged merely in operating the interface instead of learning substantially. Also, the illustrations used in the low support condition might have interfered with participants’ mental representation of the learning content. Future research should investigate which types of support might be helpful under which conditions.
Task Experience and Layout Influence the Negative Effect of Unnecessary Information on Learning

Keywords: Comprehension of text and graphics, Educational Psychology, Instructional design, Multimedia learning

Presenting Author: Giertjan Rop, Erasmus University Rotterdam, Netherlands
Co-Author: Anne Schueler, Leibniz Institut für Wissensmedien (IWi, Germany)
Co-Author: Peter Verkooijen, Erasmus University Rotterdam, Netherlands
Co-Author: Katharina Schelker, Leibniz Institut für Wissensmedien, Tübingen, Germany
Co-Author: Tamara Van Gog, Utrecht University, Netherlands

When designing multimedia instructional materials presenting irrelevant or unnecessary information should be avoided, because it hinders rather than helps learning. However, a recent study seemed to indicate that task experience might be a boundary condition to this negative effect: students learn to ignore unnecessary information with task experience. This study was conducted using learning materials of identical layout, but varying the process of the unnecessary information was always presented at the same location. Therefore, in the present study we examined whether task experience is a robust boundary condition to the negative effect of unnecessary information, by using more complex materials, and varying the layout of the task (unnecessary information integrated in or separated from the relevant information). Participants learned a password-list using a slide-show consisting of six slides, and after each slide their knowledge of the preceding slide was tested. Results showed that the unnecessary information significantly hampered learning only when it was presented separated from the relevant materials. The negative effect on learning no longer occurred after participants gained task experience, thus it seems that participants were able to adapt their study strategy also when learning with more complex materials. However, we only found this effect if the unnecessary information were presented on the right hand side of the screen. This surprising finding may be interesting but it failed to establish its robustness. When replicated, it suggests that it is important to not only consider study strategies, but also reasoning direction when designing multimedia research and designing instructional materials.

Memory for textual conflicts predicts sourcing when adolescents read multiple expository textbooks

Keywords: Comprehension of text and graphics, Educational Psychology, Literacy, Reading comprehension

Presenting Author: Elisabeth Stang Lund, University of Oslo, Faculty of Educational sciences, Norway
Co-Author: Ina Bøtter, University of Oslo, Norway
Co-Author: Eva Venndes Brante, University of Oslo, Faculty of Education, Norway
Co-Author: Hege Stremme, University of Oslo, Norway

Abstract: Eighty-six Norwegian 11th-graders read four texts that discussed two conflicting issues concerning the relationship between sun exposure and physical and mental health, respectively. Before reading the texts, participants were asked about the topic and interest in health issues were assessed, and after reading, their self-reported critical reading strategies, memory for conflicting content information, and sourcing in the form of attributing key information from the texts to their respective sources were measured. After having removed variance associated with gender, prior knowledge, and interest in the first step of a forced-order hierarchical multiple regression analysis, memory for conflicting content information (but not self-reported critical reading strategies) emerged as a unique positive predictor of sourcing performance. This finding has theoretical importance because it shows that representing conflicting content information also may contribute to sourcing performance among adolescents reading multiple expository texts on a controversial issue. In terms of educational practice, this study highlights the importance of helping adolescents to notice conflicting information when reading multiple texts because such processing, in turn, may facilitate the construction of mental representations that also take source information into consideration.

Should I get a flu shot? The contribution of critical thinking to argumentation skills

Keywords: Argumentation, Comprehension of text and graphics, Reading comprehension

Presenting Author: Christian Tarchi, University of Florence, Italy

In this study we investigated the relationship between critical thinking skills, multiple documents reading, and the quality of learners’ arguments following reading. Fifty Italian university students participated in this study. We assessed students’ self-perception of cognitive systems, critical thinking skills, epistemic cognition, prior beliefs, topic interest, and topic knowledge. Then, students were asked six readings reporting divergent perspectives on the topic of vaccination. Finally, students wrote a short argumentative essay in which they were asked to give their opinion on flu vaccination, basing their justification on the texts that they had just read. The results of the univariate ANOVA revealed that students who wrote short essays with a sounder argumentation were characterized by lower rational and experiential scores, and by higher critical thinking skills. This study confirms the importance of source evaluation and hypotheses testing skills in elaborating a sound argument supporting a decision after reading multiple and conflicting documents on a controversial topic.

Session P 410

2 September 2017 08:45 - 10:15
Liena - K103
Single Paper
Higher Education

Paper Presentation: Higher Education - F

Keywords: Higher education, Learning approaches, Metacognition, Qualitative methods, Student learning, Teacher Professional Development, Teaching / instruction, Teaching approaches, Technology

Interest group: SIG 04 - Higher Education

Chairperson: Mari Luise Bäkle, Université de Sherbrooke, Canada

Relations between students’ perceptions of the teaching-learning environment and engagement

Keywords: Higher education, Qualitative methods, Student learning, Teaching / instruction

Presenting Author: Kaire Liljeholm, University of Turku, Estonia
Co-Author: Jari Kaarm, University of Turku, Estonia
Co-Author: Lisa Postareff, University of Helsinki, Finland

The quality of learning is influenced by both students’ individual characteristics, the level and quality of engagement and by students’ perceptions of the teaching-learning environment (TLE). Previous studies have explored a relationship between students’ perceptions of the enhancing and impeding factors of the TLE and cognitive engagement (i.e. approaches to learning) and have found that students employ different approaches to learning perceive different factors as enhancing or impeding. Previous studies has mainly focused on exploring students’ perceptions of TLE at the curriculum level, but the current study explores students’ perceptions of the enhancing and impeding factors of the TLE at the course level. In addition, the aim is to investigate how students’ perceptions are related not only with their cognitive engagement but also with their behavioral engagement. The data consisted of 33 semi-structured interviews and behaviours from three different undergraduate university courses. The data was analysed using qualitative content analysis. The findings showed that students’ perceptions of the enhancing and impeding factors of the TLE were related to 1) course design 2) teaching practices and 3) assessment practices. The engagement factors were related to emotional, cognitive and behavioural engagement, but impeding factors were mostly related with emotional and behavioural disengagement. The results imply that it is important to support academic staff in developing courses which support students’ emotional and behavioural engagement along with cognitive engagement.

Are distance education students different than college students in their learning strategies use? - Session P 410

Keywords: Higher education, Learning approaches, Metacognition, Student learning

Presenting Author: Kari Kleivins, Open Universiteit Nederland, Netherlands
Co-Author: Colette Meij, Open University, Netherlands
Co-Author: Niels van den Negen, Open University of the Netherlands, Netherlands
Co-Author: Jérôme Gjelsaers, Open University of the Netherlands, Netherlands
Co-Author: Ruslan Leontjavas, Open University, Netherlands
Co-Author: Paul A. Kirschnor, Open University, Netherlands
Co-Author: Renato de Groot, Open University of the Netherlands, Netherlands

Distance education students are known to employ more different learning methods than students in traditional education. To make learning more effective and increase students’ learning outcomes, it is important to make learning more effective and increase knowledge acquisition and comprehension. Information regarding learning strategy use of students can be very useful for students and counselors to enhance learning and for educational institutes to improve their education. Since lifelong learning and continuous professional development become prominent, there is an increase in adult students that are enrolled in distance education (DE). Students within DE may use other learning strategies than students within traditional education. A widely used instrument to inquire learning strategies use is the Motivated Strategies for Learning Questionnaires (MSLQ), which is based on strategy use by college students. Since differences between DE students and college students in strategy use were expected, we aimed to explore the underlying structure of the scale in DE students and to propose a best-fit solution for grouping the items into subscales by means of exploratory and confirmatory factor analyses. In total, 1150 DE students filled out the learning strategy part of the MSLQ. The analyses revealed a differential factor structure of five factors for DE students (as in contrast with the nine factors found for college students). The findings can be explained by a differential interpretation of the items based in differences between educational systems (traditional vs distance education) and age (younger vs older students). Based on these findings, we recommend to use the newly reported subscales for (adult) students within online distance education in which the students can determine their own level of learning using an accordant study plan.

Using the Double-edged Sword: Instructors’ Approaches to Diversity at a University in Hong Kong

Keywords: Higher education, Qualitative methods, Teaching / instruction, Teaching approaches

Presenting Author: Tracy Zou, The University of Hong Kong, Hong Kong

With the growing emphasis on interdisciplinarity and internationalisation in higher education, the classroom today becomes more diverse and culturally diverse. A high level of diversity may create precious opportunities for student learning but could also generate tensions for teachers and students. It is sometimes referred as a ‘double-edged sword’. This study aims to explore strategies and practices adopted by instructors in teaching a diverse classroom. Fourteen interviews have been conducted with instructors who taught Common Core courses in one university at Hong Kong. Common Core courses have been designed to broaden students’ horizons and develop their cultural awareness and competence. A Common Core class contains students from all disciplines and different cultures. The results show that the instructors were aware of the different backgrounds of students. Most felt it had made teaching more challenging and some had leveraged the diversity to create an energetic learning environment. Four major types of good practices have been identified: (1) providing specific guidance and support; (2) encouraging exploration of disciplinary and cultural related topics; (3) facilitating meaningful interdisciplinary and intercultural interactions; and (4) using students’ experiences as resources to enhance engagement. The findings also suggest that the disciplinary differences were perceived to exert a larger impact on the teaching and learning practices than the cultural differences based on nationalities.

Students’ perception of flipped classroom in university courses

Keywords: Higher education, Teacher Professional Development, Teaching approaches, Technology

Presenting Author: Eniko Sioini, University of East Finland, Finland
Co-Author: Teemu Valtosen, University of Eastern Finland, Finland
Professionals in learning and instruction are seeking ways to change teacher-centered approaches towards more student-centered approaches in higher education. One way to enable this change is the Flipped Classroom (FC) pedagogical model, in which lectures still exist but are arranged with the assist of technology (e.g., video materials, online learning platforms with online materials etc.) allowing students to study the lessons with more unrestricted time (time/location flexibility). Additionally, with the FC model, students are more prepared beforehand to the contact meetings (i.e. classes, demonstrations) and can engage in active, student-centered learning approaches with fellow students in order to learn the content area more in depth. Teacher role is more seen as instructor, guide or mentor for learning the content area. The main aim of this study was to investigate FC model within two university-level courses. Students’ general attitudes towards FC design were studied with posttest questionnaire. Additionally, preliminary results of personal perceptions for mastering tasks (Self-efficacy for learning) and learning tasks (Intrinsic goal orientation) were investigated with pre-posttest design. According to initial results (N = 38), majority of the students considered FC design as suitable way of learning them and were willing to participate in similarly designed courses. Also, initial positive change for Self-efficacy and Intrinsic goal orientation was found. The FC design, results and study significance for higher education learning are discussed. These initial results will be confirmed with larger sample in the EARLY 2017 conference.

Session P 411

2 September 2017 08:45 - 10:15
Main Building A - A05
Single Paper
Higher Education, Learning and Special Education

Paper Presentation: Special Educational Needs

Keywords: Achievement, Case studies, Educational Technology, Higher education, Learning and developmental difficulties, Learning disabilities, Mathematics, Motivation, Numeracy, Qualitative methods, Student perspectives of learning and teaching, Special education, Student learning

Interest group: SIG 15 - Special Educational Needs

Chairperson: Nadia Leroy, Université Grenoble Alpes, France

Dyslexia in Adolescents: Sharing Insights from a Longitudinal Study

Keywords: Case studies, Learning and developmental difficulties, Qualitative methods, Social aspects of learning and teaching

Presenting Author: Eva Wanda Brante, University of Oslo, Faculty of Education, Norway

In a longitudinal case study we investigated how 13 male adolescents’ life and schooling were affected by their dyslexia. Semi-structured interviews and other assessments were developed into case studies by dyslexia researchers in thirteen countries. Participants were interviewed twice; at 10 - 12 years of age and about four years later. The aim was to provide understanding of the impact of dyslexia over time through the study of adolescents’ personal perspectives. The Frostig Center studies have revealed the predictive value of six success attributes, in relation to academic achievement. This paper focuses on three of the success attributes; self-awareness, use of effective support systems and appropriate goal setting, which turned out to be strong for these adolescents. Overall, the predominant themes that emerged from the interviews was one of healthy adjustment. Moreover, ten of the adolescents were doing very well academically. However, three boys appeared to be at considerable risk as they showed less hopeful thinking, lower self-efficacy, and insufficient evidence of important success markers.

Even though these adolescents still struggle with decoding and are largely dependent upon technological accommodations, the majority of them demonstrate remarkable resilience in the face of dyslexia. When the success attributes are strong, students are better equipped to manage schooling. Thus, we encourage teachers all over the world to persistently build on the success attributes, thereby providing students with dyslexia these essential capacities for handling educational challenges.

Barriers for Universal Design for Learning (UDL) among higher education students with disabilities

Keywords: Higher education, Qualitative methods, Special education, Student learning

Presenting Author: Júlia Gritli Frexenet, Vrije Universiteit Brussel (VUB), Belgium

Co-Author: Katrin Struyven, Vrije Universiteit Brussel (VUB), Belgium

Co-Author: Caroline Andries, Vrije Universiteit Brussel (VUB), Belgium

Due to an over reliance on self-advocacy, the traditional model often fails to take into account the needs of students with disabilities in higher education. The Universal Design for Learning (UDL) framework offers a promising alternative, as UDL aims to support access, participation, and progress for all learners, resulting in an accessible and more beneficial learning environment for students with disabilities. The main objective of this qualitative study is to explore whether the UDL framework addresses the students with disabilities’ perceptions of learning needs within the traditional model effectively. Findings suggested that students’ perceptions align well with the UDL principles, especially with the third principle (i.e., multiple means of engagement). In addition, we found barriers when implementing UDL, as meeting the learning needs for some students can create barriers for others. In order to overcome these weaknesses, UDL needs to address the individual learning needs in a direct way, and not only through environment and curricula changes. Therefore, this study argues strongly for a flexible implementation of UDL, while carefully monitoring students’ progress.

Evaluation of a computer-based training for enhancing arithmetic skills in math-disabled children

Keywords: Educational Technology, Learning disabilities, Mathematics, Numeracy

Presenting Author: Joerg Tobias Kuhn, WWU Muenster, Germany

Co-Author: Christian Schwer, WWU Muenster, Germany

Co-Author: Leonie Ebert, WWU Muenster, Germany

Co-Author: Julia Raddatz, WWU Muenster, Germany

Co-Author: Christian Dobel, University of Jena, Germany

Co-Author: Heinz Holling, WWU Muenster, Germany

Children with mathematical learning disability (MLD) often display substantial deficits in mathematical skills, which may result in substantial impairments in their educational progress and mental health. This study evaluated a computer-based training for elementary school children with MLD (grades 2–4), focusing on basic aspects of number processing, calculation skills, arithmetic fact retrieval, and working memory. During a 19-week intervention period, a less impaired group of children with MLD (N = 30, percentile rank math ability < 25) received the computer-based training and was compared to a waiting control group of 19 children with a more severe form of MLD (N = 17, percentile rank math ability > 10) received a weekly small group numeracy intervention in addition to the computer-based training (waiting control group) N = 18. Results showed that the less impaired MLD group displayed substantial gains in curricular arithmetic, fact retrieval, and several basic numerical skills at posttest compared to the control group (U = 46, z = 1.00), whereas the more severely-impaired MLD group displayed gains mainly in fact retrieval (zr = 91 – 1.30). At follow-up three months after posttest, stable training effects were found in a measure of curricular arithmetic (z = 38) in the less impaired MLD group. Overall, results show that mathematical skills in children with MLD can be effectively improved and transfer to curricular domains can be achieved, although establishing stable training effects for stable gains requires further research.

The development of at-risk children’s reading skills and motivation during early school years

Keywords: Achievement, Learning disabilities, Motivation, Special education

Presenting Author: Marja-Kristina Leinikainen, University of Jyväskylä, Finland

Co-Author: Noona Kuru, University of Jyväskylä, Finland

Co-Author: Anna-Maija Pokkeius, University of Jyväskylä, Finland

Early identification of children at risk for reading disability is important to be able to plan intervention to support their reading development from the beginning phases of instruction. This study examined the development of at-risk children’s reading skills and motivation during early school years. The participants were 257 children who had been identified to have an early risk for reading disabilities based on pre-testing at the end of kindergarten in longitudinal First Steps study. Children’s reading skills were followed from school entry until the end of grade 2. The results showed that children who gained age level at the end of grade 2 in reading or phonological skills, had better name and listening comprehension skills than children who lagged behind of age level already in kindergarten. Children who lagged behind of age level, in turn, showed poorer self-concept in reading and more task-avoidance behavior already prior to school entry than children who gained age level. The challenge to early identification is that among at-risk children there are clear differences already at kindergarten which might be difficult to identify.

Session P 412

2 September 2017 08:45 - 10:15
Virta - 114
Single Paper
Cognitive Science, Educational Policy and Systems, Learning and Social Interaction, Learning and Special Education

Paper Presentation: Learning and Development in Early Childhood - D

Keywords: Assessment methods and tools, At-risk students, Cognitive development, Cognitive skills, Developmental processes, Early childhood education, Educational Psychology, Language (L1/Standard Language), Literacy, Meta-analysis, Motivation and emotion, Social development, Social interaction, Special education, Video analysis

Interest group: SIG 05 - Learning and Early Development

Chairperson: Tim Corcan, Deakin University, Australia

Dancing Babies: Stimulation from Supporting Maternal Interaction Behavior in Infancy

Keywords: Early childhood education, Educational Psychology, Social interaction, Video analysis

Presenting Author: Arija Libinje, University of Bamberg, Germany

Co-Author: Christian Schleucher, University of Bamberg, Germany

Co-Author: Jan-David Freund, University of Bamberg, Germany

The distinction of interaction behavior along the dimensions of stimulating and emotional supporting interaction behavior has been found to be fruitful, as both aspects are shaped differently and associated with different background variables. Application of this differentiation has been expanding from older children to the age group of toddlers in recent years. Yet, it is still not clear whether it is also applicable to interactions with children in their first year of life, because research at this age mainly focusses emotional supporting interaction behavior. In expansion of the research field we investigate (1) the extent of
emotional supporting and stimulating interaction behavior and (2) their associations to maternal, child, and context characteristics. Using data from the German National Educational Panel Study our analyses are based on data of videotaped play situations between mothers and their 7 month old children (n=2190). Results indicate that mothers show both, stimulating interaction as well as emotional supporting behavior. Moreover, CIS-regression analyses revealed that maternal education was significantly associated with both, emotional supporting behavior as well as stimulating behavior, while household income and child temperament were only associated with stimulating interaction behavior.

Differences and similarities in children’s acquisition of different implicature types

Keywords: Cognitive development, Cognitive skills, Developmental processes, Language (L1/Standard Language)

Presenting Author: Gerlinde Große, Frükhildische Bildungsforschung, Germany
Co-Author: Cornelia Schöne, Leipziger Universität, Germany
Co-Author: Michael Tomasello, Max Planck Institute for Evolutionary Anthropology, Germany
Co-Author: Napoleon Kattoo, University of Cambridge, UK, United Kingdom

In the current study, we compared the development of two kinds of quantity implicatures, ad-hoc and scalar, in 3- and 5-year-old German-speaking children and adults. We explored children’s performance in a child-friendly referential choice task, manipulating three factors: age (3 years, 5 years, adult), the saliency of the alternative term (mention of the stronger alternative term before or after encountering the critical term), and the implicature type (ad-hoc, e.g. ‘a car’ vs. ‘a doll and a car’ or scalar, e.g. ‘all apples’ vs. ‘some of the apples’). While the older children and adults were skillful on both types of implicature, the 3- year-olds found the ad-hoc easier than the scalar. For participants of all ages, performance in both implicature types was sensitive to the saliency of the alternative term. These results are compatible with a unitary view of pragmatic inferencing, according to which the two kinds of quantity implicature are generated by the same inferential mechanisms. Nevertheless, aspects of the data also suggest two non-pragmatic processing factors that differentially influence the two implicature types: “Semantic underspecification” of quantifiers in language acquisition and “quantifier domain restriction” in processing multiple displays.

Impact of Early Childhood Education and Care on Socioemotional Development: A Meta-Analyis

Keywords: Early childhood education, Meta-analysis, Social development, Motivation and emotion

Presenting Author: Hannah Ufert, Freie Universität Berlin, Germany
Co-Author: Ana Susac, Freie Universität Berlin, Germany
Co-Author: Yvonne Anders, Freie Universität Berlin, Germany

The meta-analysis provides a quantitative synthesis of longitudinal evidence of the impact of variations in quality and quantity of center-based Early Childhood Education and Care (ECEC) on socioemotional outcomes in Europe. The preliminary coding for the effects of global process quality (e.g., warm and responsive interactions measured by CIS, ECERS-R or CLASS) and promotion of early learning (e.g., measured by ECERS-E or ELLICO) produced 109 separate findings from 14 large-scale longitudinal studies, gathering knowledge for around 12,000 children from 10 European countries. Preliminary results of a three-level longitudinal meta-analysis that showed increased positive modifications on the socioemotional outcomes (Cohen’s $d = .16 < .01$) whereas there is no benefit from higher global process quality. Preliminary review for the effects of quantity (e.g. variations in intensity and duration of ECEC) and structural quality (e.g. staff qualification, group size) reveals a complex picture which will be further clarified using the meta-analytic approach. To follow is also a mixed-effects moderator analysis examining potential moderators of effects including age, phase of academic career, measure of ECEC effects, type of outcome, and source of information on outcome. The results complement existing meta-analytic evidence on cognitive development, and carry impact for policy-makers, indicating which aspects of ECEC demand increased attention due to their direct contributions to children’s development.

Teachers Assessing Pre-Reading Skills

Keywords: Assessment methods and tools, At-risk students, Literacy, Special education

Presenting Author: Ritta Finnekoski, University of Jyväskylä, Finland
Co-Author: Marja-Kristiina Lerkkanen, University of Jyväskylä, Finland
Co-Author: Mikko Ars, University of Jyväskylä, Finland
Co-Author: Leena Holoapanen, University of Eastern Finland, Finland
Co-Author: Kenneth Eklund, University of Jyväskylä, Finland

The aim of the study was to investigate to what extent teachers were able to identify difficulties in pre-reading skills (letter knowledge and phonological skills) of especially the lowest achieving students. The accuracy of teacher ratings of students’ pre-reading skills was studied by comparing teacher ratings to actual test scores. The data has been used from two Finnish longitudinal studies: Sample 1 (class teachers, n = 91; special education teachers, n = 51) and Sample 2 (class teachers, n = 136; special education teachers, n = 34). In this study scoring in the test below the 15th percentile was the indicator of low achievement in reading difficulties. The results showed first that the teacher ratings correlated quite well with the test scores. However, closer investigation of sensitivity and specificity of the teacher ratings revealed that a number of children in need of intensified support for their early reading development remained unidentified and on the other hand there were some students identified despite test scores being within normal range. The findings underline the importance for developing more systematic and reliable assessment tools for pedagogical purposes, and respectively, the need to pay special attention to issues related to early identification and assessment of reading difficulties in teacher training.

Keywords: at-risk students, assessment methods and tools, special education, literacy

Session P 413

2 September 2017: 08:45 - 10:15
Pensio B - B1096
Single Paper
Motivational, Social and Affective Processes, Teaching and Teacher Education
Paper Presentation: Motivation and Emotion - D

Keywords: Achievement, Educational Psychology, Emotion and affect, experimental, effects of education, Higher education, Motivation, Secondary education, Self-regulation, Teaching approaches
Interest group: SIG 08 - Motivation and Emotion
Chairperson: Jakob Tesch, DZHAW - German Centre for Research on Higher Education and Science Studies, Germany

Can Students Differentiate Between Dimensions of Need-Supportive Teaching? An Experimental Study

Keywords: Experimental studies, Higher education, Motivation, Teaching approaches

Presenting Author: Martin Leenknecht, Roosevelt Center for Excellence in Education, Netherlands
Co-Author: Lisette Wisnia, Erasmus University Rotterdam & University College Roosevelt, Netherlands
Co-Author: Sofie Loyens, University College Roosevelt, Netherlands
Co-Author: Ramsius, Koen Rikkers, UCIR, Utrecht University, Netherlands

Students’ basic psychological needs (need for autonomy, competence, and relatedness) should be supported by teachers by providing autonomy support, structure, and showing involvement, in order to enhance students motivation and achievement. In current study, the origin of students’ perceptions of need-supportive teaching is studied. Central research question is: Can students differentiate between the dimensions of need-supportive teaching (i.e., autonomy support, structure, and involvement), or are their perceptions intertwined? This was studied using scenarios in which one of the three dimensions of need-supportive teaching was emphasised while the others were kept neutral. Students perceptions of the teacher in the scenarios were compared. Results show that teachers that are autonomy supportive or providing structure are perceived as involved as well. Although, involved teachers are not automatically perceived as autonomy supportive and providing structure. The results indicate that students are able to differentiate in their perceptions and that these perceptions are not intertwined. This also means that it is not sufficient for teachers to only support one of the three dimensions. Further research should focus on contextual factors influencing students perceptions of need-supportive teaching.

An intervention fostering abilities to regulate achievement emotions with secondary school students

Keywords: Educational Psychology, Emotion and affect, Secondary education, Self-regulation

Presenting Author: Daniela Racanello, University of Verona, Italy

Achievement emotions and related antecedents such as emotion regulation strategies have recently received particular interest for both their theoretical and applied importance (Pekrun & Linnenbrink-Garcia, 2014). Notwithstanding the large amount of studies focused on the development of emotion regulation abilities, scarce attention has been paid to specific interventions aiming at developing them within learning contexts. Therefore, we involved 62eight-graders (included in an experimental or in a control group) to test the efficacy of a two-unit intervention program aiming at fostering abilities to regulate five negative achievement emotions, embedded within the domain of Italian. In a pre and in a post-intervention phase, we measured students’ abilities to report functional emotion regulation strategies, the intensity of ten
achievement emotions related to Italian, and students’ emotion regulation abilities in non-school contexts. Only for the experimental group, after the intervention the number of spontaneously reported functional strategies increased, while the intensity of anxiety and anger related to Italian decreased. However, emotion regulation abilities related to non-school contexts did not vary. Acknowledging limitations such as the short duration of the intervention or the absence of generalisability of its effects to non-school contexts, we provided evidence-based indications on the goodness of the proposed program. From an applied perspective, our findings encourage the development of further intervention programs involving also younger students, based on the awareness of the role played by achievement emotions within school contexts.

University Student’s Daily Affect, Sleep, and Motivation: Are they related to Learning Outcomes?

Keywords: Educational Psychology, Emotion and affect, Higher education, Motivation

Presenting Author: Tanja Körner, Goethe University Frankfurt; Institute of Psychology, Germany
Co-Author: Julia Karchbach, Goethe-Universität Frankfurt, Germany

The importance of sleep, affect, and motivation for learning are well known on a trait level, but we are just beginning to understand the role of their daily states. Important first work demonstrated that higher daily sleep quality was associated with improved daily affect and self-perceived learning goal achievement (Flueckinger et al., 2016). Thus, it would be crucial to know if such daily states are also related to long-term learning outcomes and if they can contribute to explain their development.

A sample of 146 students (age 19-31, 90% female) reported on their last night’s sleep, their current affect and current motivation at the end of a weekly bachelor class in psychology (as minor subject). They reported on average on 8.87 sessions (Nobs =1295). Further, they answered a multiple-choice pre- and post-test on the course topic at the beginning and end of the term.

Using multilevel modelling, we found that higher sleep quality was related to higher positive affect on the within- and between-person level. Sleep quality was also positively related to motivation (effort and enjoyment) but only on the between-person level. Sleep duration was unrelated to both affect and motivation. Further, positive affect predicted effort and enjoyment on the within- and between-person level.

Interestingly, both average sleep duration and intradividual variability in sleep duration predicted post-test performance.

Thus, sleep quality was related to directly self-perceivable daily functioning and sleep duration and variability were related to long-term learning outcomes. These findings illustrate how educational psychology can benefit from a short term micro-longitudinal perspective.

Dimensional Comparison Effects of Students’ Achievements in Multiple Domains on their Task Values

Keywords: Achievement, Educational Psychology, Motivation, Secondary education

Presenting Author: Hanna Gaspard, University of Tübingen, Germany
Co-Author: Yi Jiang, University of Tübingen, Germany
Co-Author: Hertl Marsh, Australian Catholic University, Australia
Co-Author: Benjamin Nagenast, Eberhard Karls Universität Tübingen, Germany
Co-Author: Ulrich Trautwein, University of Tübingen, Germany
Co-Author: Allan Wiesth, University of Maryland, United States

Different motivational theories assume that students’ motivation is shaped by intradimensional comparisons across different domains. Expectancy-value theory (Eccles et al., 1983) assumes that students’ intradimensional hierarchies of expectancies and values predict their academic choices, whereas dimensional comparison theory (Möller & Marsh, 2013) assumes that students’ academic self-evaluations are affected by dimensional comparisons of their achievements in different domains. Integrating these theories, the present study investigated how students’ task values can be predicted by their achievement in multiple academic subjects. Previous studies had shown dimensional comparison effects on intrinsic value and related constructs such as interest. This study aimed at extending these findings by investigating these effects across different subjects and for different dimensions of task value. In a sample of over 800 German students from Grades 5 to 12, students’ task values and achievement were assessed in five academic subjects (i.e., German, English, math, biology, physics). The results for dimensions of task value closely related to components of interest (i.e., intrinsic and attainment value) largely supported the assumptions of dimensional comparison theory: Strong evidence was found for negative contrast effects between achievement and value in “far” domains such as math and languages. There were also some positive assimilation effects between achievement and value in “near” domains such as math and physics. Less pronounced dimensional comparison effects were found for facets of utility value. The findings further our understanding of the development of domain-specific task values. Implications of the domain specificity of task values for intervention research are discussed.

Session P 414
2 September 2017 08:45 - 10:15
Main Building C - C6
Single Paper
Assessment and Evaluation, Higher Education

Paper Presentation: Assessment and Evaluation - B

Keywords: Assessment methods and tools, Competencies, Design based research, Higher education, Learning Technologies, Mixed-method research, Motivation, Quantitative methods, Social aspects of learning and teaching, Student learning

Interest group: SIG 01 - Assessment and Evaluation

Chairperson: Sarah Howard, University of Wollongong, Australia

How to evaluate the learning outcomes of digital storytelling?

Keywords: Assessment methods and tools, Design based research, Learning Technologies, Student learning

Presenting Author: Veera Kallunki, University of Helsinki, Finland
Co-Author: Marianne Weitlou, University of Helsinki, Finland
Co-Author: Hannes Niemi, University of Helsinki, Finland

In this presentation a new tool for analyzing the learning outcomes of digital storytelling is discussed. Digital storytelling - a rapidly generalizing educational pedagogy - has lacked concrete evaluation tools that can be used in teaching and research. Digital storytelling is a pedagogy that connects online technologies and storytelling, making it possible for students to tell their own story relating to the topic to be learned. The pedagogy has been shown to have positive effects on learning in many school subjects, and is reported to promote twenty-first century skills and student engagement. However, although the positive effects of digital storytelling are widely known, further research needs to be done on the reaching of learning outcomes through the use of digital storytelling in teaching. The new perspective offered in this presentation is to evaluate the learning outcomes by reviewing the output itself, the student-generated digital story. In this presentation the findings for the research question, “How can the digital story be evaluated and what kind of aspects should be taken into account in evaluation?” , are discussed. Results are based on a design research where the evaluation rubric was created by utilizing theoretical perspectives from educational research. The evaluation tool was tested by means of multiple perspectives of learning, such as “students’ storytelling skills”, “their cognitive domain of learning”, “social skills and digital competence” can be utilized as an evaluation tool both in schools and in research.

How do academics conceptualise and assess engagement? A review of classroom engagement measures

Keywords: Assessment methods and tools, Higher education, Motivation, Social aspects of learning and teaching

Presenting Author: Joana Tai, Deakin University, Australia
Co-Author: Rola Alijani, Deakin University, Australia

Conceptualisations of student engagement, in the literature, have progressed from early ideas focussing on the actions of students, to more complex theoretical understandings of what an engaged student might do, feel, belong to, and be an holistic view of engagement. National assessments of student engagement in higher education exist largely in a survey format, measuring overall engagement with the university and course they are studying. However, we know less about how individual teaching academics currently conceptualise student engagement as compared to theoretical models of engagement, and national surveys of student engagement. Since they are the “front line” in engaging students, an understanding of academics’ conceptualisations of student engagement could aid in identifying strategies to improve student engagement. Through analysing the tools that classroom educators use to assess engagement, we can better understand their underlying understandings of student engagement. We therefore conducted a review of the literature to identify engagement assessment classroom educators use within higher education contexts. Databases were searched for studies of classroom engagement. A variety of recent methods to assess engagement were analysed. While most consist of a survey focussing on behavioural aspects of engagement, some also contain emotional engagement items. One study also used teacher observations and photographs of the classroom to assess engagement. Published accounts indicate that academics’ conceptualisations of student engagement are still largely behavioural. Holistic conceptions of engagement should be encouraged to promote students’ wellbeing and better learning experiences within higher education.

Assessing self-reflections in medical education using Comparative Judgement

Keywords: Assessment methods and tools, Competencies, Higher education, Quantitative methods

Presenting Author: Liesle Coetjans, Université catholique de Louvain (UCL), Belgium
Co-Author: Marlie Lusterhuis, University of Antwerp, Belgium
Co-Author: Benedicte De Winter, University of Antwerp, Belgium
Co-Author: Ewen De Maeyer, University of Antwerp, Belgium
Co-Author: Nele Michels, University of Antwerp, Belgium

To assess students’ self-reflections in the medical domain, rubrics are commonly used. Recently, however, a new method to evaluate products from performance assessment has been introduced. Comparative judgement (CJ) is based on the assumption that people are able to compare two performances more easily and reliably than assigning a score to a single one. This method has however not been implemented in the domain of medical education. The present study therefore evaluates how the reliability level evolves using this method and how the rank-order obtained relates to the rank-order obtained using rubric ratings. Twenty-two self-reflections were assessed by a group of nine raters using CJ. These were compared by the ratings of two raters who used rubrics. Results indicate that
a reliability level of 0.70 is obtained after ten comparisons per self-reflections. With twenty comparisons per self-reflection, this augments to a reliability level of 0.78. The rank-order using C{\text{J}} correlates strongly with the rank-order using rubrics rating.

**Using comparative judgement for peer assessment**

**Keywords:** Assessment methods and tools,Competences, Higher education, Mixed-method research

**Presenting Author:** Maarten Goossens, university Antwerp, Belgium

**Co-Author:** Marije Lestenhuis, University of Antwerp, Belgium

**Co-Author:** Renaete Bouwer, University of Antwerp, Belgium

**Co-Author:** Roos Van Gasse, University of Antwerp, Belgium

**Co-Author:** Sven De Mayer, university Antwerp, Belgium

Peer assessment has its educational merits but questions can be asked whether it generate reliable and valid scores. Literature suggest that traditional scoring methods can't. A promising new method is comparative judgement (C{\text{J}}), wherein judges choose the best of two presented tasks in light of a certain competence. Research indicates positive results using C{\text{J}} as a peer assessment method. In this study 27 students and 4 teachers judged separately the 27 ERD's of the students and provided each ERD with feedback. Quantitative analyses resulted in reliabilities of the rank-orders of 76% (teachers) and 79% (students) and a spearman rank correlation between the two ranks of .58 (p<0.001) suggesting a poor shared vision of students and teachers. Qualitative analysis of the feedback however showed students were misled by irrelevant features of the task such as background color. Excluding two task based on the qualitative analysis resulted in a spearman rank correlation between the two ranks of .76 (p<0.001) suggesting these two ERD schemes cause the low initial spearman rank-correlation. C{\text{J}} shows to be able to measure competences in a reliable way. Furthermore, in terms of validity we can conclude that peers and teachers have an overall shared vision on the competence but that students generally pay more attention to and can be misguided by irrelevant characteristics of a task. Special instructions for students are necessary to learn them to see through unimportant features of the task.

**Session P 415**

2 September 2017 08:45 - 10:15

Main Building C - C8

Single Paper

Teaching and Teacher Education

**Paper Presentation:** Teaching and Teacher Education - G

**Keywords:** Attitudes and beliefs, Communities of practice, Competencies, Educational Psychology, Educational Technology, Game-based learning, Higher education, Pre-service teacher education, Primary education, Teacher Effectiveness, Teacher Professional Development, Teaching approaches, Vocational education

**Interest group:** SIG 11 - Teaching and Teacher Education

**Chairperson:** Lisbeth M Brevik, Department of Teacher Education and School Research, Norway

**Do teachers like to read? Profiles of pre-service teachers’ reading attitudes**

**Keywords:** Attitudes and beliefs, Communities of practice, Competencies, Higher education, Pre-service teacher education

**Presenting Author:** Iris Vansteelandt, AP University College/Ghent University, Belgium

**Co-Author:** Suzanne E. Mol, Leiden University, Netherlands

**Co-Author:** Hilde Van Keer, Ghent University, Belgium

This study examined the evolution of the affective and conative reading attitudes, reading behaviour, and perceived reading competence of pre-service teachers from the time of enrollment in teacher education course (N=253) until their graduation (N=67), who graduated within the three years of teacher education course. Three attitude profiles were identified using cluster analysis; i.e. personally-oriented, socially-oriented, and low-affect readers. Preliminary analyses that show that at time of enrollment personally-oriented readers (36.9%) appear to be the more solitary readers, whereas socially-oriented readers (33.6%) were most willing to interact with others about reading. Both profiles are comparable to the pre-service teachers’ reading frequency and self-competence beliefs. The low-affect readers (39.5%) seem the most reluctant and alternate readers. At graduation, all profiles remained, however, low-affect readers show to have become less reluctant and alternate, while personally-oriented readers show to have grown more socially-oriented. This study stresses the importance of acknowledging individual differences in reading attitude when designing teacher education courses aiming at providing all teachers with the tools and willingness to foster their students’ reading proficiency and enthusiasm.

**Teachers and Game-based Pedagogy: Meaningful Implementations and Necessary Competences**

**Keywords:** Educational Technology, Game-based learning, Primary education, Teacher Professional Development

**Presenting Author:** Marijana Kangas, University of Lapland, Finland

**Co-Author:** Tuula Neusainen, University of Jyväskylä, Finland

**Co-Author:** Jenni Pikka, University of Jyväskylä, Finland

**Co-Author:** Mikko Vesisenaho, University of Jyväskylä, Finland

In this paper, we examine different types of game-based pedagogy in the context of basic education and the teacher competences necessary for the meaningful implementation of game-based learning processes. Our data comes from 15 schools participating in a development project focusing on game-based pedagogy between 2013 and 2016. Educational games was the most common type of game-based pedagogy but the use of gamification started to spread more broadly in the course of the project. In terms of teacher competences, we identified references to four main areas: pedagogical planning and organization based on curriculum, tutoring, and assessment, technological (selecting and combining tools in meaningful ways, overcoming technology-related obstacles), collaborative (sharing and communication), and personal - including the teacher’s engagement in game-related practices and improvisation (playfulness, games and exercise). The results are applicable for acknowledging areas needed in game-based pedagogy and for developing teacher education and in-service programs as teacher competences on game-based learning will become a more integral part of the repertoire of teachers’ professional knowledge and skills.

**Promoting Primary School Teachers Assessment Competence via a Training Program Combined with Diaries**

**Keywords:** Competencies, Educational Psychology, Primary education, Teacher Professional Development

**Presenting Author:** Julia Klug, Universität Wien, Austria

Assessment is one of teachers’ key competences. So far, teachers’ judgment accuracy has often been investigated (e.g., Spini, 2005; Südkamp, Kaiser, & Möller, 2012). Since there is a call for further education programs to foster new facets of teachers’ assessment competence, the aim of the present study was to adapt and test a training program including a diary for reflecting one’s assessment behavior at school with primary school teachers. The program and diary have first been developed and evaluated with secondary school teachers (Klug, Gerich, & Schmitz, accepted for publication). The results should now be replicated and generalized for the group of primary School teachers. Furthermore, the study was ameliorated by adding a follow-up test in order to see if effects are stable. N=49 primary school teachers participated in the study which combined pre-, post- and follow up test measures with time-series data. Results show that the training and diary in fact enhance primary school teachers’ assessment competence as well as their knowledge and reflected experience compared to a waiting control group similar to the study with secondary school teachers. Effects are stable over time. The additional standardized diary proved to be a useful tool to get insights into what teachers’ implemented in their daily assessment business. It can be used as a measure to check for implementation fidelity as well as for stimulating reflection about assessment practices even if we cannot show an additional intervention effect above and beyond the effect of the training program.

**DUAL VET in Spain: current situation and attitudes of VET teachers towards dual VET**

**Keywords:** Communities of practice, Teacher Effectiveness, Teaching approaches, Vocational education

**Presenting Author:** Pilar Pineda, Universitat Autònoma de Barcelona, Spain

**Co-Author:** Laura Arana-Sabatés, UAB Universitat Autònoma de Barcelona, Spain

**Co-Author:** Anna Cirasò, Universitat Autònoma de Barcelona, Italy

This paper aims to analyse the perspective of VET Spanish teachers concerning the barriers and facilitators of dual VET and its implementation in Spanish schools. The study also seeks to better understand the teacher’s attitudes towards dual VET.

A validated questionnaire was used and applied to a representative sample of VET schools across 5 different regions in Spain. The source of information was the professional who manage VET: VET coordinators and teachers. The sample consists of 322 centers.

At the moment the fieldwork is being done, which will end in December 2016. The study ends in April 2017. By this date we will have all the results for the presentation at the conference in August 2017.

**Session P 416**

2 September 2017 08:45 - 10:15

Pini A - A1081

Single Paper

Teaching and Teacher Education

**Paper Presentation:** Teaching and Teacher Education - H

**Keywords:** Attitudes and beliefs, Bilingual education, Educational Technology, Language (Foreign and second), Pre-service teacher education, Primary education, Quantitative methods, Secondary education, Social interaction, Survey Research, Teacher Professional Development, Teaching approaches

**DUAL VET in Spain: current situation and attitudes of VET teachers towards dual VET**

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**Co-Author:** Laura Arana-Sabatés, UAB Universitat Autònoma de Barcelona, Spain

**Co-Author:** Anna Cirasò, Universitat Autònoma de Barcelona, Italy

This paper aims to analyse the perspective of VET Spanish teachers concerning the barriers and facilitators of dual VET and its implementation in Spanish schools. The study also seeks to better understand the teacher’s attitudes towards dual VET.

A validated questionnaire was used and applied to a representative sample of VET schools across 5 different regions in Spain. The source of information was the professional who manage VET: VET coordinators and teachers. The sample consists of 322 centers.

At the moment the fieldwork is being done, which will end in December 2016. The study ends in April 2017. By this date we will have all the results for the presentation at the conference in August 2017.
The beginning teachers’ support network: An important ingredient in the recipe of job satisfaction?

Keywords: Primary education, Quantitative methods, Social interaction, Survey Research

Presenting Author: Laura Monique Thomas, Ghent University, Belgium

A considerable number of beginning teachers leave the teaching profession within the first years of practice. Although the importance of a supportive school team in preventing teachers’ early exit is often stressed, research investigating this phenomenon using a network perspective is scarce. The aim of this study is to fill this gap and to examine the role of school teachers’ support networks in relation to job satisfaction. To meet this objective, an innovative network approach (i.e., social network analysis) is used. Results regarding beginning teachers’ career path in the first few years of teaching, the composition of their school support networks, and the potential of those networks for their job satisfaction, are discussed.

Teacher identity, beliefs and technology-related well-being

Keywords: Educational Technology, Quantitative methods, Survey Research, Teacher Professional Development

Presenting Author: Antti Syvänen, University of Tampere, Finland

The acceleration of digitization has resulted in a demand to large scale implementation of ICT in teaching. Also the current changes in curriculum policies reflect this. We suggest that the demand to increase the educational use of ICT may cause technostress to teachers, which can be defined as a specific type of work stress associated with the use of technology at work. We will present findings from two empirical studies examining technostress and factors predicting it. Study 1 (n = 2,741) found the key predictors of the technostress were ICT competence, the coencidence of the educational use of the ICT with teaching style, school support, and all the educational use of ICT. Study 2 (n = 183) examines some of these found factors, further exploring relationship between well-being and professional identity.

Session P 417
2 September 2017 08:45 - 10:15
Main Building A - A32

Assessment and Evaluation, Teaching and Teacher Education

Paper Presentation: Teaching and Teacher Education - I

Keywords: Assessment methods and tools, Attitudes and beliefs, Competencies, Cooperative / collaborative learning, E-learning / Online learning, Educational Technology, Higher education, Language (English, Foreign language), Pre-service teacher education, Quantitative methods, Teaching approach, Video analysis

Interest group: SIG 11 - Teaching and Teacher Education

Chairperson: Elsa Eiriksdottir, University of Iceland, Iceland

Transforming the classroom experience for trainee teachers

Keywords: Cooperative / collaborative learning, E-learning / Online learning, Pre-service teacher education, Teaching approaches

Presenting Author: Miguel Nussbaum, Pontificia Universidad Católica de Chile, Chile

Co-Author: Camila Barahona, Pontificia Universidad Católica de Chile, Chile

When transforming the classroom experience the aim should be to focus up to class time to focus on practical activities. In the proposed flipped classroom strategy, students cover traditional classroom content through short videos, followed by formative assessment. Formative assessment also provides a space for developing critical thinking by combining learning objectives with higher-order thinking skills. The formative assessment system generates a report on the student performance, that allows the teacher to interact with the students by recalling and analyzing the detected weaknesses. In a final collaborative stage student solve problems by taking into account their peer’s point of view.

Future teachers’ learning gains in the field of German as a second language

Keywords: Teaching and Teacher Education - II

Presenting Author: Jannet Paetsch, Otto-Friedrich-Universität Bamberg, Germany

Co-Author: Hans-Jürgen Wagner, Humboldt-Universität zu Berlin, Germany

Co-Author: Ann-kathrin Darsow, Humboldt-Universität Berlin, Germany

Language support for multilingual learners plays a major role in classrooms today. In Germany, teacher education includes opportunities to learn (OTL) in the field of German as a second language (GSL) which are required for teacher preparation. The present study examines the relationship between future teachers’ GSL learning gains and OTL within the framework of the Berlin OTL-training. Data was collected in the context of the project Sprachen-Bildung-Chancen: Innovationen für das Berliner Lehramtsstudium summer 2015. The sample consists of 180 teacher candidates who study different subjects at different universities in Berlin. Students showed significantly higher skills after attending OTL-training. Moreover, there was a significant relationship between the students’ self-reported OTL and their learning gains in the DAZ60m test. To test our assumption, that differences in the GSL competencies of students who attended the OTL-training and those who did not were mediated by OTL, we will specify a mediation model in further analysis.

Measuring pre-service teachers’ professional vision of inclusive education: videography instrument

Keywords: Assessment methods and tools, Pre-service teacher education, Quantitative methods, Video analysis

Presenting Author: Karoline Keppens, Ghent University, Belgium

Co-Author: Ida Hvev, Ghent University, Belgium

Globally, schools and teachers are facing a growing diversity in student populations, which is reflected in worldwide educational policies to implement more inclusive learning environments. According to the literature, pre-service teachers need to be supported in their future role as facilitators of inclusion. As a consequence, pre-service teachers should be able to recognize and interpret effective teaching strategies in inclusive education, including the conception of ‘inclusive education’ and ‘special education’ (Van Petri & Spiddel, 2013) as professional vision. In assessing professional vision on a large scale, the use of video has become a prominent tool. One way to study professional vision through video is the method of comparative judgement. However, comparative judgement has not yet been applied to study pre-service teachers’ professional vision about inclusive and heterogeneous environments in a reliable and comparable way. The present instrument to measure pre-service teachers’ professional vision of inclusive classrooms in a standardized way. This paper describes the development of the instrument along with two validation studies to inquire the validity of the instrument. The first study is an expert study (n=45) investigating whether the selected video clips are discernible examples of inclusive classrooms. The second study - a pilot study (n=100) - investigates whether our model of professional vision fits the data generated by our measure (e.g. comparative judgement) and whether the videos/clip do not involve too much complexity. Results of both studies confirm the validity of the instrument to measure pre-service teachers’ professional vision of inclusive classrooms in a standardized way.

Pre-service teachers’ TCPACK and Intentions to Use ICT in Teaching

Keywords: Communication and Information Technology, Pre-service teacher education

Presenting Author: Jari Kukkonen, University of Eastern Finland, Finland

Co-Author: Sauli Vatkesniemi, University of Eastern Finland, Finland

Co-Author: Eriko Soini, University of Eastern Finland, Finland

Previous research suggests that teachers’ knowledge and skills should be one strong pedagogical predictor of teachers’ intention to use ICT in education. For testing this, we are combining technological pedagogical knowledge (TPACK) and intentions to use ICT in the Theory of Planned Behaviour (TPB). In this study, first year pre-service teachers’ intentions to use ICT in education was investigated. Among the large number of first-year student teachers, it was revealed that first-year student teachers have a positive intention to use ICT, but the skills measured with TPACK and especially self-efficacy were not in positive relation to behavioural intentions. However, the largest group of first-year teacher students and the result may indicate that the recently started students have not gained the knowledge and skills (TPACK) as well as not gained experiences enforcing self-efficacy related to teaching with ICT.

This study describes the findings of a pilot study in which a developmental intake assessment instrument is implemented. The instrument allows us to determine students’ basic competences, beliefs and needs and provides us with possibilities to better coach students throughout our teacher education programme. In this paper, we focus on the first part of the instrument, which contains questions about previous experiences that are relevant to teaching, more specifically on the reasons that preservice teachers have to teach and how the skills they already possess could benefit the students they teach. Data were collected in a Dutch first-grade teacher education programme in February 2016. 87 preservice teacher completed the assessment. Students were asked to explain why they would like to teach and how their skills could benefit the students they were going to teach. All data were coded in terms of a prior teaching and learning experiences, b) perceptions of the task, c) perceptions of one’s abilities, d) values,
and e) teaching a full-time career, and then were labeled into adaptive versus maladaptive motives. The most prevalent motive among our respondents was the desire to transfer knowledge (25%), closely followed by the love for the subject domain (22%). Interestingly, all motives that were frequently mentioned were adaptive motives. In contrast with other studies, in our study the desire to transfer knowledge was the most important motive for applying for the teacher education programme.

Measuring Primary Children’s Images of and Attitude toward Curiosity

Keywords: Attitudes and beliefs, Primary education, Science education, Survey Research

Presenting Author: Tim Post, University of Twente, Netherlands

Co-Author: Juliette Walma van der Molen, University of Twente, Netherlands

This paper presents the results of a study to validate a questionnaire that measures primary children’s images of and attitudes toward curiosity (the CIAC questionnaire). Many policy documents and scientific studies on 21st-century learning advocate the importance of stimulating children’s curiosity. However, research shows that in most classrooms little opportunity is given to children’s wonderment and questioning behaviour.

We sought to bridge that gap by focusing on children’s images of and attitude toward curiosity, rather than their curious behaviour. In our view, children’s curious behaviour will only be cultivated by a positive classroom climate in which children value the epistemic importance of asking questions, derive pleasure from their questioning behaviour, and feel that their epistemic questions are appreciated by their teachers. In the absence of these images and attitudes curiosity and belief in the value of curiosity is not cultivated.

Based on a literature review on attitude, curiosity, and 21st-century learning, we developed a framework that describes the underlying components of children’s images of curiosity (i.e., social vs. epistemic images) and their attitudes toward curiosity (e.g., perceived importance of curiosity, their self-efficacy). Subsequently, these components were translated into nine scales that comprise the CIAC. Results of a validation study among 737 children (age 8-13), using factor analyses, largely confirmed the factor structures of the image and attitude scales and showed good convergent and discriminant validity. These results will be presented, including the results of a correlational study that investigated potential differences between subgroups of children in the sample.

Subtypes of emotion regulation: exploring patterns in classroom behaviour

Keywords: Emotion and affect, Neuroscience, Primary education, Self-regulation

Presenting Author: Lysandra Sinistaro-Harding, University of Cambridge, United Kingdom

Co-Author: David Whitehead, University of Cambridge, United Kingdom

Emotion regulation describes the ability to influence the expression and experience of affect. Adaptive ER contributes to healthy development, social competence and academic success (Kochanska, Murray & Hartan, 2000). This study investigated emotion reactivity and regulation in middle childhood. One hundred and twenty-eight children were recruited from five UK primary schools. From within their school setting, participant sensitivity to emotion-elicitng events were recorded using skin conductance data by ambulatory technology, whilst age-group paired children performed two LEGO construction tasks. Observed behaviours were video-recorded and coded to establish regulatory tendencies. These were compared to self-reports of emotion regulation and teacher-reports of emotional and behavioural strengths and difficulties. Iterative partitioning cluster analysis methods were used to identify four regulatory profiles. 1) The ‘Adaptive’ cluster were prosocial, had positive self-perceptions of their ability to regulate their emotions, frequently expressed emotion and employed a range of positive regulation strategies. 2) The ‘Maladaptive’ group had significant problems relating to their peers, displayed a range of behavioural problems in class and had little self-confidence in their ability to regulate their emotions. They used few positive regulatory strategies and expressed little emotion. 3) The ‘Reactive’ cluster were physiologically sensitive and expressed very little emotion. They displayed inattentive/hyperactive disturbances in class. Finally, 4) the ‘Distracted’ group were generally prosocial and emotionally expressive. They relied upon distraction strategies to regulate their emotions. These results indicate four meaningful profiles that could support the identification of vulnerable individuals for positive school-based intervention and support.

Do private uplifts and hassles affect teachers’ emotional exhaustion? Results from a diary study

Keywords: Emotion and affect, Quantitative methods, Teacher Professional Development, Motivation and emotion

Presenting Author: Juliane Schmidt, Leibniz Institute for Science and Mathematics Education (IPN), Germany

Co-Author: Klara Kleinmann, Leibniz Institute for Science and Mathematics Education (IPN) AND Centre for International Student Assessment, Germany

Recent studies showed that teacher burnout has a significant impact on their performance at work and on their students’ achievement (Kliszmann et al., 2016; Shen et al., 2015). Burnout is defined as a multidimensional syndrome that is influenced by factors that are located in the work environment of an individual. However, whether burnout is indeed a work-related phenomenon that is unrelated to private resources and stressors has not yet been systematically investigated. Therefore, the aim of the current study was to examine whether daily private uplifts and hassles are related to emotional exhaustion—the core component of burnout. In a diary study over a course of 14 consecutive days, 141 beginning teachers provided information about their daily work-related private uplifts and hassles as well as about their daily emotional exhaustion. Results showed, first, that daily emotional exhaustion was negatively related to daily work-related uplifts and positively linked with daily work-related hassles. Second, daily private uplifts had a statistically significant negative association with daily emotional exhaustion that went beyond the influence of work-related uplifts and hassles, whereas private hassles were not statistically significantly related to teachers’ emotional exhaustion. However, further analyses showed that the association between private uplifts and emotional exhaustion was not robust. Therefore, private uplifts and hassles seem not to be relevant for emotional exhaustion. Therefore, future research might rather focus on work-related factors when developing approaches to reduce or prevent teacher burnout.

Session P 419

2 September 2017 08:45 - 10:15

Linna - Väinö Linna (K104)

Singal Paper

Motivational, Social and Affective Processes

Paper Presentation: Motivation and Emotion - G

Keywords: All-risk students, Attitudes and beliefs, Educational Psychology, Emotion and affect, Inquiry learning, Lifelong learning, Mathematics, Motivation and emotion, Out-of-school learning, Primary and secondary education/technology

Interest group: SIG 08 - Motivation and Emotion

Chairperson: Sharon Nichols, UTSA, United States

From School is Cool to We don’t Need Education: Predictors of School Alienation

Keywords: All-risk students, Attitudes and beliefs, Lifelong learning, Motivation and emotion

Presenting Author: Kaja Marcin, University of Bern, Switzerland

Co-Author: Tina Hascher, University of Bern, Switzerland

This cross-sectional study explores differences in the prevalence of school alienation in different school settings, i.e. between primary and secondary schools and the different school tracks in the Swiss Canton of Bern. It investigates the relation between various predictor variables at individual- and classroom-level and the two outcome variables alienation from teacher and alienation from learning aiming at describing the educational settings of primary and secondary schools with regard to how well they support the young adolescent students in fulfilling their developmental needs and how this relates to the development of school alienation. The sample includes students from Swiss primary schools in grade 4 (N = 496) and secondary schools in grade 7 (N = 550). Data was collected using a standardized questionnaire and analyzed applying descriptive hierarchical linear regression analysis. Separate multilevel models were developed for the primary and the secondary school samples, to compare the predictive strength of contextual factors on alienation from teachers and learning at school in the different educational settings.

Keywords: school alienation, basic needs, attitudes, emotion, motivation

Control and value appraisals predict enjoyment and boredom in primary school children

Keywords: Emotion and affect, Mathematics, Primary education

Presenting Author: Dave Putwain, Liverpool John Moores University, United Kingdom

Co-Author: Wendy Symes, University of Munich, Germany

Co-Author: Sandra Backer, University of Munich, Germany

Co-Author: Reinhard Peukert, Ludwig-Maximilians-Universität (LMU), Germany

According to control-value theory (CVT), activity and outcome-related control beliefs and subjective values give rise to specific achievement emotions. Enjoyment is proposed to arise from positive subjective value accompanied by strong control. Boredom is proposed to arise principally from lack of subjective value, and may also be accompanied by very low or high control. We tested these propositions in a sample of primary school students, a population that has not been studied in relation to CVT. Specifically, we examined the relationship between two different types of control beliefs (action-control and action-outcome beliefs) and subjective values (intrinsic, attainment, and utility). Data were collected from 579 primary school students over three waves (emotions at Time 1 and Time 3, and control and value appraisals at Time 2) and analysed in a series of structural equation models. Enjoyment was predicted by higher intrinsic, attainment, and utility value. Only attainment value, however, interacted with control beliefs: higher action-control and outcome-control beliefs amplified the positive relationship between attainment value and enjoyment. Positive utility value and control beliefs predicted higher enjoyment in an additive fashion. Control beliefs were not significantly predicted by enjoyment in the models with intrinsic value. Boredom was predicted by lower intrinsic, attainment, and utility value. Intrinsic value interacted with action-control beliefs: higher action-control beliefs amplified the negative relationship between intrinsic value and boredom. These results support the role of control and value appraisals as antecedents of learning-related emotions and highlight the importance of attending to different types of subjective value.

Are we alienating our digitally competent students? Consequences for academic well-being

Keywords: Educational Psychology, Out-of-school learning, Technology, Motivation and emotion

Presenting Author: Lauri Hietaranta, University of Helsinki, Finland

Co-Author: Katarina Salmen-Avo, Helsinki Collegium for Allied Studies, Finland

Co-Author: Kai Hakkarainen, University of Helsinki, Finland

Co-Author: Kristi Lonka, University of Helsinki, Finland

This study examines how students’ digital skills are associated with academic well-being in two cohorts. It has been proposed that the conventional school system is alienating students with advanced digital skills. More precisely, as these skills are mainly developed out-of-school, the more digitally competent students might be less engaged, value school less or experience burnout when being taught the
Students' engagement in student-centered versus teacher-centered STEM learning environments

Keywords: Emotion and affect, Inquiry learning, Student learning, Motivation and emotion

Presentation Author: Annemie Sruly, University of Antwerp, Belgium

Over the past decade, the issue of young peoples' declining interest and engagement in STEM (Science, Technology, Engineering and Mathematics) has been a key theme in science education research and policy. A number of pedagogical strategies to foster student's interest and engagement in STEM have been taken. One approach is the integrated STEM education approach, where students need to connect the different components of STEM through real world applications and project-based work. This approach is more student-centred and invites young people to be active learners. In the current paper, we investigate the impact of an integrated more student-centered STEM learning environment, versus a teacher-centered STEM learning environment, on students' behavioral and emotional engagement.

Observations and focus groups were done in six classes of six Flemish secondary schools (8th grade) between January and March 2016. Different STEM learning environments and students' engagement were investigated. The findings in the current paper show that the implementation of an integrated student-centered STEM approach is effective to get students more behaviorally and emotionally engaged.

Further longitudinal research is needed to investigate if such an approach additionally leads to more STEM literate students and more students enrolling in higher STEM education.

Session P 420

2 September 2017 08:45 - 10:15
Main Building A - A4
Single Paper
Teaching and Teacher Education

Paper Presentation: Teacher Professional Development - E

Keywords: Cognitive skills, Developmental processes, Early childhood education, Educational policy, Higher education, In-service teacher education, Mathematics, Pre-service teacher education, Qualitative methods, Reasoning, Teacher Professional Development - Teaching / Instruction

Interest group: SIG 11 - Teaching and Teacher Education

Organiser: Dr. Caroline Mansfield, Murdoch University, Australia

Who does take part in which kind of teacher professional development?

Keywords: Educational policy, In-service teacher education, Mathematics, Teacher Professional Development

Presenting Author: Michael Besier, Leuphana University of Lüneburg, Germany

Co-Author: Dominik Leiss, Leuphana University of Lüneburg, Germany

In 2013, overall 67 mathematics teachers participated in teacher professional development (TPD) courses either dealing with formative assessment (TPD-FA) or not dealing with formative assessment but with general ideas about competency oriented mathematics (TPD-NFA). Based on all mathematics teachers' prior beliefs, interest and self-efficacy concerning formative assessment, clusters of teachers are identified by hierarchical cluster analysis. Results of this cluster analysis point out: (1) There exists a cluster of teachers having high self-efficacy, low beliefs, and low interest concerning formative assessment. These teachers (2) mainly participate in teacher professional development not dealing with formative assessment (TPD-NFA), but (3) do only have little pedagogical content knowledge (PCK) concerning formative assessment. Since formative assessment is said to be crucial for successful teaching, these findings have to be thought about carefully.

Developmental tasks for kindergarten teachers at their career start in kindergartens

Keywords: Developmental processes, Early childhood education, Qualitative methods, Teacher Professional Development

Presenting Author: Sabine Lenneweber, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

Kindergarten teachers in Germany are a new professional group. They have undergone a newly designed teacher training for the first time at university level especially for working in the field of Early Education and Care (ECEC). The graduates start their work in a kindergarten under unusual conditions: there is neither a professional profile for their orientation nor even a clear description of the professional work they are supposed to execute. So they will have to develop their own specific professional profile based on what they have learned in their university courses and do their work accordingly. Here they have to meet a multitude of expectations. The presented studies analyse the career start which is highly relevant for the professional. It analyses what kind of requirements they are about to meet and how they cope with them. The entering of the professional field can be understood as an implementation of an innovation. Thus theories of innovation and transfer constitute the frame of this study (Bornmann 2011).

The study follows an approach of biographically oriented professionalization. The theoretical frame is the concept of developmental tasks and the model of professionalization (Kodinar 2014).

Subject of longitudinal study are the first two cohorts of university trained kindergarten teachers during their career start. Based on guideline-interviews and through content analysis a model of developmental tasks for the career start of kindergarten teachers has been worked out. By contrasting case-studies I analysed three different modes of dealing with requirements and identified institutional factors of influence.

Individual characteristics of teacher candidates: Re-examining the "negative selection" hypothesis

Keywords: Cognitive skills, Educational policy, Higher education, Teacher Professional Development

Presenting Author: Julia- Carolin Brachem, German Centre for Higher Education Research and Science Studies (DZHW), Germany

Co-Author: Hindgar Schaep, DZHW - German Centre for Higher Education Research and Science Studies, Germany

Teachers' individual characteristics are considered to be relevant for teachers' professional competencies, successful teaching, the development of students' competencies, and student achievement. Previous research regarding the choice between teacher education and other study programmes and the selection within teacher education has mainly considered cognitive, interest, personality, and sociodemographic aspects, highlighting, amongst other things, that the teaching profession attracts people with rather unfavourable characteristics ("negative selection" hypothesis).

Our study contributes to this body of research, addressing the questions (1) whether students' individual characteristics, such as cognitive abilities, vocational interests, and personality, have an effect on the choice of a teacher education programme or another study programme (2) and on the choice of a specific teaching degree, differentiating STEM and non-STEM majors. Using beyond existing studies, we analyse a larger sample and distinguish simultaneously between teaching degree and field of study. We use data from the Starting Cohort 5 (First Year Students) of the German National Educational Panel Study (NEPS), which includes an oversampling of teacher education students (Telephone interviews 2011/2012, N = 4,478).

Our empirical results partly support and partly contradict the "negative selection" hypothesis. They lead to the conclusion that it is crucial for education policy and players involved in teacher education to take into account the heterogeneity among teacher candidates in terms of the academic level of teacher education programmes and the subjects chosen.

Preserve Math Teachers’ Implementation of Tasks and Links with Mathematical Knowledge for Teaching

Keywords: Mathematics, Pre-service teacher education, Reasoning, Teaching / instruction

Presenting Author: Enirg Adler, Bogazici University, Turkey

The aim of this study is to investigate pre-service mathematics teachers’ quality of implementation of tasks and its links with mathematical knowledge for teaching (MKT), both in their field-experiences in middle school classrooms and in microteaching experiences, within a course at university. The sample consists of 40 (37 female, 3 male) senior preservice middle school mathematics teachers at a university in Turkey. As a measure of their mathematical knowledge for teaching, they took the Turkish translation of the primary TEDS-M released items test. Quality of implementation of mathematical tasks is computed using Stein and Kaufman’s (1996) multidimensional framework. The teachers' thinking and reflecting about the tasks, attending to students' thinking and concluding mathematical reasoning as the intellectual authority. Data regarding teacher candidates' implementation of tasks were collected using the Classroom Observation Instrument (CoI) developed by Stein & Kaufman, 2010. The comparisons between pre-service teachers’ quality of implementation and MKT in microteaching and practice teaching experiences did not show major differences. There were only significant differences in favour of preserve teachers’ attending to students' thinking while teaching at middle school classroom settings. This is discussed to be in links with pre-service teachers’ perceptions about how realistic the context was. Teachers’ MKT was not found to be related with any indicators of quality of implementation of tasks, in any of the experiences. Yet, the links of contextual factors and teacher knowledge with quality of task implementation, particularly attending to student thinking need to be further studied.

Presentation P 421

2 September 2017 08:45 - 10:15
Main Building A - A3
Single Paper
Motivational, Social and Affective Processes

Paper Presentation: Motivation and Emotion - H
Keywords: Achievement, Collaborative Learning, Educational Psychology, Instructional design, Language (L1);Standard Language), Mathematics, Motivation, Motivation and emotion, Parental involvement in learning, Social aspects of learning and teaching, Student learning, Teacher Effectiveness, Teaching / instruction
Interest group: SIG 08 - Motivation and Emotion
Chairperson: Thomas Cochrane, New Zealand

Mediating Role of Basic Needs: Parental Conditional Regard, Teacher Autonomy Support and Well-Being
Keywords: Educational Psychology, Motivation, Parental involvement in learning, Motivation and emotion
Presenting Author: Ayasun Alp, Middle East Technical University, Turkey
Co-Author: Aylin Koçak, Hacettepe University, Turkey
Co-Author: Alhanisos Mouratidis, Hacettepe University, Turkey

Based on SDT (Ryan & Deci, 2000) several researchers have tried to uncover the contextual features that satisfy adolescents’ psychological needs for autonomy, competence, and relatedness. In most of these studies however, researchers have focused on one aspect of the social context, either the school or the family environment, and also focused on either the issue of need frustration or need satisfaction and their implications on ill-being or well-being, respectively. Therefore, in this study, we aimed to test whether adolescents’ perceptions of parents’ conditional negative regard (PCNR) and teachers’ autonomy support (TAS) are associated with need satisfaction and need frustration which in turn are related to adolescents’ life satisfaction and subjective stress. To test our hypothesis, we recruited 258 Turkish adolescents (N = 258, Mage = 16.77, SD = 1.01). Results of SEM showed that PCNR was positively related to need frustration which in turn was positively associated with adolescent’s subjective stress and TAS was positively related to need satisfaction which in turn was positively associated with life satisfaction. These findings imply that while need frustration operates as a mediating mechanism between PCNR and subjective stress, need satisfaction functions as an intervening mechanism between TAS and life satisfaction. Therefore, future intervention programs which aim to increase adolescents’ well-being should focus on diminishing PCNR and enhancing teachers’ autonomy supported behaviors.

Learners’ habitual social comparisons can hinder effective learning partner choice
Keywords: Collaborative Learning, Educational Psychology, Social aspects of learning and teaching, Student learning
Presenting Author: Josephine Neugebauer, Institut für Erziehungswissenschaft, Germany
Co-Author: Kai Sassenberg, Leibniz-Institut für Wissensmedien (IWiM), Germany
Co-Author: Devin G. Ray, The School of Psychology, Aberdeen, United Kingdom

Students’ achievement heavily depends on who they learn with and from in school. While learning with others students can easily become aware of differences between themselves and their learning partners. This awareness facilitates social comparisons between learners and can influence learners’ behavior in collaborative learning. However, research on the influence of social comparisons on learning partner choices is lacking. Thus, we investigate how habitual and strategic social comparison motives influence who students seek to learn with. Specifically, we propose that a predisposition to habitual social comparison (i.e., high Social Comparison Orientation) renders learners insensitive to the beneficial influence of strategic social comparison motives. Two studies were conducted with a total sample size of N = 230 university students. Participants completed web-based studies in which we assessed the influence of habitual and strategic social comparison motives on students’ choice of learning partner for an upcoming learning task. Across both studies, we found that only participants who were not predisposed to habitual social comparison benefited from strategic social comparison motives. Thus, a habitual tendency towards social comparison appears to negate the beneficial effects of strategic social comparison motives. Students choose their own learning partners. This finding joins a growing body of work documenting the importance and impact of habitual social comparison in the context of knowledge exchange between peers.

Dimensional Comparisons in Primary School: A Validation of the Generalized I/E Model
Keywords: Achievement, Language (L1);Standard Language), Mathematics, Motivation
Presenting Author: Christoph Noppel, University of Luxembourg, Luxembourg
Co-Author: Samuel Greff, University of Luxembourg, Luxembourg
Co-Author: Ulrich Kaller, University of Luxembourg, Luxembourg
Co-Author: Antoine Flachbach, University of Luxembourg, Luxembourg

The internal/external frame of reference model (I/E model) focuses on the impact of comparison effects on the formation of verbal and mathematics self-concepts. Thereby, the I/E model claims positive associations between achievement and academic self-concept within the same domain (social comparison effect) and negative relations across domains (dimensional comparison effect). The recently introduced generalized I/E model expands the focus of the I/E model to other domain-specific outcomes such as academic interest in different domains. Whereas the original I/E model can be considered as established in higher grades, research in primary school children is relatively scarce. The G/E/I model was never tested in primary school to date. The present study therefore examined the relations between verbal and mathematics achievements on the one hand and corresponding domain-specific self-concepts (core of the I/E model) and interests (extension G/E/I model) on the other hand in two large samples of 3,994 first-grade and 4,017 third-grade elementary school children in Luxembourg. For first-graders, we found evidence for social comparison effects in that achievement on the one hand and academic self-concept and interest on the other hand were positively related within the same domain. However, we did not find any evidence for dimensional comparison effects across domains. For third-graders, we found evidence for both effects. Accordingly, our results fully supported the assumptions of the G/E/I model for third-graders but only partially for first-graders; finding were discussed in line with prior research on social and dimensional comparison effects.

The Relevance of Teachers’ Autonomy Support at Work for Students’ Perception of Instruction
Keywords: Instructional design, Motivation, Teacher Effectiveness, Teaching / instruction
Presenting Author: Barbara Otto, Ludwigshafen University of Education, Germany
Co-Author: Natalie Vannini, Goethe-University Frankfurt, Germany
Co-Author: Nej Madjar, School of Education, Bar-Ilan University, Israel

So far, little is known about the specific factors that have an impact on teachers’ need supportive behavior in the classroom. Therefore, the current study aimed at investigating the specific role of teachers’ autonomy support at work for students’ perceptions of need supportive classroom instruction. In order to answer this research question data of 141 classes and their associated mathematics and German teachers were assessed. Students had to report on their perception of need supportive instruction in both subjects whereas their teachers had to indicate their level of perceived autonomy support at work. Data were analyzed by two-level Hierarchical Linear Modeling. The analyses revealed a significant effect of teachers’ perceived autonomy support on students’ perception of need supportive instruction in both subjects. The findings are discussed with regard to their practical implications.

Session P 422
2 September 2017 08:45 - 10:15
Vita - B12
Single Paper
Instructional Design

Paper Presentation: Instructional Design - D
Keywords: Communities of learners, Comprehension of text and graphics, Conversation / Discourse analysis, Educational Psychology, Experimental studies, Higher education, History, Instructional design, Learning analytics, Mathematics, Problem solving, Student learning
Interest group: SIG 06 - Instructional Design
Chairperson: Kati Keski-Mäenpää, University of Jyväskylä, Finland

How does the presentation of source information affect processing of multiple documents?
Keywords: Educational Psychology, Experimental studies, History, Instructional design
Presenting Author: Martin Merth, Leibniz-Institut für Wissensmedien, Germany

In this experiment, we investigated how the presentation of source information affects learners’ processing of multiple documents. In particular, 123 participants worked on a task that asked them to explain differences between eight documents’ coverage of the German Emergency Law. These differences were caused by the documents’ origin that was pointed out to the participants in the source information. This source information was either presented in a block before or after all of the documents’ contents, or it was presented in a more integrated fashion, either directly before or directly after the corresponding document, resulting in a 2x2 factorial between subject design. Controlling for historical thinking skills, we observed an interaction with regard to the participants’ performance. More specifically, when presenting the source information integrated with the documents’ contents, performance was better when the source information was presented before the respective documents’ contents. In contrast, when the source information was presented in a block all at once, performance was better when the source information was presented after the documents’ contents. This latter finding is explained with the assumption that learners mainly attend to source information if they are aware of conflict. When the source information was presented in a block before all of the contents, learners had no chance to be aware of the conflict while the source information was presented.
Investigating task difficulty and generativity on the learning effect of delayed instruction

Keywords: Experimental studies, instructional design, Mathematics, Student learning

Presenting Author: Junsoong Huang, National Institute of Education, Singapore
Co-Author: Rachel Lam, National Institute of Education / Nanyang Technological University, Singapore
Co-Author: Manu Kapur, The Education University of Hong Kong, Hong Kong

Past studies have shown that compared to problem-solving after receiving instruction, students who solve problems before receiving instruction (i.e., delayed instruction) attain better learning outcomes. However, the effect of delayed instruction was mainly examined using problem-solving as the generative task. We conducted two experimental studies to examine delayed instruction without involving problem-solving. Two characteristics of a generative task were manipulated: the degree of generativity (i.e., generating analogies - more generative vs evaluating given analogies - less generative), and the level of task difficulty (i.e., analogy between two variable and three-variable algebraic word problems - more difficult vs analogy between two two-variable algebraic word problems - less difficult). In Study 1, participants independently generated two-variable problems from a given two-variable word problem (SGA2-2), or evaluated pairs of two-variable problems given by teachers (TDA2-2). Both conditions were followed by an instruction on formulating algebraic equations for two-variable problems. Findings revealed that the TDA2-2 condition outperformed the SGA2-2 condition on the immediate posttest. In Study 2, the task difficulty level was higher. Participants independently generated three-variable problems from a given two-variable problem (SGA2-3), or evaluated pairs of two- and three-variable problems given by teachers (TDA2-3), followed by the same instruction as in Study 1. Findings revealed that the SGA2-3 condition outperformed the TDA2-3 condition on the immediate posttest. These findings suggest that a generative task and task difficulty levels contribute to the boundary conditions that optimize delayed instruction for learning.

Do self-generated symbolic representations support performance in propositional logic tasks?

Keywords: Comprehension of text and graphics, Instructional design, Mathematics, Problem solving

Presenting Author: Sarah Malone, Saarland University, Germany
Co-Author: Natalie Ott, Saarland University, Germany
Co-Author: Markus Vogel, University of Education Heidelberg, Germany
Co-Author: Roland Brunken, Saarland University, Germany

Learning and problem solving can be fostered in providing multiple representations (multimedia effect, Mayer, 2009). In addition, learners benefit even more from text and picture if they have created the pictures themselves by drawing while reading (generative drawing effect, Schmeck et al., 2014). The present study investigated, whether these effects can be replicated for multiple symbolic representations (text and formula). A 2 x 2 mixed design study was conducted with the between-subjects-factor representation generation (demanded vs. not demanded) and the within-subjects-factor type of given representation (text vs. formula). N=125 students, randomly assigned to one of the two groups, had to solve 30 problems from the field of propositional logic, either after having translated them into the missing representation (generation of text resp. formula demanded) or directly (generation of text resp. formula not demanded). One third of the problems was represented as a text and another third as a formula. The remaining served as control items, including both representations.

Results show, that the participants performed by tendency better in those items that provided the problems in both representations, than if only one representation was given. Generating the missing representation did not have a fostering effect on problem solving.

Contrary to generative drawing, representation generation seems not to be not beneficial, if a second symbolic representation has to be created. The multimedia effect for multiple symbolic representations could be confirmed, however, it is restricted to ready-made representations.

A Blooming Education Seminar in Higher Education Seminar with Learning Analytics Support

Keywords: Communities of learners, Conversation / Discourse analysis, Higher education, Learning analytics

Presenting Author: Nicolò Nistor, Ludwig Maximilians-Universität München, Germany
Co-Author: Miha Dascălu, "Politehnica" University Bucharest, Romania
Co-Author: Larse Lucía Stavarche, "Politehnica" University Bucharest, Romania
Co-Author: Stefan Trausan-Matu, "Politehnica" University Bucharest, Romania

The use of online knowledge communities (OKCs) as learning environments, e.g., in higher education encounters two main issues: the learning guidance issue, and the newcomer integration issue. While the former can be solved by instructional design, the latter is still open and may be solved by Social Learning Analytics (SLA) support. This paper proposes B-LABS (Blogs and Learning Analytics Based Seminar), a higher education seminar with a formal component as a face-to-face seminar, and an informal component comprising learning in OKCs. B-LABS was carried out during summer term 2016 at a large German university with a group of N = 65 undergraduate students. SLA tools were employed to select from the OKCs with adequate topics those with most intensive discussions. Based on questionnaire data and exam grades, the effects of OKC community participation, presentation in the seminar, and student demographics, on perceptions of the seminar, acceptance of blogs as learning environments, and cognitive seminar effects were assessed. The students successfully followed the B-LABS script, two thirds of the learning groups managing to initiate and sustain discussions with blogger OKCers. The learning outcome included students’ insight in mathematics didactics and knowledge of OKC specific educational and psychological theories. Student acceptance of the learning environment was predicted by performance expectancy and perceived social influence. Future B-LABS tools further develops reliability indication that identify expert performers in OKCs, and predict OKC newcomer integration likelihood.

Session P 423

2 September 2017 08:45 - 10:15
Pens B - B110
Single Paper
Teaching and Teacher Education

Representation: Teaching and Teacher Education - K

Keywords: Cognitive skills, Comparative studies, Conceptual change, Content analysis, Educational policy, Higher education, In-service teacher education, Interdisciplinary, Pre-service teacher education, Social aspects of learning and teaching, Teacher Professional Development, Teaching / instruction

Interest group: SIG 11 - Teaching and Teacher Education
Chairperson: Héctor Javier Pijeira Diaz, University of Oulu, Spain

Using Statistics as a Way of Interpreting Social and Historical Events

Keywords: Interdisciplinary, Pre-service teacher education, Social aspects of learning and teaching, Teaching / instruction

Presenting Author: Zuhal Yilmaz, Yeditepe University, Turkey
Co-Author: Köbra Ergül, Yeditepe University, Turkey
Co-Author: Gürşu Aykın, Bahçeşehir University, Turkey

The statistics taught in schools should support students' ability to understand the world. This understanding entails being a reflective citizen who can utilise mathematical and statistical knowledge to explore social and historical events in the world with the aim of becoming more effective in managing ourselves and society. This study aims to realise this objective through connecting interdisciplinary subject areas such as history and geography with statistics. In this study, seven senior secondary mathematics education pre-service teachers (PSTs) were presented with big historical events and issues (i.e. Hiroshima and Nagasaki, Battle of Gallipoli, etc.). Then, they analysed the data related to the events through utilizing TinkerPlots software. Also, a bigger platform was used as a mean for sharing social reflections on these events in connection to the statistical results gathered in the classroom. At the end, how these in-class statistics applications influence PSTs’ way of interpretation of social, historical and political life and how they reflected on their understanding of statistical concepts were reported.

Europeanisation in teacher education: Framing the mobility of European policies and practices

Keywords: Comparative studies, Content analysis, Educational policy, Teacher Professional Development

Presenting Author: Vasiliios Symeonidis, University of Innsbruck, Austria, Austria
Co-Author: Christian Kräkel, Teacher Education and School Research, Austria

This paper aims at presenting the complexities of analysing the ongoing process of Europeanisation in teacher education, providing a framework for mapping the mobility of European policies and practices related to the specific field. At first, a literature review and a content analysis of official EU policy documents will identify the key moments in which important political decisions have been taken with regard to the teachers and teacher education agenda in Europe, outlining the main characteristics of the relevant policies and practices as developed in the international policy sphere. The main actors involved in this process of Europeanisation and the dynamic relation of policy flows will then be described, in an effort to illustrate how Europeanisation works in the field of teacher education. Actor network theory (Latour, 2005; Law 2008; Fenwick and Edwards, 2010) enables us to map the main actors and interrelations involved in the reconceptualisation of ideas, solutions and processes in teacher education. The findings of this study indicate that a linear model of policy implementation is not sufficient to describe the Europeanisation process in teacher education. Thus, a dynamic framework, which considers “uploading” policies (from national to EU level) as important as “downloading” them (from the EU to national level), is presented. The framework takes into consideration the dimensions of research, policy and practice, the relation to predominant teacher education issues, helping us to move beyond the global dichotomy and towards a global approach (Caena, 2014).

Representing teachers’ domain-specific conceptions of financial literacy by using concept maps

Keywords: Conceptual change, Content analysis, In-service teacher education, Teaching / instruction

Presenting Author: Sarina Leumann Sow, Swiss Federal Institute for Vocational Education and Training, Switzerland
Co-Author: Carmela Aprea, Friedrich Schiller University Jena, Germany

In Switzerland, issues around money and financial matters are an integral component of the curricula in Vocational Education and Training (VET). However, the planned and implemented lessons are not only determined by curriculum, but by multiple, complex and interrelated factors. One key factor is how teachers’ characteristics supporting (or hindering) targeted and successful learning and instruction processes. Particular symbolic mental representations with respect to general or domain-specific aspects of teaching-related phenomena and processes play an important role. In contrast to other (e.g., mathematics or science), little is known about teacher’s conceptions in the domains of economics and in the subdomain of financial literacy in particular. Hence, this study intends to describe and analyse content and structure of domain-specific conceptions of financial literacy of Swiss VET teachers applying the method of concept mapping for data collection. Results about contents show among others, that the following four main strands are fundamental: (1) budgeting and indebtedness, (2) consumer behaviour and the influence of the family, advertising and consumer requests, (3) salary and mandatory taxes as well as (4) financial institutions with the focus of asset building. Concerning the structure of the content-related conceptions, the concept maps present a mixed picture with regard to their extent, elaboration and organisation. The majority of the maps were portrayed rather integrated, the relations between the concepts were mainly labelled with accurate verbal explanations and few to no symbolic types to express qualitatively different concepts and/or relations were used.
It’s all about learning opportunity? The Influence of learning opportunities on economic knowledge

Keywords: Cognitive skills, Comparative studies, Higher education, Teacher Professional Development

Presenting Author: Christina Siegfried, Goethe-Universität Frankfurt, Germany

Due to the unsatisfactory results of different studies focusing on economic competence of student in Germany, economic education became an important point within the political discussion of general education (Schumack, Oepke & Eibler, 2011). Economic acting is an essential part of everyday life. The financial and economic crisis is only one example that highlights the importance of economic competence. Thus, in many school curricula, economic topics are already implemented (Mark, 2015). Despite this fact different studies found out, that the economic competence of students is still lacking (e.g. Retzmann et al., 2012). Therefore, the question is raised to what extend teacher themselves lack in economic competence. While different studies already have taken place to analyse economic knowledge of students, there are only few ones focusing on economic knowledge of teachers. Due to this, data of three universities in the federal state of Hesse of students studying education of administration and business administration and students of the subject politics and economics was collected. Based on this data the following paper analyses the relationship of economic knowledge and its different predictors using a path analysis. Results show that there is a huge difference in economic knowledge of the participants, which can be mainly explained by the attendance of economic opportunities to learn.

Session P 424

2 September 2017 08:45 - 10:15
Room E1 - E301
Single Paper

Cognitive Science, Teaching and Teacher Education

Paper Presentation: Educational Effectiveness - B

Keywords: Achievement, Comparative studies, History, Informal learning, Out-of-school learning, Parental involvement in learning, Primary education, Qualitative methods, School effectiveness, Student learning, Teacher Effectiveness, Teaching / instruction

Internal group: SIG 18 - Educational Effectiveness

Chairperson: Stefan Keller, School of Teacher Education Basel, Switzerland

Combining Generic and Content-Specific Practices in Exploring Teaching Quality in Physical Education

Keywords: Primary education, Student learning, Teacher Effectiveness, Teaching / instruction

Presenting Author: Charalampos Charalambous, University of Cyprus, Cyprus

Co-Author: Emris Kyriakides, University of Cyprus, Cyprus

Co-Author: Niki Frangoulou, University of Cyprus, Cyprus

Co-Author: Leonidas Kyriakides, University of Cyprus, Cyprus

Trying to understand teaching quality and its effects on student learning, for years researchers have largely attended to either generic or content-specific teaching practices, without simultaneously attending to both. Aiming to address this research gap and attempting to complement recent works that attempted to do so but focused on cognitive outcomes, the present study considers both generic and content-specific practices when exploring teaching quality in Physical Education (PE) and its effects on student psychomotor learning. The main research question guiding this exploration concerns the added value of exploring the joint contribution of generic and content-specific teaching practices, as opposed to considering each type of practices in isolation. To answer this question we measured students’ psychomotor skills (i.e., performance, accuracy and reaction time) that were assessed at the beginning (pre-test) and at the end (post-test) of the school year. Three classroom observations were also conducted for each of the 49 participating teachers to measure teaching quality; finally, a student survey was used to tap instructional quality viewed through students’ eyes. Data were analyzed by employing item response theory models, structural equation modeling, and multilevel modeling. The study findings suggest that the joint contribution of generic and content-specific teaching practices explains more teacher-level variance, compared to that explained when considering either type of practices in isolation. This finding has important theoretical and practical implications.

Characteristics of Parental Mediation of a History Museum’s Curriculum

Keywords: History, Informal learning, Parental involvement in learning, Primary education

Presenting Author: Billie Elam, University of Haifa, Faculty of Education, Israel

Co-Author: Merav Yosten, University of Haifa, Faculty of Education, Israel

We examined parental mediation of a history museum’s curriculum to their accompanying children during a museum visit. There is little research about this topic, in spite of the prevalence of this phenomenon as a form of informal education. Ten parent-child dyads (9-12 years old) were fitted with a small head-camera to record their entire visit, including their interactions with exhibits and related conversations.An external video camera captured their selected route and the duration spent in the museum and each of its galleries. The parent-child conversations were analyzed according to the grounded theory approach. Seven mediation categories were identified: mediating information; mediating the museum; activating the child; feedback to the child; activating the museum; mediating learning in the museum; and the general learning that takes place during the museum’s visit. These mediation categories were grouped together under the heading “Museum Conduct Mediation”. The remaining four categories which related to mediation of the museum’s curricula, were grouped together under the heading “Museum Content Mediation.” All these seven categories and the 40 mediation strategies that were identified, compose a model of the parental mediation in a history museum. Implications for museum design and informal education are discussed.

New Ways of Dealing with Lacking Measurement Invariance in Educational Research

Keywords: Out-of-school learning, Qualitative methods, School effectiveness, Teaching / instruction

Presenting Author: Markus Schirmer, DIPF, Germany

Co-Author: Desiree Thies, Deutsches Institut für Internationale Pädagogische Forschung, Germany

Educational research frequently aims to compare different groups or the development of certain (latent) constructs over time. For example researchers compare teaching quality between different countries, or the perception of teaching quality between groups (girls vs. boys). Furthermore in longitudinal studies researchers might also analyze the development of teaching quality across two or more measurement points. However, for such analyses measurement invariance (MI) between groups, subjects or measurement points is an essential precondition. In other words, we need to test if the same factor structure for a scale upwards between groups or across measurement points (MI). If the aim of a study is to compare scales between groups or MP a certain level of MI needs to be given. The following paper will discuss if lacking MI could also be an important result of its own, which should be interpreted and reported. Analyses are based on data of the Study on the development of all day schools (SEIG) and PISA 2009.

Session P 425

2 September 2017 08:45 - 10:15
Room E1 - E301
Poster Presentation

Teaching and Teacher Education

Poster Presentation: Teaching Education and Motivation

Keywords: Attitudes and beliefs, Communities of practice, Comparative studies, Content analysis, Instructional design, Motivation, Pre-service teacher education, Primary education, Problem-based learning, Collaborative methods, Reflection, Secondary education, Teacher Professional Development, Teaching / instruction, Video analysis, Vocational education

Interest group: SIG 11 - Teaching and Teacher Education

Chairperson: Brooke Sawyer, Lehigh University, United States

Comparison of teaching motivations and perceptions of male and female Estonian preservice teachers

Keywords: Attitudes and beliefs, Comparative studies, Motivation, Pre-service teacher education

Presenting Author: Mare Lehmus, University of Tartu, Estonia

Co-Author: Priit Luk, University of Tartu, Estonia

In Estonia as well as in several other countries there is problem of teachers unbalanced gender distribution in education system. We have only about 12% male teachers working in our educational institutions. Motivations why individuals choose teaching career and how they perceive teacher work have been investigated in different countries, but there are only some studies found about factors influencing teaching motivation of Estonian preservice teachers (N = 460). The Factors Influencing Teaching Choice (FIT-Choice) scale was used to collect data, and 10 factors for motivations and 6 factors for perceptions were found. Several differences between male and female preservice teachers were found. In motivations five factors from 10 were evaluated higher by female than male respondents, and in perceptions about teaching career three factors from six evaluated also higher by female respondents.

Propitious conditions for case-based learning with classroom videos: the participants’ perspective

Keywords: Content analysis, Instructional design, Pre-service teacher education, Video analysis

Presenting Author: Manuela Frommelt, University of Teacher Education Lucerne, Switzerland
Novice teachers in the Czech Republic: Why do they leave and change schools?

**Keywords:** Primary education, Quantitative methods; Secondary education, Teacher Professional Development

**Preseenting Author:** Eva Minková, Masaryk University, Czech Republic

**Co-Author:** Swetlana Hanusova, Faculty of Education, Masaryk University, Brno, Czech Republic

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Novice teachers are at a vulnerable stage of their career and are at an increased risk of quitting teaching. Therefore it is necessary to study the drop-out of novice teachers together with the reasons behind it.

Our study focuses on Czech primary and secondary beginning teachers (up to three years of experience) and aim to explore how they perceive the interactive and institutional aspects of their job as well as the broader context, how valued and supported they feel, and how this connects to their intention to stay in their school (stayers), change schools (movers) or quit teaching (leavers). Also, we focused on how their views change over time. 126 teachers completed a questionnaire consisting of 70 Likert scale items and additional context questions twice in a school year (with slight adaptations; 6 months between the stages). The distribution of stayers (73 % / 74 %), movers (17 % / 18 %) and leavers (10 % / 10%) was similar in both stages. Statistically significant differences between stayers and movers/leavers were especially in the perception of the institutional level (school, colleagues, school leadership). It is noteworthy that it was the movers who were more negative. This gap widened further with time – in the second stage, movers were even more negative towards their school context, especially towards school leadership. Stayers felt statistically significantly more valued and supported. The findings are important for educational policy as well as provide impulses for the development of teacher education and induction programmes.

A video portfolio for the summative assessment of pre-service teachers\' teaching competences

**Keywords:** Pre-service teacher education, Teaching / Instruction, Video analysis, Vocational education

**Presenting Author:** Karstin Bauwelen, University of Applied Sciences Northwestern Switzerland, School of Teacher Education, Switzerland

The increasing focus on the development of competences in European educational systems goes hand in hand with an increasing need for instruments to assess these competences reliably. In this context, at the School of Teacher Education Northwestern Switzerland a video portfolio has been developed for the summative assessment of pre-service teachers\' teaching competences at the end of their studies. Pre-service teachers submit a set of lesson plans, videotaped lessons, and analysis of and reflection on their classroom-related competences. Each video portfolio undergoes a high inference rating by two trained experts according to a mandatory evaluation rubric. It is expected that the extensive documentation of a complete real work process and well documented ratings by two trained experts will bring high about quality assessments which meet the general scientific test quality criteria (objectivity, reliability, validity amongst others).

To test this hypothesis the evaluation forms of more than 150 video portfolios of secondary school pre-service teachers are analyzed for the dimensionality of the assessed construct (factor analysis) and reliability (inter-rater reliability). To gather more information about the validity of the instrument we use a pre-service teacher and rater questionnaire after the next video portfolio examinations (N=75 resp. N=45). Moreover, the video portfolio grades are compared with pre-service teachers\' final examination grades before the introduction of the video portfolio.

At the conference we will present the concept of the video portfolio, preliminary results of our evaluation, measures for revisions of the instrument based on these results, and further evaluation plans.

School-university partnerships in Initial Teacher Education. The model \"School Adoption\"

**Keywords:** Communities of practice, Pre-service teacher education, Reflection, Teacher Professional Development

**Presenting Author:** Andreas Bach, University of Salzburg, Austria

Although the development of partnership models is considered a key concept in the current teacher training programs of many countries, the collaboration between schools and universities in Germany has not been professionalized yet, and is characterized more by traditional roles. The European University of Flensburg was the first university in Germany to implement the concept of \"School Adoption\" in the teacher education program. The model is part of a long-term internship (\"practical semester\") and takes place in the Master\'s program. During the so-called \"adoption week\", student teachers teach all lessons at a school, while the teachers engage in further education. Faculty staff members from the university work intensively together with student teachers and teachers. The overall goal is to develop a form of cooperation in practical teacher training that can support the professionalization of the student teachers as well as the development of the participating school. The first results of an accompanying evaluation show a high level of satisfaction with the new practice model among all participants. This paper reports on the concept of the Flensburg model and on the results based on the transactional stress model, which show that student teachers tend to see the complexity of teaching more as a positive challenge after participating in the partnership model.

Evidence-based optimization of a learning setting to support professional vision

**Keywords:** Content analysis, Pre-service teacher education, Video analysis, Problem-based learning

**Presenting Author:** Victoria L. Barth, Freie Universität Berlin, Germany

**Co-Author:** Valentina Piwovar, Freie Universität Berlin, Germany

**Co-Author:** Diemut Ophardt, Technische Universität Berlin, Germany

**Co-Author:** Katharina Krymansk, Freie Universität Berlin, Germany

**Co-Author:** Tina Rös Kusmich, FB Erziehungswissenschaft und Psychologie, Germany

**Co-Author:** Felix Ch. Thiel, Freie Universität Berlin, Germany

While previous studies demonstrated that the competences of professional vision can be supported through case-based learning/Goeze, Zettmann, Vogel, Fischer, & Schrader, 2014; Piwovar, Thiel, & Ophardt, 2013), there are almost no empirical findings which examine the efficacy of the learning setting for case-based learning. Using two quasi-experimental studies, we explored (1) if there are differences between the professional vision of pre-service teachers when a problem-based learning setting entails elements of direct instruction vs. if it does not. And (2), if this learning setting can increase the competencies of professional vision for classroom disruptions as well as the knowledge of classroom management by pre-service teachers over time. To assess professional vision of classroom disruptions, we used a video-based case analysis with an open response format (Barth, A. et al., 2014).

Session P 426

2 September 2017 08:45 - 10:15

Pinni A - A3103

Poster Presentation

Motivation; Social and Affective Processes

Poster Presentation: Motivation, Attitudes and Beliefs

**Keywords:** Attitudes and beliefs, Collaborative Learning, Conceptual change, Educational policy, Emotion and affect, Experimental studies, Goal orientation, Misconceptions, Morality, Motivation, Motivation and emotion, Parental involvement in learning, Pre-service teacher education, Primary education, Secondary education, Social interaction, Synergies between learning - teaching and research, Teacher Professional Development, Teaching approaches

**Interest group:** SIG 08 - Motivation and Emotion

**Chairperson:** Yuri Uesaka, University of Tokyo, Japan
understanding of the cognitive influence model. The purpose of the present study was to examine the factors associated with the development of a promotion versus prevention regulatory focus, which in turn influence the motivation for academic goals. As part of a larger study, participants identified three personal goals and indicated their reasons for pursuing them. For the purposes of the present research, however, all goals were coded and the first academic goal indicated for each participant was used. We also measured participants’ regulatory focus and their perception of autonomy support from their parents and favorite professor. We examined whether both parenting and teaching style (i.e., autonomy supportive versus psychologically controlling) is associated with a promotion or prevention orientation and, in turn, whether such orientations influence motivation for academic goals. Preliminary results indicate that autonomy support from parents was significantly associated with students exhibiting a promotion orientation, while autonomy support from favorite professor was only marginal. Neither autonomy support from parents or professor was associated with a prevention-orientation. Further analyses investigate whether promotion and prevention orientations differentially predict motivation for pursuing academic goals (i.e., autonomous, controlled, approach and avoidance motivation). Discussion will focus on potential limitations in terms of student autonomy support and how both parents and teachers can influence the way students frame their experience during academic goal pursuit.

The influence of attitudes and emotions in learning from multiple texts
Keywords: Attitudes and beliefs, Conceptual change, Emotion and affect, Misconceptions
Presenting Author: Ian Tricker, University of Southern California, United States
Co-Author: Krista Muus, McGill University, Canada
Co-Author: Gale Sinatra, University of Southern California, United States
Co-Author: Robert Danielson, University of Southern California, United States
Co-Author: Reinhard Peckrun, Ludwig Maximilians-Universität (LMU), Germany
Co-Author: Philip Winne, Simon Fraser University, Canada
Co-Author: Marianne Chevrier, McGill University, Canada

We assessed the effects of reading multiple refutation texts about genetically modified foods (GMFs) on participants’ misconceptions and attitudes. University students (N=217) drawn from two North American universities first read a refutation text on GMFs and were then randomly assigned to receive additional information about advantages of GMFs, disadvantages of GMFs, or both. Results revealed that students reading about the advantages of GMFs had significantly better attitudes than students that read about the disadvantages. Results also suggest that emotions significantly predicted changes in attitudes. There were also significant knowledge gains overall. Theoretical and practical implications are discussed including the impact these findings may have on science education.

How perceived emotions of classmates affect students’ emotions
Keywords: Attitudes and beliefs, Emotion and affect, Social interaction, Motivation and emotion
Presenting Author: Philipp Forster, Ludwig Maximilians-Universität (LMU), Germany
Co-Author: Kaig Shao, University of Munich (LMU), Germany
Co-Author: Reinhard Peckrun, Ludwig Maximilians-Universität (LMU), Germany

The emotional environment in the classroom setting has been identified as important to students’ experience of emotions (Peckrun, 2006). However, research on the role of students’ emotions for their own experienced emotions is largely lacking. To redress this research deficit, we investigated N = 104 Chinese middle school students. Correlational analyses revealed that students’ perceptions of their classmates’ enjoyment, anxiety, and boredom are positively related to their own experience of these emotions. Mediation analyses showed that the link between students’ perceived and experienced enjoyment is mediated by their appraisals of control and value. Overall, our findings support the importance of students’ perception of others’ emotions for their own emotional lives.

Viewpoints to tablet computers, learning and motivation – how are they related?
Keywords: Collaborative learning, Primary education, Secondary education, Motivation and emotion
Presenting Author: Laura Hirsto, University of Eastern Finland, Finland
Co-Author: Timo Tossavainen, University of Eastern Finland, Finland

In this paper the experiences of using and utilising tablets for learning among students of two different types of combined elementary and secondary schools in Finland. Earlier research had shown contradictory results on the effects of the use of tablets and iPods in education for learning and motivational themes. Thus, it is evident that we need more research to find out and understand the potential of tablets for learning (e.g. Underwood & Farrington-Flint, 2015). The aim of this paper is to investigate primary and secondary education students' experiences of learning in two different kind of tablet school contexts. The first school has had few years of experience of using one-to-one tablets in all subject areas frequently, and the other has used school-based tablets more seldom. According to preliminary results, pupils experienced these differing contexts varied. Of course, the better availability of the tablet facilitated more varying pedagogical use of them. However, there seemed to be also different kinds of general pedagogical practices in these two contexts. Pupils in the one-to-one tablet school more often reported practices that facilitated self-regulated learning and collaborative knowledge building. The results will be discussed in the light of earlier studies and theoretical viewpoints to motivation.

Exploring teacher-student boundaries through ethnocentric dilemmas in the secondary school context
Keywords: Educational policy, Morality, Pre-service teacher education, Teacher Professional Development
Presenting Author: Zuzana Moly, Masaryk University, Austria

Teachers face frequent ethnocentric dilemmas in their daily work (Shapira-Lishchinsky, 2011), and require adequate skills in ethical reasoning (Strike & Sollis, 2009:227 early career secondary teachers in Australia who had up to five years teaching experience responded to five vignettes presented within a survey as part of a larger study. Each vignette outlined a brief situational context in which ethical boundaries of a teacher may be compromised. The interaction domains depicted in the vignettes were: physical support, connectivity, emotional support, instrumental support. Three themes emerged in the responses across all vignettes: proposed action, contextual considerations, and protective behaviour. Higher order themes and their relationships are examined within the ethical policy context of teachers.
In this paper, participatory roles in productive small student groups working in a collaborative virtual science learning environment are examined. The study took place in six upper secondary schools in advanced-level biology and chemistry courses. The students worked in 39 small groups of three or two students. Teacher support was provided. In all three 75-95 minutes working sessions, both teachers and peer groups were videotaped and audio recorded, when the students were conducting a scientific experiment in a virtual collaborative science learning environment. Finally, the groups prepared and carried out presentations about their collective outcomes (= group outcome). Outcomes were evaluated on six levels (from 1 = low to 6 = high) by independent science experts in regard to the research plan, hypothesis, conclusions and quality of scientific language. Altogether six traits (two low, two averages and two high outcomes groups) were chosen for the role analysis. The identification of participatory roles is based on observable, verbal or non-verbal inputs at the turn level. The video data is analyzed with Noldus Observer XT 12 program. Preliminary outcomes show the same kind of role patterns that were found in the study of Volet et al. (2016): High performing groups adopted more content focused roles and showed more flexibility in role taking and role distribution among the group members than lower performing groups. However, also some meaningful differences were identified. In-depth analyses for all six groups will be conducted.

The effect of cooperative learning on group work skills of pupils in Dutch primary education

Keywords: Cooperative / collaborative learning, Peer interaction, Primary education, Quasi-experimental research

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Co-Author: Tom Snijders, University of Groningen, dep. of sociology, Netherlands

Co-Author: Simone Doolard, University of Groningen, Netherlands

Although research on cooperative learning emphasizes the positive effects on student outcomes, there is limited use of cooperative learning in schools.Success for All - The Netherlands (SIA-NL) tries to increase the quality of group work in Dutch primary education. The main research question of the study is whether the SIA-NL program leads to improved group work skills of primary school pupils. A quasi-experimental design with a treatment and a control group is used. At the end of school year 2015-2016 grade 1 pupils (6- and 7-year-old children) executed a cooperative learning task in small groups of four pupils (N = 152), which was recorded on video. When the cooperative learning task took place, the pupils of the treatment group had followed SIA lessons for a whole school year. The observation instrument of Blatchford, Barnes, Rubie-Davies, Basset and Chowne (2006) that is used, involves four categories to measure the group work: socioemotional ethos, group participation, discourse topic and type of pupil-pupil dialogue. At this moment, video coding is ongoing. After completing the coding, treatment and control group will be compared by using multilevel analysis. Findings will be presented at the conference. In general terms, it is predicted that changes in behavior as a result of involvement in the SIA-program will lead to more effective group work.

Using Twitter data to understand participation in a science outreach campaign

Keywords: Informal learning, Science education, Social aspects of learning and teaching, Technology

Presenting Author: Adam Maloie, Indiana University, United States

In this poster we will share the results of our research on a recent social media campaign run by Science Friday, a major science-related radio show with >1M listeners each week in the United States. The campaign was #GaphaplopWeek and focused on Twitter. We captured ~13,000 tweets that were part of this campaign. We will discuss the process of collection and share results on who participated and the nature of their participation. Initial results indicate that most of the content was posted by the main participating organizations with most of the activity being retweets of that information. We believe the results of this research can provide information on how they might expect their social media followers to participate in a campaign.

Indigenous Participation in Arts Education: A framework for increasing learning outcomes

Keywords: Arts, Communities of learners, Culture, Social aspects of learning and teaching

Presenting Author: Robert Barton, Griffith University, Brisbane, Queensland, Australia

This paper presentation examines current approaches to teaching and learning for Indigenous students globally. It explores how the role of the arts and arts education as a vehicle for realising social justice particularly through storytelling is vital for success for Indigenous students in schools. Results for Indigenous students continue to sit well below that for the non-Indigenous population, demonstrating the need for such an approach. This presentation will therefore suggest that stories and storytelling is a key and more appropriate pedagogical approach for better engaging Indigenous students particularly through the arts and arts education. Stories and storytelling provide important social and cultural functions for Indigenous students. A stronger focus on this approach will ensure that cultural diversity is not a barrier to education participation and performance but rather an enabler. A prospective framework for designing and developing narratives through arts-based practice for Indigenous students is shared. The model is causal in its structure and relationship between each focal point as the story line moves down from "Why?" and then from left (History?) to right (Where?). The framework is visual in its presentation provides a road map of the journey's students will undertake throughout the course of a lesson/topic area. Students can be engaged both in the design and development of content against each element of the model or the teacher can choose to use the framework as a basis for developing their lesson structure and underpinning delivery for narrative into the class.

School social work in Switzerland. Characteristics and factors of interprofessional collaboration

Keywords: Primary education, Quantitative methods, Social interaction, Social sciences

Presenting Author: Monica Brunn, Swiss School of Social Work, Switzerland

Co-Author: Simone Ambard, University of Bern, Switzerland

Co-Author: Roger Piitkärni, Bern University of Applied Sciences, Switzerland

Co-Author: Ueli Hostettler, PHBern - University of Teacher Education, Switzerland

Today schools deal with a number of emerging social issues. This places new demands on the division of work and on the collaboration between different professional groups, including services of school social work which have recently been established in many Swiss schools. Yet, little research has examined how school social workers collaborate with relevant actors within schools. The present study addresses this gap by exploring the existing forms of collaboration between school social workers, principals and teachers. Based on an interdisciplinary approach, the study identifies factors that influence interprofessional collaboration. More specifically, the study should help to achieve a better understanding of how external pressures due to social problems, resource adequacy, leadership, role perception, and the organization of social work influence the collaboration among the various actors involved. By doing so, the project will contribute to the advancement of basic research on school social work and on interagency collaboration between schools and youth welfare services. At the same time, researchers invest in facilitating the transition of knowledge from basic research to the field of practice. It is expected that the various actors will make use of research findings when reflecting their professional practice and when developing new directions for their actions. To obtain the data from several hundred schools, online surveys and paper-and-pencil questionnaires are used for data gathering. For data analysis, descriptive analyses, linear regression analysis as well as mediation analysis are performed.

Teacher-Student Relationships From Kindergarten to Sixth Grade and Students’ School Adjustment

Keywords: Achievement, Educational Psychology, Social aspects of learning and teaching, Social interaction

Presenting Author: Rianne Bosman, University of Amsterdam, Netherlands

Co-Author: Debora Roorda, University of Amsterdam, Netherlands

Co-Author: Irene van der Veen, Kohnstamm Institute, University of Amsterdam, Netherlands

Co-Author: Heima Koomen, University of Amsterdam, Netherlands

This study used a person-centered approach to identify teacher-student relationship trajectories from kindergarten to sixth grade. Additionally, predictors of relationship trajectories and students’ motivation and academic adjustment in sixth grade were examined in a Dutch sample. Teachers reported about relationships with individual students (N = 1300) in kindergarten, grade 3, and grade 6 (i.e., closeness, conflict, and dependency), and they provided information about externalizing problem behaviors in kindergarten. In sixth grade, students performed on math and reading tests and completed questionnaires about task motivation and self-efficacy. Latent class growth analyses demonstrated three trajectories for closeness: high and stable (normative), very high and decreasing, and moderate and increasing. For conflict, low and stable (normative), low and increasing, and high and decreasing trajectories were found. For dependency, a low and decreasing (normative) and a low and increasing trajectory were found. Boys, students with lower verbal abilities, and students with more externalizing problem behavior were overrepresented in non-normative trajectories. Students with low teacher-student closeness in kindergarten or enduring exposure to negative teacher-student relationships during elementary school (low and increasing levels of conflict and dependency), scored lower on achievement tests and motivation at the end of elementary school than students in normative trajectories.

Session P 428

2 September 2017 08:45 - 10:15
Meeting Point: I 016B
Invited Symposium

New measurements of professional learning: On the explanatory power of new data collection methods

Keywords: Assessment methods and tools, Biology, Cognitive skills, Cooperative / collaborative learning, Emotion and affect, Game-based learning, Informal learning, Motivation and emotion, Neuroscience, Quantitative methods, Social interaction, Workplace learning

Interest group: STEM 14 - Learning and Professional Development

Discussant: Erno Lehtinen, University of Turku, Finland

Sociometric badges and WiFi sensors: using wearable sensors to study dynamics of social learning

Presenting Author: Maaike Ekindjik, University of Twente, Netherlands

Co-Author: Piet Van den Bossche, University of Antwerp, Belgium
Social interaction at the workplaces is at the basis of various forms of social learning, such as knowledge sharing, feedback giving and help seeking. Due to the dynamic nature of these processes, social learning at the workplace is extremely difficult to measure using self-report measures. Wearable sensors have opened a new world of possibilities to study the dynamic characteristics of social interaction in an innovative way. With the present studies, we aim to increase understanding of how sensor technology can be used to understand the dynamics of social learning.

We experimented with two types of sensor technologies to continuously measure social interaction. In one of the studies, we tracked the location of 48 employees of a healthcare department for three weeks, using WiFi-tags. In addition, somometric badges were used during four days to measure social interaction and validate the WiFi-tags. Social network measures (density, centrality) were applied to calculate the dynamics of social interaction patterns and were related to individual characteristics, such as proactive personality.

Our study contributes to the existing literature with more detailed and ecological valid insights on how day-to-day interaction patterns between employees evolve and how this is related to individual characteristics. During the presentation, we will show a number of possible applications of how sensor technology can be used to describe the dynamics of social interaction patterns as a proxy for social learning (based on our experiences and main the challenges of sensor technology to study social learning at the workplace.

Developing methods for understanding the Role of Emotions in Agentic Learning at work (REAL)
Presenting Author: Anneli Elsäepeto, University of Jyväskylä, Finland
Co-Author: Päivi Hikku, University of Jyväskylä, Finland
Co-Author: Susanna Paloniemi, University of Jyväskylä, Finland
Co-Author: Katja Vähtsäinen, University of Jyväskylä, Finland

In the REAL project, our objective is to determine how salient emotions are related to the quality of professional learning processes and outcomes. In addition, we aim to develop an innovative method for the on-line assessment of emotions within professional learning contexts. In previous studies of emotions, the limitations of self-reports have often been noted, and it has been suggested that self-reports should be combined with observational and psychophysiological data. In the REAL project, we shall utilize complementary data collected via (i) self-reports and (ii) physiological indicators of the autonomous nervous system (ANS) to measure involvement in learning and the assessment of the quality of learning. The on-line assessments will be collected via a net-based Emotion Circle. The physiological data include electro dermal activity (EDA), collected via a net-based Emotion Ring. Data on heart rate variability (HRV) will be collected via simultaneous registration of various heart rate indicators. In the first stage, we shall use a simulated recording procedure in which we play back to the participants the video-recorded situations of their group-based training sessions. At this point we shall ask them to evaluate their emotions within the videotaped training sessions using Emotion Circle as combined with thinking aloud, interviews, plus the registration of EDA and HRV. In the data analysis, we shall identify the most important emotions and investigate how they are related to the quality of the learning processes and outcomes.

How can neuroscience and education move forward together? Myths and opportunities
Presenting Author: Nienke van Attewiel, VU University Amsterdam, Netherlands

Modern neuroscience research, including neuro-imaging techniques such as functional magnetic resonance imaging (fMRI), enables exploring the living human brain with unprecedented accuracy. Not surprisingly, these recent developments in neuroimaging raise high expectations in society, and in the educational practice in particular. The translation of neuroimaging research to the practice is however not straightforward and sensitive to misconceptions. For example, common myths are that we only use 10% of our brain, or the idea that learners are either “left-brained” or “right-brained”. Moreover, it is often wrongly assumed that we can use brain scanners to “see” any kind of trait (e.g. intelligence) or disorder (e.g. learning or developmental disorders) in individual brains. To clear the field for the promising opportunities provided by neuroimaging research, it is essential to unravel such misconceptions, as they distract attention and resources away from the promising developments. In this presentation, I will set out which steps are involved in translating neuroimaging research to the educational practice, to present a realistic overview of misconceptions vs. the opportunities provided by techniques such as fMRI.

Error detection beforehand? Eye-tracking and face recognition for analyzing learning from errors
Presenting Author: Christoph Fischer, University of Paderborn, Germany
Co-Author: Torben Tönichges, University of Bielefeld, Germany

Since working life becomes complex and challenging, learning from errors is an important issue of professional learning. Learning from errors implies consternation and emotional reactions, otherwise cause analyses and reflection upon alternatives remain undone. The eyes are crucial sensors for information processing and the human face reflects emotional reactions. Hence, both are relevant sources for the investigation of learning from errors. On the basis of standardized video tasks, 20 subjects are repeatedly prompted to problem solving and conducting errors. Learning from errors is measured through the avoidance of the identical error in a repeated attempt. The experiments aim at investigating (a) if learning from errors requires an emotional reaction, and (b) if gaze behavior and face expression presage committing an error. The first issue is relevant for the theory on learning from errors, the second issue is of specific relevance for human-machine interactions and the design of digitalized workplaces. Looking behavior is gathered by eye-tracking data (e.g. saccadic amplitudes) and emotional reactions are gathered through automated face recognition via video camera. The contribution reflects the reliability of eye-tracking and face-recognition data for analyzing professional learning processes.

Session Q 429
2 September 2017 10:30 - 12:00
Main Building D - 01DB
Single Paper

Instructional Design, Motivational, Social and Affective Processes
Paper Presentation: Motivation and Secondary Education
Keywords: Cognitive skills, E-learning / Online learning, Educational attainment, Educational Technology, History, Instructional design, Meta-analysis, Motivation, Motivation and emotion, Science education, Secondary education, Social interaction
Instructor Group: SIG 08 - Instructional Design, SIG 08 - Motivation and Emotion
Chairperson: Danny Kostons, University of Groningen, Netherlands

Course design perception in MOOCs: comparing performance between on-campus and worldwide students
Keywords: E-learning / Online learning, Educational Technology, Instructional design, Motivation
Presenting Author: Sophie Dandache, UCL, Belgium
Co-Author: Marianne Fennay, Université catholique de Louvain (UCL), Belgium
Co-Author: Pierre Badel, Université catholique de Louvain (UCL), Belgium
Co-Author: Mr Reuchamps, Université catholique de Louvain (UCL), Belgium
Co-Author: Nathalie Schirffe, Université catholique de Louvain (UCL), Belgium

This study highlights the importance of taking into consideration the motivation to enroll in a MOOC when constructing it. More precisely, we want to see whether two groups of learners can be distinguished in function of their will to obtain or not a certificate. We will then compare how, in function of their motivation to enroll in a MOOC, the different choices of the participants’ satisfaction, their perception of the course’s instructional design and their rate of success can differ. Therefore, participants who followed a MOOC on political sciences were asked to answer to a survey before and after having followed the course. The sample (N=226) was composed of students who were following the course on-campus in a flipped classroom way and of external participants from all around the world. By this, we raised the likelihood of having learners of both types (i.e. who is versus is not interested in obtaining a certificate). Results showed indeed that the sample could be clustered in function of their motivation to follow the course. By the means of t-test, three factors could be retained to reflect the learner’s opinion on the different instructional design elements namely: workload, design and assessment. Finally, path analyses were conducted to compare the link between learners’ satisfaction, opinion on the instructional design and success on the MOOC. Results showed that the paths significantly differed between both clusters. Results are discussed in terms of elements to take into consideration when building and/or following a MOOC.

Autonomy support and thwart in the classroom: triggers for teachers
Keywords: Motivation, Secondary education, Social interaction, Motivation and emotion
Presenting Author: Alexander Minaert, University of Groningen, Netherlands
Co-Author: Kim Stroot, Leiden University, Netherlands
Co-Author: Marie-Christine Opdenaker, University of Groningen, Netherlands

The first years of secondary education are precarious for students, as their commitment to education tends to decline. Teacher-student interactions are critical in this regard, with according to Self-Determination Theory, among others, teachers’ autonomy support and thwart being of relevance. While current research on the topic has focused primarily on their learning processes, and progression of the school year, Multilevel analysis showed, in line with expectations, teachers’ expression of autonomy thwart to be most uncommon in the most innovative schools, while no differences between types of schools were found for teacher autonomy support. Further, in line with expectations, expressions of autonomy support became less common as the school year progressed, while for autonomy thwart no effect of progression of the school year was found. In the last step of the analyses, these differences between types of schools were examined qualitatively to establish what teaching practices had induced them.

Micro-level views on task characteristics, situational interest and the use of learning strategies
Keywords: Cognitive skills, History, Secondary education, Motivation and emotion
Presenting Author: Isabell Baumes, Universität Passau, Germany
Co-Author: Matthias Boehm, Universität Passau, Germany
Co-Author: Volker Gotta Mägli, Universität Passau, Germany
Co-Author: Andreas Michler, Universität Passau, Germany
Co-Author: Christof Woeber, Universität Passau, Germany


Interestlessness and personal significance as components of situational interest are regarded as key factors for learners’ use of learning strategies and may be influenced by characteristics of learning tasks (e.g. task structure, graphical design elements, and the type of intended learner activity). Especially challenging tasks influence personal significance and the use of learning strategies. So far, classification systems for describing characteristics of tasks are still lacking. Thus, this study presents the development of a classification system and investigates the relationship between task characteristics, learners’ situational interest and their use of learning strategies.

It is hypothesized that surface task characteristics mainly affect interestlessness, whereas the type of activity should affect both components of situational interest. Furthermore, personal significance is hypothesized to predict learners’ use of elaboration strategies especially for tasks that are ill-structured, less illustrated, or require challenging learner activity.

Initially, a classification system for the task characteristics was created. Subsequently, the participants (N = 801 6th graders) solved 34 tasks. For each task situational interest and learning strategy data was collected. Changes in the relationship between the components of situational interest and the use of learning strategies caused by the influence of task characteristics were explored by a combination of SEM analyses and meta-analyses.

The classification system was verified. Descriptive analyses revealed that surface characteristics of the tasks affected interestlessness, whereas students’ activity affected both components of situational interest. Only personal significance predicted the use of elaboration strategies, varying significantly by the type of task. Implications of the findings were discussed.

**Encouraging a career in science? A review of school effects on students’ future orientation in STEM**

**Keywords:** Educational attainment, Meta-analysis, Science education, Secondary education

**Presenting Author:** Sigrid Reinhard, Technical University of Munich, Germany

**Co-Author:** Doris Holzberger, Technical University of Munich, TUM School of Education, Germany

Although previous research points out that schools play a central role for students’ future orientation (science, technology, engineering and mathematics (STEM), relationships have not yet been investigated based on a joint theoretical foundation and therefore have not been established sufficiently. In order to investigate the status quo and derive suggestions for further research in this area we conducted a systematic literature review. By means of data base and manual journal search we found 251 articles. According to our inclusion criteria, we finally included 28 peer-reviewed journal articles published between 1990 and 2015, investigating school effects on students’ future orientation in STEM via quantitative, qualitative, or mixed methods. Our analyses showed that the studies were diverse concerning investigated outcomes. The individual items in STEM, hypothesized relationships, as well as in their results. In order to systematically advance the research field, we derive an integrated framework of school factors and future orientation in STEM and two main challenges for future research: (1) need for theory-based research, and (2) towards more sophisticated models.

**Session G 430**

2 September 2017 10:30 - 12:00
Main Building D - D11
Single Paper
Teaching and Teacher Education

**Paper Presentation:** Teaching and Teacher Education - S

**Keywords:** Assessment methods and tools, Attitudes and beliefs, Comparative studies, Competences, Developmental processes, Higher education, Learning approaches, Mixed-method research, Pre-service teacher education, Secondary education, Teacher Professional Development, Teaching approaches

**Interest group:** SIG 11 - Teaching and Teacher Education

**Chairperson:** Paul Ayres, University of New South Wales, Australia

**Mathematics Teachers’ Attitudes Towards Homework and their Comparison to Science Teachers’ attitudes**

**Keywords:** Attitudes and beliefs, Comparative studies, Learning approaches, Mixed-method research

**Presenting Author:** Ida Kulikansky, Ruppin Academic Center, Israel

**Co-Author:** Haim Ershav, Ben Gurion University of the Negev, Israel

Homework (HW) is an integral part of the learning process. Homework’s advantages can be divided into three aspects: cognitive, pedagogical, and affective and its disadvantages can be divided into affective, social, and pedagogical aspects. Teachers’ attitudes are known to have a great influence on their actual practices in their classes; thus, it is important to extend our knowledge about teachers’ attitudes toward HW. This research was divided into two parts. In the qualitative part of the study 25 teachers were interviewed. The interviews dealt with the rationale behind assigning HW, their advantages and disadvantages, and the types of HW given. Through inductive analysis categories were extracted. The research tool in the quantitative part of the study was a questionnaire that was distributed to 154 teachers of mathematics and 63 science teachers. In general, teachers’ attitudes toward HW were found to be moderate with an average of 3.485. The study compares between male and female mathematics teachers’ between teachers with different experience and between teachers teaching at different school levels (lower secondary). The results of the mathematics teachers’ mean attitudes toward HW revealed that they were significantly higher than those of science teachers in several categories. These differences probably stem from the different approaches toward mathematics and science teaching.

**Task-Specific Difficulty Judgments of Teacher Students**

**Keywords:** Assessment methods and tools, Competences, Secondary education, Teacher Professional Development

**Presenting Author:** Justine Stang, University of Passau, Germany

**Co-Author:** Detlef Uhrhaue, University of Passau, Germany

The study aimed to examine the accuracy of task-specific difficulty judgments of teacher students and the influences of personal characteristics such as self-perceived judgment ability or curriculum knowledge on task-specific judgment accuracy. Ninety-two teacher students participated in the online study. Teacher students were mainly female and studied on average at the university for about five semesters. They had to decide whether ten mathematics tasks are real learning material of sixth graders or not and were asked to estimate the difficulty of twelve mathematics tasks. These judgments were compared with the reported difficulty of the standardized mathematics tasks. Results showed that teacher students had problems to judge task-difficulty. They overestimated task-difficulty and seldom could bring the tasks into the correct difficulty order. Higher curriculum knowledge, however, helped teacher students to judge task-difficulty more accurately. The results are discussed in terms of content with implications for research and educational practice.

**Changes in Dealing with Requirements during Practical Training**

**Keywords:** Developmental processes, Mixed-method research, Pre-service teacher education, Teacher Professional Development

**Presenting Author:** Julia Kosnar, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

**Co-Author:** Oziel Atlin, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

**Co-Author:** Melanie Billich Knapp, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

Teacher trainees complete four phases of practical training during their studies at the School of Teacher Education in Switzerland. The study “Developmental tasks of teacher trainees in their field studies” examined the individual perception of demands and their description by students at the end of each practical training. The data was collected through guided interviews (N=36) and was categorically analysed in an inductive procedure (Böhm 2004).

As a theoretical background we used the concept of developmental tasks (Havighurst). For career entry an empirically proved canon of professional developmental tasks (role-taking, classroom-management, adaptive instruction and cooperation) has been identified (Keller-Schneider & Hericks 2011). Through our data a compilation of requirements for practical training emerged. The results show a high compatibility of demands in the named four domains but also that challenges differ according to different states of professional development. In addition, a fifth dimension was found, labelled as “undergoing a training situation”.

Subsequently, based on more than 80 questions mentioned in interviews, a questionnaire was developed, asking for (1) the relevance teacher students assign to various demands, (2) how competent they consider themselves in dealing with these and 3. the extent they feel stressed by them. Up to now, it was conducted in two pre-tests.

In our contribution, the identified developmental tasks will be illustrated by concrete data and interesting outcomes of the survey will be presented. The results confirm the relation between the three dimensions which will be proved by conducting them to a theoretical model of processes of professionalisation.

**Teacher students’ experiences of flipped learning – Relations with learning orientations and goals?**

**Keywords:** Attitudes and beliefs, Higher education, Learning approaches, Teaching approaches

**Presenting Author:** Laura Hirsto, University of Eastern Finland, Finland

**Co-Author:** Sanna Väisänen, University of Eastern Finland, Finland

The aim of this paper is to explore and present teacher students experiences of flipped learning in relation to their learning orientations and goals for their own learning in the course and in teacher education. The flipped learning design includes generally the ideas that students are (1) provided online (lecture) material before class time, (2) engage in discussion and collaborative group work during face-to-face sessions, and (3) engage in higher-order activities. There seems to be support for the efficiency of the flipped learning design on student attainment and engagement. However, there is also evidence that student experiences in learning environments depend also from their learning goals, and their time use for preliminary assignments. There seemed to be differences in the experiences between elementary teacher students and subject teacher students.

**Session G 431**

2 September 2017 10:30 - 12:00
Main Building C - C7
Differentially instructed instruction to address student diversity in learning: effects, practices and training

Keywords: Cultural diversity in school, Learning and developmental difficulties, Meta-analysis, Mixed-method research, Primary education, Qualitative methods, Secondary education, Student, Teaching, Professional Development, Teaching / instruction

Interest group: SIG 11 - Teaching and Teacher Education

Organiser: Katrin Struyven, Vrije Universiteit Brussel (VUB), Belgium

Discussant: Leonidas Kyriakides, University of Cyprus,

Cognitive effects of differentiation practices: A systematic review and meta-analysis

Presenting Author: Marjolein Deurk, University of Groningen, Netherlands

Co-Author: Heester Beoer, University of Groningen, Netherlands

Co-Author: Hester Boer, University of Groningen, Netherlands

Co-Author: Roel J. Boeker, Rijksuniversiteit Groningen, Dept of Education and GION, Netherlands

The importance of dealing with cognitive differences of students by applying differentiation practices, like taking into account individual instructional needs within ability groups, is currently greatly emphasized by educators, research, and policy. However, the evidence remains unclear. Especially the question how to ensure that students of all ability levels profit equally of the differentiation is yet unanswered.

We conducted a systematic review and a meta-analysis in order to give an overview of the effects of differentiation practices on language and math performance in primary education, synthesizing the results of empirical studies (n = 21) on this topic since 1995. We found that using computerized systems as a differentiation tool and using differentiation as part of a broader program or return had small to moderate positive effects on students' performance. Between- or within-class homogeneous ability grouping had a small negative effect on ability students, but no effect on others. The finding that ICT can be a useful tool to facilitated differentiated instruction is not covered in earlier reviews. In line with earlier reviews, our findings emphasize that ability grouping alone is not enough to guarantee 'good' differentiated instruction. Other differentiation practices, like peer instruction, should be considered.

Differentially instructed instruction in mixed-age classes – Results from a study in small, alpine schools

Presenting Author: Robbert Smit, University of Teacher Education St. Gallen, Switzerland

A teacher in a mixed-class is necessarily aware of the need to consider individual learning goals when preparing the lessons. Differentiation can be defined as an approach to address the diverse needs of individual students and small groups of students to maximize the learning opportunity for each student in a classroom (Tomlinson, 1999). Mixed-age teachers use different teaching practices to deal with their age-heterogeneous classes. But what do these practices look like? How intensely do the students use them? And can we consider them as differentiated instruction? The Swiss-Austrian project "Small schools in the region that give training as a place for teaching and learning in these rural provinces. We employed a mixed-methods research design with a priori questionnaire survey (N=260 teachers), followed by a case study of 31 schools. Based on interviews with the teachers, it shows that they use a variety of different teaching practices, but mainly during seatwork. Many teachers, however, do not employ differentiated instruction to its full potential. The teachers complain that they often miss the time to meet the individual needs of each child. One reason is that they have to share their attention to several grades. The quantitative analyses evidences that school development in a professional teaching team fosters good and more frequent differentially instructed moderation by high self efficacy expectations.

Training primary education teachers to differentiate: Effects on teaching and student learning

Presenting Author: Evelyn Krasabergen, Utrecht University, Netherlands

Co-Author: Eva van de Weijer-Bergsma, Utrecht University, Netherlands

Co-Author: Emilia Praz, Utrecht University, Netherlands

Co-Author: Johannes Van Luijt, Utrecht University, Netherlands

The increasing diversity of students within primary school classrooms requires teachers to adapt their lessons to the varying educational needs of their students (‘differentiation’). In the current large scale study, project GROW, we evaluate the effects of an intensive professional development (PD) program targeting differentiaion in primary school mathematics on teachers' instructional behavior and student achievement and motivation. Thirty primary schools (grade 1 to 6) divided over three cohorts participated in the two-year study. Schools from the different cohorts received training in a phased design with repeated measurements. Student achievement was evaluated in 5608 and motivation (self-efficacy, self-concept and task-value) in 10288 students, respectively. Instructional behaviors during mathematics lessons were observed in a subsample of several cohorts in several contexts (i.e., grade level, intelligence and working memory). Results show that teachers who received the PD program adopt more often differentiation practices than the control teachers, but only in control. In year 1, growth in student mathematics achievement was larger in the cohort that received the PD program. Preliminary analysis suggests that the PD program has more positive effects on student self-efficacy, but not with concept or task-value. Effects on students were not visible in year 2. The results of this large-scale study show that teacher professional development about differentiation in primary mathematics education can have positive effects on teacher behavior, student achievement and motivation. However, the results also indicate that the PD program cannot be considered a cure-all that requires long-term efforts. Future research should examine how PD can be further optimized to enhance implementation of differentiation.

Differentially instructed instruction in secondary education: Results from a professional development programme

Presenting Author: Wouter Smets, Karel de Grote University college, Belgium

Co-Author: Debbie Deneve, Karel de Grote Hogeschool Antwerpen, Belgium

This study presents the analysis of an in-service teachers' professional development programme. The participants intend to introduce differentiated instruction in their lessons. They share a commitment to improving education to deal better with the diversity in an ever-changing social context. Therefore, the concept of differentiated instruction such as articulated by Tomlinson (2000) is used, focusing on student’s readiness levels, interests and learning profiles. After a 3-days PD program the participants worked collaboratively in teacher teams and got four months of coaching from an external expert. Participants of the programme experienced four core elements of effective instruction: (1) knowledge; (2) facilitation; (3) support; (4) teachers’ and students’ mindset. Depending on the school and the teacher team in which differentiated instruction is introduced, they are experienced as a concern or rather as a success factor. These factors are discussed using Fullan’s (2001) framework for educational change. The introduction of differentiated instruction may be seen as a complex and context dependent process.

Session G 432

2 September 2017 10:30 - 12:00
Virta - 120
Symposium

Motivational, Social and Affective Processes, Teaching and Teacher Education

Teacher Self-Efficacy and Its Development in Diverse Contexts

Keywords: Teacher education, Pro-service teacher education, Qualitative methods, Self-efficacy, Teacher Effectiveness, Teaching / instruction

Interest group: SIG 11 - Teaching and Teacher Education

Discussant: Robert Klassen, University of York, United Kingdom

Cognitive Processes Underlying Self-efficacy in Expert, Novice, and Beginning Teachers

Presenting Author: Izabell Jonauskaite, University of York, United Kingdom

Co-Author: Liza Kim, University of York, United Kingdom

Co-Author: Neil Dyer, University of York, United Kingdom

This study examined the cognitive processing underlying teachers' self-efficacy beliefs. Data were collected from 33 participants: 11 expert teachers, 11 novice teachers, and 11 beginning (pre-service) teachers from the United Kingdom. Using think-aloud protocol analysis, six 22 codes were reduced to 8 themes that illustrated how teachers determined their level of teaching self-efficacy. Results from the study showed that teachers from Proficient group were more likely to determine level of self-efficacy by the decision and not to the student point of view. Teachers from expert group used a combination of self, situational and outcome expectancies and novices and beginners taking a personal point-of-view. Expert teachers relied on their greater store of knowledge and teaching histories in determining their level of self-efficacy. The findings have the potential to inform about how teachers develop and make meaning of how teachers process challenging classroom situations.

Examining Preservice Teachers’ Engagement and Self-Efficacy Beliefs: A Cross-Lagged Panel Study

Presenting Author: David Morris, St. Mary’s College of Maryland, United States

Although engagement and self-efficacy are regarded as important motivational constructs, little is known about their relationship in the context of teaching. In this longitudinal study, 94 preservice teachers were asked to report their engagement and teaching self-efficacy at the beginning of the year and end of a teacher education program. Over the course of the program, the preservice teachers became more self-efficacious but reported slightly less enjoyment associated with their teaching. A cross-lagged panel design was used to explore reciprocal causal relationships between these variables. Controlling for past levels of self- efficacy, preservice teachers’ engagement at the beginning of the program predicted their subsequent beliefs about their capabilities to use instructional strategies, motivate student engagement, and teach in culturally responsive ways. It did not, however, predict their self-efficacy for classroom management. Inconsistent with theoretical descriptions and research in other domains, there was little evidence that preservice teachers’’ beliefs about their capabilities informed their engagement of teaching. Implications for theory and teacher education are discussed.

Teaching Self-Efficacy and Its Sources in Teacher Training Experiences in Physical Education

Presenting Author: Roberto Tadeu Iaacobe, Universidade Estadual Paulista, Brazil

Co-Author: Romeu A. Costa Filho, Universidade Estadual Paulista, Rio Claro, Brazil

During the teacher training process, student-teachers should learn how to address high cognitive, emotional, and behavioral demands generated by teaching. At the same time, they need to develop and strengthen their personal belief that they will be able to handle challenges. In the context of physical education, these demands can be even greater due to the environmental conditions where classes are taught. This study aims to measure, describe, and analyze the beliefs of personal efficacy for physical education and its construction from the situations experienced during school-based teacher training. Eight-seven student-teachers (54% women; Mage = 21.8) from a state university in Sao Paulo, Brazil, responded to a sociodemographic questionnaire and the Teachers’ Sense of Efficacy Scale (T-SSES). To describe student-teachers self-efficacy, we analyzed the pattern of thematic codes based on theory developed by the student-teachers during and at the end of the teacher training process. Student-teachers showed moderate high teaching self-efficacy beliefs, which were based mainly on mastery experiences and social persuasion. The relevance of teaching self-efficacy beliefs for teacher education, in particular for the teacher training process in the physical education context, is discussed.

Self-efficacy for Teaching Special Populations in Two National Contexts

Presenting Author: Richard King, University of Kentucky, United States

Co-Author: Christen Dillon, University of Kentucky, United States

Co-Author: Ellen Usher, University of Kentucky, United States

The purpose of this study was to assess two teacher self-efficacy measures, one general and one specific to teaching learners with Autism Spectrum Disorder (ASD), among teachers (N = 205) in two national contexts: the United States (U.S.) and Australia (AUS). Preparticipants completed the Teacher’s Sense of Efficacy Scale (T-SSES), and a Teacher’s Sense of Efficacy for Teaching Learners with Autism Spectrum Disorder (T-SSES-Asd). The T-SSES-Asd is one of the most challenging groups to teach (White, Smith, & Stoddten, 2012). This study compared teachers’ efficacy beliefs on this learner-specific measure and its relationship to other variables known to be associated with teacher self-efficacy. Measures included Hoy & Wolfskill’s (1993) Teachers’ Sense of Efficacy Scale and a researcher-developed self-efficacy scale for teaching students with ASD. Results indicated that teachers with more experience were more confident in their ability to teach students with ASD. Both the teaching self-efficacy scale and self-efficacy for teaching students with ASD were positively correlated with self-efficacy for self-regulation and with job satisfaction. Self-efficacy for teaching students with ASD was negatively associated with a
Session Q 433
2 September 2017 10:30 - 12:00
Penis B - B3117

Symposium

Enhancing language competences and reading of second language learners

Keywords: At-risk students, Cultural diversity in school, Reading comprehension, Second language acquisition, Self-efficacy, Student learning, Teaching / instruction

Interest group:
Organiser: Annette Tellenborn, Switzerland

Discussion:谮 هو كوبز, Humboldt-Universität Berlin, Germany

Improving second language skills: Effects of focus on meaning and focus on form

Presenting Author: Jennifer Paatsch, Otto-Friedrich-Universität Bamberg, Germany

Co-Author: Anna Schor, Humboldt-Universität Berlin, Germany

Co-Author: Anja Felbrich, Institute for Educational Quality Improvement (IQB), Germany

Co-Author: Petra Stanat, Institute for Educational Quality Improvement (IQB), Germany

Weak language skills in the language of instruction are assumed to be a key factor contributing to the lower mean achievement levels immigrant children reach in school. Although a number of programs for supporting immigrant students to become proficient in the language of instruction are implemented in schools, we know very little about their effectiveness. In the present study, 362 third-grade students from immigrant families received additive second language support over the course of a whole school year according to two different approaches: a form-focused intervention (n = 125) and a meaning-focused intervention (n = 127). We implemented a field-experimental pretest-posttest design including a control group (n = 110) to test the efficacy effects of both interventions with respect to the learning on German as second language skills as well as on content knowledge learning. To control implementation quality, we used coded video recordings of two lessons per teaching group (64 videos in total) with several coding categories, including indicators of the two approaches, as well as quality of teaching and classroom interaction characteristics. Preliminary results showed that children who received the form-focused intervention did outperform neither children in the meaning-focused intervention nor children in the control group, who received no language support (n = 110) in respect to their grammatical or reading skills. Small effects in favor of the both intervention groups seem to emerge for vocabulary. Further analyses will explore the role of implementation quality in more detail.

How Stereotypes Effect Vocabulary Acquisition of Students with and without Immigrant Background

Presenting Author: Ilona Ahrens, Center for Research on Education and School Development, TU Dortmund University, Germany

Co-Author: Anna Ohle, TU Dortmund, Germany

Co-Author: Caroline Wilker, FU Berlin, Germany

Co-Author: Bettina Hannover, FU Berlin, Germany

Co-Author: Nele Mehyan, Center for Research on Education and School Development, TU Dortmund University, Germany

Students who, due to an immigrant background, have another family language than the language of instruction at school are faced with challenges regarding their language competence acquisition. We investigated stereotype threat as a cause for lower vocabulary growth of immigrant children in an important phase of language development during their primary school years. In an experimental design we studied n = 118 children with an immigrant background and n = 72 native children attending 4th grade. Following a vocabulary pretest, children were randomly assigned to (two slightly varying) stereotype threat conditions or a control condition. Afterwards children were supposed to learn difficult new words. In line with our expectations, immigrant children's vocabulary growth was inhibited in the stereotype threat conditions compared to the control condition. In contrast, non-immigrant children learned more in the stereotype threat conditions than in the control condition; it seems: they profitted from stereotype lift. The discussion focusses on our findings' implications for a more effective promotion of language skills of non-native speakers of German at school.

Focus on Reading Comprehension and Self-Efficacy in Middle-School Social Studies

Presenting Author: Ana Taboada Barber, University of Maryland, United States

The need to address comprehension skills in conjunction with discipline-specific content knowledge has become salient with the advent of the Common Core State Standards (CCSS, 2010) in the United States. The CCSS call for students to engage with a wide range of complex texts across the disciplines, including English Language Learners (ELLs). In the current study, we focus on a literacy-in-social studies intervention called United States History for Engaged Social Studies (USHER). USHER is grounded in the reading engagement model (e.g., Guthrie & Wigfield, 2010; Guthrie et al., 2004; Wigfield et al., 2008), which emphasizes student reading engagement via cognitive-strategy use and supports for reading self-efficacy. Our purpose was to increase reading comprehension and motivation in middle school ELLs across four classes. A secondary goal was to engage students in social studies academic vocabulary. Participants included four sixth-grade social studies/language arts teachers and their students (i.e., n=149 students; with 62% of students speaking a language other than English (90% Spanish)). We approached the intervention with a formative experiment (Jacobs, 1990), mixed methods research design. The emphasis was on students' engagement on the factors that underlie the effectiveness of an intervention in achieving a pedagogical goal (Resnick & Bradley, 2004). Quantitative results indicated statistically significant increases in comprehension, academic vocabulary, and reading self-efficacy beliefs from pre- to post-implementation. Our qualitative findings indicate that each teacher had areas of strength in relation to USHER, as well as challenges. We'll describe implications for teacher preparation.

Extra-curricular reading enhancement of third graders with German as a second language

Presenting Author: Catherine Naepflin, Pädagogische Hochschule, Switzerland

Co-Author: Caroline Wilker, University of Teacher Education Fribourg/CH, Switzerland

Co-Author: Isabelle Huguen, University of Teacher Education Lucerne (PH Luzern), Switzerland

Co-Author: Manuela Fimmert, University of Teacher Education Lucerne, Switzerland

Co-Author: Silke Haun, Pädagogische Hochschule FR, Switzerland

Co-Author: Erich Hartmann, Universität de Fribourg, Switzerland

Reading ability is a crucial factor for school success and a key competence for lifelong learning and professional success. However, some pupils have difficulties in acquiring sufficient reading competences during their school trajectory. One group of at-risk students is the second language learners.

Our intervention study UFL aimed at increasing the reading fluency of pupils with poor reading performance at Grade 3. They participated in an out-of-school Paired Reading program where they read over 20 weeks averaged 2.3 times a week for 16 minutes aloud with non-professionals as tutors (volunteers). By the means of a randomized controlled field trial, the effectiveness of the program was investigated. In this presentation we focus on a subsample of third graders with German as second language (n=42). Analyses about the effectiveness of the program showed only a significant time effect, but no significant program effect. Significant correlations were found only between reading self-concept and reading fluency. Furthermore, findings showed that initial vocabulary knowledge had a significant effect on the development of reading fluency. Further analyses will be done to investigate why the Paired Reading program in this subsample did not show any effect. Implications for further implementation of Paired Reading programs with second language learners will be discussed.

Session Q 434
2 September 2017 10:30 - 12:00
Main Building A - A2A

Symposium

The use of Research Methods to study Learning Transfer

Keywords: Assessment methods and tools, Communities of practice, Educational Psychology, Informal learning, Learning, Meta-analysis, Mixed-method research, Motivation, Qualitative methods, Quasi-experimental research, Teacher Professional Development, Workplace learning

Interest group: SIG 17 - Methods in Learning Research

Discussant: Eva Knyدل, KU Leuven - University of Leuven, Belgium

Training transfer and the role of work environment support: A meta-analysis

Presenting Author: Ashley Hughes, Michael E. DeBakey VA Medical Center and Baylor College of Medicine, United States

Co-Author: Stephanie Zajic, Rice University, United States

Co-Author: Isabelle Wolk, Rice University, United States

Co-Author: Eduardo Salas, Rice University, United States

Estimates demonstrate that as little as 52-92% of acquired learning is lost within a year following training (Arthur, Bennett, Stanush, & McNelly, 1997; Saks, 2002), wasting billions in organizational spending on training each year (Miller, 2012, 2013, 2014). As such, research on training transfer has garnered attention from theoretical and empirical research alike (e.g., Baldwin & Ford, 1986; Blume, Ford, Baldwin, & Hayes, 2010; Ford & Walshe, 1997; Hayes, 1995). While environmental factors have received much attention in the recent research to ensure training is transferred, specifically, empirical work has shed light to the roles of organizational support and motivation in predicting training transfer. To this end, we conducted a meta-analytic examination of three work environmental factors and their relationship with transfer training. Results demonstrate that all factors (organizational support, peer support) positively and moderately correlate with training transfer (r=.30-.35). Interestingly, motivation to transfer was found to fully mediate all three relationships -organizational support, supervisor support and peer support- to training transfer. Secondly, peer support explains the most variance (i.e., 47% of r2 in training transfer of variables included in this model). Lastly, future research should perform more longitudinal tests on the impact of support over time. Ultimately, this study aids in informing and impact the state of the science such that practitioners can feel confident that the effort and expenditure put toward ensuring training transfer is well spent.

Using implementation intentions in a quasi-experimental design to improve learning transfer

Presenting Author: Carla Queasad-Pallares, University of Leeds, United Kingdom

Co-Author: Pilar Pineda, Universitat Autònoma de Barcelona, Spain

The aim of this paper is to test implementation intentions as a strategy to increase transfer of learning within a quasi-experimental pre-post two groups design. It uses intentional sampling, formed by 61 Spanish public employees after responding different questionnaires based on the Model to Predict Transfer (Queasad Pallares & Gegametnur, 2015). Implementation intentions (Gollwitzer, 1993) were tested as an intervention strategy to improve transfer level of the experimental group. Results indicate there are no significant differences in the transfer level between control and experimental group, so the effect of
implementation intentions to increase transfer cannot be established. This study disproves its hypothesis which allows us to propose new paths for research, and advancing in the evaluation of transfer of learning.

The use of mixed-methods to study the learning transfer process in virtual communities of practice

**Presenting Author:** Miren Fernández, Universidad de las Islas Bálticas, Spain  
**Co-Author:** Victoria Marsich, Columbia University. Teachers College, United States

The formation of [online] communities of practice (CoP) has been found productive in promoting sharing of knowledge, skills and experiences, and in supporting better and faster learning as a result of this exchange. In this paper we show a research situated in this field within the Spanish context. Its general purpose was to analyze the performance of the organization as a learning place, to establish when and why professionals use informal learning and communities of practice, and propose a system for certifying informal learning. The method used was a multi-case study and we opted for a mixed non-simultaneous methodology. The cases were selected by following an intentional sampling method. The selected sample consisted of eight cases. The instruments used for data collection were the questionnaire, an interview, and data from the CoP. A lack of transfer of final products (created in CoP) into the workplace. Neither managers nor professionals consider that they profit from the final products produced even though they use informal learning because it permits direct and immediate learning transfer. Although it is difficult to evaluate the participation in CoP and informal learning acquired through this participation, participants and moderators establish the learning transfer process and knowledge gained to the workplace as an essential criterion. In sum, this study can be used to improve and spread good practice in this domain and it also sheds light on the challenges of assessing informal learning outcomes in organizations.

Reconstructing the Why: A Qualitative Interview Study on Transfer of Training

**Presenting Author:** Andrea Gegenfurtner, Technische Hochschule Deggendorf, Germany  
**Co-Author:** Michael Hellwig, University of Regensburg, Germany

What are the (benefits and pitfalls) of using qualitative research approaches to study transfer of training? This presentation will present three cases from a qualitative interview study. Participants were university lecturers who were mandated to participate in staff development programs to improve their teaching skills. The three cases illustrate different motives and their associated transfer activities. Grounded in goal conversations and interviews, the analysis begins with a description of a lack of transfer of final products (created in CoP) into the workplace. Neither managers nor professionals consider that they profit from the final products produced even though they use informal learning because it permits direct and immediate learning transfer. Although it is difficult to evaluate the participation in CoP and informal learning acquired through this participation, participants and moderators establish the learning transfer process and knowledge gained to the workplace as an essential criterion. In sum, this study can be used to improve and spread good practice in this domain and it also sheds light on the challenges of assessing informal learning outcomes in organizations.

Session Q 435

2 September 2017 10:30 - 12:00  
Main building C - Conference Hall  
Symposium  
Learning and Social Interaction

**Child Language in Preschool Settings: Development and Support**

**Keywords:** Competencies, Developmental processes, Early childhood education, Experimental studies, Language (Foreign and second), Language (1/Standard Language), Pre-service teacher education, Quantitative methods, Second language acquisition, Teacher Professional Development, Video analysis

**Interest group:** SIG 15 - Learning and Development in Early Childhood

**Discussant:** Franziska Vogt, Switzerland

**Narratives as a window into children's emerging second language skills**

**Presenting Author:** Ulla Licandro, Leibniz University Hannover, Germany

Telling a story requires the narrator to move beyond the observable and to create meaning by coordinating, integrating, and encoding large amounts of information solely through language, which makes preschool narrative skills an important predictor and facilitator of literacy and academic success. Regardless, little is known about dual language learners’ (DLLs) emerging narrative skills. The current study explored the oral narrative skills of preschool-age Turkish-German DLLs. All participating children produced a narrative sample in response to a wordless picture book and completed further assessments. Considerable variance emerged between children, which could be partly accounted for by age, expressive language skills and nonverbal intelligence. Implications for the support of DLLs in early childhood education and care will be discussed.

**Language Supporting Practices of Early Childhood Professionals – Results of the BiSS-Study a2E**

**Presenting Author:** Christine Beckerle, Hanover University, Germany  
**Co-Author:** Katja Mackowiak, Leibniz University Hannover, Germany

The study “Conditions of Success in Everyday Language Support in Kindergarten (a2E)” is part of the nationwide initiative “Education through Language and Writing (BiSS)" in Germany. It focuses on the evaluation of advanced training concepts on language support in Early Childhood Education and Care (ECEC), in a pre- and mixed-methods design, the language supporting competencies of the ECEC professionals were analysed via videos and interviews, the children's language skills via language tests and profiles.

This paper concentrates on the language supporting techniques, which ECEC professionals use in daily kindergarten life to promote children’s language development. One main finding is that the professionals are very heterogeneous in their use of these techniques in total as well as of the three different kinds of techniques (correcting, modelling, and stimulating techniques). One hypothesis, that will be investigated, is that different numbers of techniques are practised in different situations: Professionals could use a higher number in more structured dyadic bookreading situations and a smaller number in more complex situations with groups of children in freeplay and eating situations. An open question, that will be addressed, is whether the professionals use a different number of techniques dependent on their work experience.

**Let’s Talk – Developing an intervention to support preschool children’s oral language development**

**Presenting Author:** Gillian Lake, Oxford Brookes University, United Kingdom

An intervention, which targeted three- and four-year-old children’s oral language, was developed for this study. The intervention was run over twelve-weekly sessions, for ten weeks. Incorporating Good Early Practice, the first session in the week was a group shared storybook reading session with a puppet, where dialogic discussion took place and the children practised sequencing the story using visual prompts. The second weekly session consisted of planning, acting out and reviewing a planned pretend play episode based on the storybook which was read in that week’s first session.

Ninety-four children were randomly assigned to a control or treatment group and were tested at pre- and post-test on a battery of vocabulary and narrative assessments. The results of a Randomised Control Trial were positive in favour of the intervention. The most important of these results was a statistically significant effect on the receptive vocabulary of the children in the treatment group, with a large effect size, as measured by the standardised British Picture Vocabulary Scales (Dunn et al., 1997).

A further positive effect concerned the Mean Length of Utterance (MLU) of the children - this score was higher in the treatment group, with a medium effect size.

The acknowledgement of the role of the adult in the intervention coupled with the positive effect on the children’s MLU and receptive vocabulary mean that the intervention has the potential to be used as a Professional Development tool for supporting language development in the Early Years, in the future.

**Early childhood professionals’ language support competence – comparing knowledge and practice**

**Presenting Author:** Nadine Igel, University of Teacher Education St.Gallen, Switzerland

Integrating professional language support in everyday activities is a highly challenging task that requires professional competencies by the practitioners. Research has highlighted the importance of professional development to develop knowledge about good teaching. This study will seek to identify the early childhood professionals’ specific knowledge about four strategies to support language development in order to relate it to their practice based on the same language support strategies. 47 early childhood practitioners participated in this study. Two methods for data collection were applied: An interview to collect the practitioners’ knowledge and a video observation to assess practice. Both interview and video data were analysed with the same category system using quantitative content analysis. The categories focus on four sets of language support strategies: dialogue, questions, vocabulary teaching, and modeling. Results show that specific knowledge about correcting children’s utterances correlates with the number of corrections observed in practice (r = .327, p < .05), but no correlations can be found between the overall knowledge about initiating and extending a dialogue and the number of dialogues observed in practice. Implications of the results will be discussed regarding future research as well as the practical relevance for developing professional trainings.

**Session Q 436**

2 September 2017 10:30 - 12:00  
Luhn - Videokabinenstock  
Symposium  
Instructional Design, Lifelong Learning, Motivational, Social and Affective Processes

**Barriers and Biases for Females Approaching STEM Careers**

**Keywords:** Attitudes and beliefs, Conversation / Discourse analysis, Cultural diversity in school, Educational Psychology, Higher education, Lifelong learning, Mathematics, Quantitative methods, Quali- experimental research, Self-efficacy, Social aspects of learning and teaching, Social sciences, Teaching approaches, Vocational education

**Interest group:** SIG 19 - Social Interaction in Learning and Instruction, SIG 14 - Learning and Professional Development, SIG 18 - Educational Effectiveness, SIG 21 - Learning and Teaching in Culturally Diverse Settings

**Discussant:** Hanke Kopsarshok, University of Groningen, Netherlands

**Barriers and biases for females in STEM career**

**Presenting Author:** Barmhard Eri, Universität der Bundeswehr München, Germany

Students’ academic self-concept is usually strongly related to achievements. Research has shown that stereotypes exert detrimental effects on both students’ academic self-concept as well as achievements. These effects can be a barrier for females’ development of a positive self-concept in stereotyped subject areas (e.g., STEM: science, technology, engineering, and mathematics). Specific support by teachers and parents may counteract these effects if they support female students with beneficial attribution patterns. The present study investigates impact factors on the academic self-concept of female students in STEM subjects where the proportion of females is less than 30 %. It goes beyond the mere influence of stereotypes and also considers the students’ school and family environment as factors of impact. The study analyses to which degree family factors, school-related factors, and stereotypes may influence such females’ academic self-concept.
For the investigation of relationships between these variables a structural equation model was conducted based on a survey with 296 females from different German universities. The analytical procedure firstly provided a confirmatory factor analysis for extracting the latent factors of stereotypes, school, and family influences and then provided a structural regression model of the impact of these factors on the students’ self-concept.

The model explained more than 30 % of the variance of students’ academic self-concept. However, even in the selected sample gender stereotypes had a large impact on students’ STEM-specific academic self-concept. Positive influences were school aspects that included: "Gender perspective action in mathematics education" and "Integrating gender with gender perspective action in mathematics education". Both factors have a significant impact on the students’ self-concept.

Mathematics self-concept in New Zealand primary school students: Intervening to lower a barrier?

Author: Penelope Watson, The University of Auckland, New Zealand
Co-Author: Christine Rubio-Davies, University of Auckland, New Zealand

Co-Author: Kate Meissel, University of Auckland, New Zealand
Co-Author: Annaline Flint, University of Auckland, New Zealand

Terhi Oja, University of Auckland, New Zealand

Co-Author: Lynn McDermott, The University of Auckland, New Zealand

Despite demonstrating mathematics ability equal to that of males, females remain underrepresented in mathematics-related fields. In terms of career choice, self-concept rather than ability has comprised a critical difference in the gender participation gap. Specifically, girls are more likely to be socialized and exposed to messages that they lack the ability to perform in mathematics. The predominant problem that lies between girls and mathematics is likely that girls think that they do not have the ability to perform well in it. A recent study of student gender, teacher gender, student teacher gender interaction, and stereotype endorsement was conducted to explore the gender differences in the performance of mathematics. The results indicated that girls in the present study were less likely to endorse stereotypes about gender and mathematics ability than the boys. In addition, the results suggested that the gender differences in mathematics self-concept were more pronounced for girls than for boys. Therefore, it is crucial to address the gender stereotypes early in school and to encourage girls to pursue careers in mathematics-related fields.

Applying reconfiguring social research to reveal barriers for female apprentices in STEM

Author: Gernot Dieselleiter, University of Graz, Austria

Co-Author: Michaela Stock, University of Graz, Austria

Co-Author: Deutsche Telekom, Bertelsmann for Professionalisierung der in Bildungsforschung, Austria

Career choices of adolescents often follow gender-stereotypical patterns, with young females deciding less frequently for a vocational apprenticeship in STEM. The purpose of this study is to reveal the framework of orientations underlying these career choices and to investigate which barriers young females are confronted with before and after entering the labour market. For this purpose, group discussions are conducted with nine groups of male and female students (N = 31) in vocational education entering the labour market, followed by narrative interviews after the students have entered their vocational field. The material is analyzed utilizing the documentary method (Boothsack, 2015), aiming for contrasting between the two genders. The preliminary results indicate, that especially for young females who choose a vocational apprenticeship in STEM and who are constantly confronted with barriers of gender-stereotypical nature, stereotypes play an important role in their individual framework of orientations.

Barriers in Gender-untypical Career Aspirations – Same Patterns for Females and Males?

Author: Silke Luntenberger, University of Teacher Education Styria, Austria

Co-Author: Stephanie Tolda, University of Graz, Austria

Co-Author: Marcella Raechter, University of Graz, Austria

Influence factors on career aspirations guide adolescents’ career-related choices and serve as obstacles to adult career satisfaction and job tenure. Adolescents’ career aspirations are affected by many factors, such as gender and self-efficacy; interst, interest, and personality (e.g., family, peers) characteristics. Gender-untypical choice behavior is still rare, with males deciding less frequently for apprenticeship in social and females in technical (or STEM) domains. Internal and external factors may serve as perceived barriers, or supports, to entry into gender-untypical professions.

The present study investigates differences between females and males with gender-typical and gender-untypical career wishes. Altogether, 574 students from 16 pre-vocational schools in Austria took part in a survey on career goals, experiences of barriers in the apprenticeship-finding process in their desired profession, and congruence between student’s career wishes and their parents’ and their best friend’s career wishes. Generally, adolescents with gender-untypical career wishes expressed external barriers, which directly influence the career choice process. Furthermore, boys with gender-untypical career wishes expressed internal barriers (e.g., insecurities in interests and estimation of own abilities). Boys, however, experienced less support from the family and reported of male role models within the family. The pattern for females was different: females with untypical career wishes did not report internal barriers. But they missed social support and career role models.

Session Q438

Session Q 437 2 September 2017 10:30 - 12:00

Maan Building D - D14

Symposium

Cognitive Science, Instructional Design, Learning and Instructional Technology

Learning to Write Synthesis Texts Part 1; Process studies

Keywords: Abilities and beliefs, Cognitive skills, Educational Psychology, Higher education, Literacy, Primary education, Writing / Literacy

Interest group: SIG 12 - Writing

Discussant: Elke Van Steenhard, KU LEUVEN, Belgium

Rewriting at the Word and Sentence Levels Predicts Children’s Essay Content & Quality

Author: Deborah McCutchen, University of Washington, United States

Co-Author: Mary Norby, University of Washington, United States

Co-Author: Tiarae Clarke, University of Washington, United States

American author Ernest Hemingway once stated, “The only kind of writing is rewriting.” In this study we examined whether skill in rewriting sentences, as measured by a sentence revision task tapping both word-level derivational morphology and sentence-level syntactic skills, predicts performance on a standardized essay writing task for fourth- and fifth-grade U.S. students, after controlling for grade level, composition skills, and parents’ education. Multilevel analysis indicated that word and sentence-level revision skill and writing fluency were each uniquely predictive of essay quality. Consistent with Biemann and Amtmann’s simple view of writing (2003), we argue that fluent text generation and revision, as well as fluent transcription, during the writing of extended multi-sentence text helps writers reduce working memory demands during writing, allowing them to attend to larger rhetorical goals.

Synthesis writing: relations between writing processes and text quality, moderated by writing style

Author: Nina Vandermeulen, University of Antwerp, Belgium

Co-Author: Brenda van den Broek, University of Antwerp, Belgium

Co-Author: Elke Van Steenhard, KU Leuven, Belgium

Co-Author: Sarah Bemote, University of Antwerp, Belgium

Co-Author: Gert Rijlaarsdam, University of Amsterdam, Netherlands

This study explored the relations between writing processes and text quality of synthesis writing for different ranges of writers. A total of 74 pre-master’s students wrote each two synthesis texts in the context of an academic writing course. Text-based ratings of student writers’ writing processes were collected via a keystroke logging software inputted information on students’ writing styles was collected using validated questionnaires. Results show relations between the fluency of text production and text quality and between writing style and text quality. Students who wrote more fluently and students with a more holistic writing style produced better text. Furthermore, a number of moderation effects were found. The effects of variation in the writing process and pausing behaviour on text quality were found to be moderated by writing style. Style variation in the writing process leads to good texts for students who characterize themselves as planners. For students who do not characterize themselves as planners, however, it leads to poor texts. With regard to the second moderation effect, we found that students who characterize themselves as planners write better texts when their pausing behaviour is less troublesome. For students who do not characterize themselves as planners, pausing behavior does not influence text quality. The results of this study corroborate earlier research showing links between the writing process and the quality of the produced text. In addition, we have found that this link in some cases depends on the writing style of the writer.

Variation in source use in argumentative writing in L1 and L2

Author: Daphne van Welzen, Research Institute of Child Development and Education, Netherlands

Co-Author: Gert Rijlaarsdam, University of Amsterdam, Netherlands

Source use is an important element of synthesis writing, and thus an essential skill for academic writing. Teaching students appropriate source use skills can help them learn how to avoid plagiarism and reduce cognitive overload while writing. Effective source use might be a language-independent skill, at least to some extent. If so, then teaching students this skill in one language (L1 or L2) might well help them improve their synthesis writing skills in both languages. The aim of this study was to determine whether source use in an argumentative task is a language- or learner-specific skill. Twenty students wrote 8 short argumentative essays each, 4 in their L1 (Dutch) and 4 in their L2 (English) using 6 short sources. Students’ texts were analysed, using a plagiarism detection tool, to determine the extent to which they integrated information from the sources in their essays, and whether this varied between tasks and languages. The extent to which source use skill might be a learner-specific skill, while the extent to which it is a language-independent skill, may well affect students’ effectiveness in synthesizing the sources’ information in their L1 and L2.

Influence of genre and task upon students’ compositional decisions for synthesis writing

Author: Danielle Zekowitzy Wistocki, Carnegie Mellon University, United States

Co-Author: David Kaufer, Carnegie Mellon University, United States

This paper reports on compositional decisions in students’ synthesis writing from two different versions of a first-year writing course within a North American university. The study examines a computer-aided rhetorical analysis tool (called DocuScope) to investigate how rhetorical task shapes student writing about sources. Drawing on a sample of 70 student texts, the analysis traces and compares features of synthesis essays written in response to a series of structurally similar assignments that commonly cause troubles for beginning writers. Unsupervised, data analysis shows a marked difference between the text features of each type of synthesis writing. We identify the patterns of variation between these assignments and argue that the variation reflects tacit linguistic and rhetorical expectations that instructors bring to the different relations of the assignment. This study contributes to the literature on the way implicit task representations of a writing assignment affects not only the epistemic assumptions framing it but the visible language produced. This study additionally offers practical insights for the instructional design of reading-to-write tasks, especially as they relate to rhetorical context and genre.
Quality measures for all-day schools in the context of federalism in Germany and output control
Presenting Author: Bettina Arnoldt, Deutsches Juristeninstitut, Germany
Co-Author: Peter Furthmüller, Deutsches Juristeninstitut, Germany

The initiative with an investment program by the Federal Government the expansion of all-day schools has strongly increased since 2002. After all-day schools were widely established and developed throughout the country, political and educational research began to stronger focus the quality of the extracurricular programs. Debates on the implementation of quality standards keep coming up ever since.

In our presentation, we pursue this issue of existing methods of quality control and also examine how the different proceedings can be assessed in the light of theoretical approaches like output control, context control or governance. The study on the development of all-day schools' has conducted comprehensive research about the Bundesländer and their regulations on all-day schools. Result of the research is a systematicatization of differences and similarities in the Bundesländer and their approaches to ensure quality in the domain of all-day schooling.

It can be shown that some Bundesländer have extended their existing instruments of quality development by specific criteria for all-day schools. Other have devised new quality guidelines for all-day schools, which are supposed to support provision for the further development of extracurricular programs. Handly any quality standards have been introduced, which provide mandatory goals for all-day schools and are checked for compliance. While school autonomy and decentralization have been implemented by almost every Bundesland to govern all-day schools, there is a variety of approaches for definition and supervision of intended outputs.

Quality Aspects of Pupil-Activating Extracurricular Programs at German All-Day Schools
Presenting Author: Stephan Kielbick, Justus Liebig University Giessen and Macquarie University Sydney, Germany

The three basic dimensions mentioned above could be approved in this empirical study to be relevant quality aspects of student-activating provisions. Yet, the results additionally present other facets of quality that seem to be more or less overlooked in the discourse on extended educational provisions so far.

The data originates from the Study on the Development of All-Day Schools (SIEG; 2012-2015). Within the partial study 'SIEG G, multiple-perspective longitudinal case studies were conducted at all-day schools in Germany. Cases were extracurricular activities at schools such as homework support, theatre club, free play time. SIEG researchers interviewed the children and the staff, led group discussions with children, and conducted participant observations in these activities. The data analysis procedure involved empirical and theoretical iterations that resulted in 11 quality dimensions and 20 quality aspects. The results are deeply rooted in the empirical cases, but are as well in an explicit relation to common quality concepts.

Extended Education' in the school context includes a wide range of extracurricular activities. These kinds of provisions share common quality features. In former studies these features are considered to be analogous to the three dimensions of high-quality curricular classes, namely classroom management, student orientation and cognitive activation. Lately, the question has been raised in the German context if these quality dimensions are in fact applicable to non-formal and informal educational contexts. This exploratory study investigates which (quality) aspects can be empirically extracted from extracurricular activities that succeed in activating pupils.

Parent's perceptions of the quality in Swedish school-age educare centres
Presenting Author: Anna Klerfelt, University of Jönköping, School of Education and Communication, Sweden

The aim of the study is to review the results from surveys made by the Swedish School Inspectorate 2010-2017 concerning the quality in Swedish school-age educare centres and – through an analysis of parts of these results and recommendations – to contribute to the discussion of quality issues surrounding extended education. The research question is: What do multiple assessments on the quality of activities within school-age educare centres, as perceived by parents, show? The empirical data is selected from surveys answered by parents during 2010-2017. The analysis will be inspired by Fairguth’s (2010) descriptions of Critical Discourse Analysis (CDA) where he describes that CDA looks to establish connections between properties of text, features of discourses practice and wider sociocultural practice.

Results comparing previous surveys (The Swedish School Inspectorate, 2010; 2012; 2013) have shown differences in the quality of educare centres, as perceived by parents. In continuation of those efforts, the analysis in this study will look for differences between previous (2016-2017) and current surveys (2016-2017) and for patterns in the results from the surveys conducted during autumn 2016 and spring 2017. The results will be used to support policy-makers, headmasters and teachers in their efforts to review and refine their own work regarding the development of activities within school-age educare centres.

Quality-aspects of all-day schools in Switzerland: What affects academic and socio-emotional development?
Presenting Author: Marianne Schaubach, University of Bernberg, Switzerland
Co-Author: Lukas Frei, University of Berne, Switzerland
Co-Author: Wmf Nieuwenboom, University of Bernberg, Germany
Co-Author: Benjamin von Almen, University of Bern, Switzerland

In the past decades, societal changes and political efforts have led to an increase in all-day schools across Switzerland, which are defined as schools not only comprising regular school hours but also offering education and care during the rest of the day (also referred to as extended education). In current debates on education in Switzerland, all-day schools are granted a central role in view of school achievement and socio-emotional development, but empirical evidence so far is scarce and inconsistent. While the quality of extended education has long been proposed to moderate the impact of all-day schools on educational and socio-emotional outcomes, it is unclear which aspects of quality are most relevant with regard to current all-day schools in Switzerland.

Data were drawn from the longitudinal research project EduCare-TasGe – All-Day School and School Success? comprising 1966 students from 53 voluntary all-day schools in the German-speaking part of Switzerland. Educational skills and socio-emotional behavior were measured at the end of first grade (T1) and again at the end of second grade (T2). The extent of cooperative learning was rated by the head of the classroom, general mathematical skills, regardless of extended education utilization, caregiver-student interactions moderated the effect of extended education on externalizing behaviour.

Session Q 439
2 September 2017 10:30 - 12:00
Pini B - B1150
Symposium
Assessment and Evaluation
Learning analytics in educational practices: Barriers and how they may be overcome.
Keywords: Achievement, Assessment methods and tools, At-risk students, Competencies, Computer-supported collaborative learning, Higher education, Learning analytics, Teacher Professional Development, Teaching approaches
Interest group: SIG 01 - Assessment and Evaluation, SIG 04 - Higher Education, SIG 11 - Teaching and Teacher Education
Discussant: Dragan Gasevic, The University of Edinburgh, United Kingdom

Humans vs. Computer-Simulated Agents as Collaboration Partners in CSCL-Environments
Presenting Author: Samuel Greiff, University of Luxembourg, Luxembourg
Co-Author: Katharina Herborn, University of Luxembourg, Luxembourg
Co-Author: rick schweizer, University of Luxembourg, Luxembourg
Co-Author: rita mullar, University of Luxembourg, Luxembourg

The Programme for International Student Assessment (PISA) firstly assessed Collaborative Problem Solving (CPS) in 2015 by a computer-based approach, in which students collaborated with computer-agents via predefined chat communication (Human-Agent format (H-A)). In the context of the PISA 2015 Validation Study, the original PISA 2015 CPS units were reformatted into a Human-Human approach (H-H), in which a classmate replaced one agent across all CPS units. The H-H approach reflected more real-life collaboration environments and collaborative learning processes as it allowed group composition effects as well as non-standardized communication between collaborators. The aim of this study was to compare the two contrasting collaborative learning environments to study the effect of interface changes (agents vs. classmate) on students’ collaborative learning activities. The sample included 777 students from 36 classes from grade 9 and 10 (grammar schools) in Germany and Luxembourg. By using so-called big data techniques of high-quality curricular classes, namely classroom management, student orientation and cognitive activation, the study investigated the increasing political and educational implications of CPS assessment, coupled with the utterly learning analytics, this study generated foundational knowledge and is therefore of theoretical and educational significance.

What do teachers do with learning analytics? A case study in higher education
Presenting Author: Annouksha van Leeuwen, Utrecht University, Netherlands

The field of Learning Analytics (LA) is concerned with studying (digital) traces of learning and the analysis of these traces to improve learning processes. Teachers have been advocated as one of the central stakeholders for which LA could have value. However, not much is known about the way teachers actually make use of LA while teaching a course. By means of logbooks and interviews, the present study investigated what functions weekly LA reports fulfill for teachers in a University course with a flipped classroom model. Data was collected weekly from students’ online and face-to-face activities, which were summarized on teacher reports. The study showed that teachers found the LA reports useful to maintain an overview of student activities, but not all teachers were able to translate these summaries into pedagogical action. The premise of LA delivering actionable knowledge is therefore not trivial, and teachers may need training or support to be able to interpret student data and translate them into action.
Using big data to understand learning gains in knowledge and understanding in higher education

Presenting Author: Jokaterina Rogaten, Open University, United Kingdom

Co-Author: Jean Francois Rouet, Université de Poitiers, France

Organiser: Marc stadler, University of Muenster, Germany

Discussions: Sari Barzilai, University of Haifa, Israel

Teaching Sourcing in Upper-Secondary School

Presenting Author: Eva Wenners Brante, University of Oslo, Faculty of Education, Norway

Co-Author: Helge I. Stremme, University of Oslo, Norway

Co-Author: Elisabeth Stang Lund, University of Oslo, Faculty of Educational sciences, Norway

Co-Author: Har Briten, University of Oslo, Norway

This presentation describes an ongoing intervention in upper-secondary school, where 150 students are taught sourcing strategies by their teachers during a six-week period. The teachers responsible for implementing the sourcing intervention participated in professional development sessions for nine hours before the intervention started, in which detailed guidelines for the intervention were shared and discussed extensively. The intervention focused on sourcing strategies when selecting, evaluating, and using information for understanding, and writing argumentative texts, and the sourcing intervention is embedded in regular subject-matter teaching in language arts classrooms. Participants in the intervention are compared to 150 upper-secondary school students that receive typical classroom instruction in the same subject during the same period of time. At pre-test, the individual difference variables that were measured included reading comprehension skills, working memory, source knowledge, topic knowledge, topic interest, and topic beliefs. At post-test and delayed post-test (one month later), intervention and control students’ sourcing strategies will be assessed by means of an application program where they select and use multiple sources on two socio-scientific topics for a particular purpose (i.e., to write a letter to the editor). Given the ongoing nature of the intervention, this presentation will focus on the design and the instrumentation of the study, and the instructional materials and the content of the intervention will be discussed in detail.

Learning to read critically: an intervention with people with intellectual disabilities

Presenting Author: Lladisa Salmeron, University of Valencia, Spain

Co-Author: Pablo Delgado Herrera, Faculty of Psychology, University of Valencia, Spain

Co-Author: Immaulada Fajardo, University of Valencia / Interdisciplinary Research Structure for Reading Research (ERI Lecture), Spain

Co-Author: Vicenta Ávila, University of Valencia / Interdisciplinary Research Structure for Reading Research (ERI Lecture), Spain

Low level of reading skills and high level of credulity are two critical barriers that people with intellectual disabilities (ID) face when confronting conflicting information from the Internet. We developed a pilot program aimed to enhance the awareness of the importance of attending to information sources when reading on the Internet and to promote the necessary abilities to assess the reliability of claims. By means of several instructional techniques adapted to oral reading (i.e. direct instruction, open discussion, modeling and contrasting cases) and through different socio-scientific controversies, eleven adults with ID participated in nine instructional sessions of 45 minutes each. Attending to utterances during discussions, results from pre- and post-test sessions indicated that participants increased both the references to source information and the connection between their prior knowledge the information on the webpages. Additionally, participants were globally satisfied with the program. Based on this experience, we are currently improving the program, that will be tested in a design with experimental and control groups, including a larger sample of young people with ID (approx. N=40). Results from the ongoing study will be presented at the conference.

"Critically Online": Teaching 9th Graders to Evaluate and Use Source Information while Reading

Presenting Author: Marc Stadler, University of Muenster, Germany

Co-Author: Johanna Paul, University of Muenster, Germany

Co-Author: Ana Perez, University of Poitiers, France

Co-Author: Lladisa Salmeron, University of Valencia, Spain

Co-Author: Mónica Maceo-Rouet, University of Paris 8, France

Co-Author: Rainer Bromme, University of Münster, Germany

Students in secondary school are often challenged to search information on the Internet without guidance. In order to select trustworthy information they need to consider source information. However, past research found that students hardly attend to source information while reading. The present study evaluated an intervention program aimed at teaching the identification, evaluation and argumentative use of source information. Students in an intervention group received five consecutive lessons of training teaching them to find source information, evaluate source information against theoretical concepts (expertise, benevolence and media quality) and to use their conclusions to substantiate arguments in a post-reading essay. Students in a control group followed usual classroom instructions. Data was collected in a pretest, an immediate posttest and a delayed posttest one week after the training. Compared to controls, students in the intervention group visited more websites containing source information, included more
source citations and evaluations in their post-reading essays and were better at discriminating trustworthy from less trustworthy websites. For most variables effects remained significant in the delayed posttest.

We conclude that our intervention program is suitable to foster secondary students' skills to identify, evaluate and argumentatively use source information while reading multiple documents.

What's with that source? Fostering 9th grade students' critical thinking about authors and media
Presenting Author: Mónica Macedo-Roel, University of Paris II, France
Co-Author: Ana Pérez, University of Poitiers, France
Co-Author: Anna Potocki, University of Poitiers, France
Co-Author: Johanna Paul, University of Muenster, Germany
Co-Author: LDLas Salmeron, University of Valencia, Spain
Co-Author: Jean François Rouet, Université de Poitiers, France

Increased amounts of information available from the Internet have triggered new demands on students' reading literacy. Our study presents an instructional intervention aimed at fostering Ninth grade students' critical evaluation of source information. 77 Ninth graders were trained to reason about author competence, author interest, and media quality over the course of three weekly 50-minute workshops. The workshops took place as part of regular class activities in the presence of teachers from various disciplines. Explanations and examples were drawn from various academic and non-academic content areas.

Compared to students in a control condition (n=78), trained students referred more to the most reliable source in a simple multiple text reading task. The trained students were also more critical with links presenting unreliable information in an explicit evaluation task. Our results are discussed in terms of beneficial effects of training adolescents to evaluate several source dimensions to improve their multiple-documents comprehension skills, and possible cognitive processes underlying the implicit and explicit source evaluation tasks.

Session Q 441
2 September 2017 10:30 - 12:00
Pinni B: B3118
Symposium
Learning and Instructional Technology
ReTooling for Effective, Efficient, and Enjoyable Collaborative Learning
Keywords: Cognitive skills, Collaborative Learning, Computer-supported collaborative learning, Educational Technology, Emotion and affect, Self-regulation, Social aspects of learning and teaching
Interest group: SIG 27 - Online Measures of Learning Processes
Discussant: Kristine Lund, University of Lyon, France
Providing emotional awareness in CSCL with an Emotion Awareness Tool
Presenting Author: Mattia Fritz, University of Geneva, Switzerland
Co-Author: Myrielle Beltrancourt, University of Geneva, Switzerland

It has been established that learning situations can trigger strong emotional reactions, both positive and negative, and conversely that emotional states influence learning processes and outcomes. In Computer-Supported Collaborative Learning, it may be important to identify and share these individual emotions so that the group can regulate them and progress with the task. For this purpose, an Emotion Awareness Tool -- the Dynamic Emotion Wheel (DEW) -- was designed based on Scherer's Component Process Model theoretical framework. A pilot study (N=16) was then conducted to investigate the use of the tool in a simulated collaborative task using eye-movement recording. The results show that learners easily appraised their own emotions using the DEW, although they spent more time expressing their emotions rather than looking as the resulting visualizations (which displayed their own and their partner's emotions). In addition, they looked more frequently at emotions represented as natural language words compared to a dimensional representation with line graphs using Valence and Control/Power as appraisal criteria of the situation. This pilot study provided encouraging results and real use data to improve the design of an Emotion Awareness Tool.

The Widgets of Oz
Presenting Author: Karel Kleijns, Open Universiteit Nederland, Netherlands
Co-Author: Maren Schellh, Open University of the Netherlands, Netherlands
Co-Author: Joop de Kraker, Open University of the Netherlands, Netherlands
Co-Author: Hendrik Drachsler, Open University of the Netherlands, Netherlands
Co-Author: Aad Slotemaker, Open University of the Netherlands, Netherlands

Computer supported collaborative learning (CSCL) is a pedagogy where students work together on assignments in online groups. According to Johnson and Johnson (2004) successful collaboration depends on five conditions that should be fulfilled: positive interdependence, individual and group accountability, promotive interaction, appropriate use of social skills, and group monitoring. Whereas the research community paid full attention to the first condition, all the other conditions received much less attention. In this paper we focus on individual accountability, promotive interaction and group monitoring and how to support these activities in CSCL groups through the use of group awareness widgets (GAWs) thereby extending the work of Pheilix, Prins, Kirschner, Erkins, & Jaspers (2011). The need of such GAWs has also to be understood from the fact that current CSCL environments may not only support but also impede group communication, coordination, and collaboration. This impediment hampers the dynamic processes of working and learning in CSCL groups which, in turn, negatively affects the effectiveness of promotive interaction and group monitoring. GAWs have potential to alleviate these adverse effects related to the group dynamics (Kleijns, Kirchner, & Jochems, 2003). To explore this potential and their effectiveness regarding the support for promotive interaction and group monitoring, two GAWs were integrated in the Elgg electronic environment used by the European Virtual Seminar on Sustainable Development (EVS) in which students collaborate in groups. However, there were ethical and usability issues regarding the use of such GAWs. The present paper will report about these issues and some of our findings.

Functions of Cognitive Group Awareness Tools
Presenting Author: Danial Bodemer, University of Duisburg-Essen, Germany

Cognitive Group Awareness Tools (CGA tools) provide textual or visual information about others' knowledge, interests, or opinions. They make users aware of the provided socio-cognitive information that can be used in different ways. In the learning sciences such tools are particularly popular for providing implicit guidance to learners that is triggering collaboration and communication behaviour intended to be beneficial for learning. The tools' effectiveness for collaborative learning is usually evaluated on an overall tool level and with a focus on learning outcomes instead of underlying processes. On this basis, research generally indicates that the use of CGA tools can be beneficial for learning. On the other hand, there is also a well-grounded reasoning for minor effectiveness and efficiency of information-based guidance approaches. In order to identify how CGA tools work they have to be investigated beyond an overall level and under consideration of the processes potentially affecting the learning outcomes. With a differentiated view, various functions of CGA tools can be identified and distinguished that may trigger cognitive processes. Three of them have been systematically disentangled and investigated in three consecutive experimental studies for collaborative multimedia learning scenarios: content-related information cueing (N = 172), providing partner information (N = 120), and visualising socio-cognitive constellations (N = 104). The results show beneficial effects on learning outcomes for the first two of the investigated functions but not for the third. Quantitative and qualitative analyses on learning processes (e.g. communication and partner modelling) provide further insights that go beyond overall tool effects.

Designing and implementing retrospective dashboards for socially shared regulated learning
Presenting Author: Sanna Jarvela, University of Oulu, Finland
Co-Author: Jenni Malmberg, University of Oulu, Finland
Co-Author: Hanna Jarvenoja, University of Oulu, Finland
Co-Author: Héctor Javier Pfejfa Díaz, University of Oulu, Finland
Co-Author: Muharem Dindar, University of Oulu, Finland
Co-Author: Paul A. Kirschner, Open University, Netherlands

We developed retrospective dashboards to support and prompt individual and shared regulation of learning 16-17 years old high school students' (N=31) advanced physics collaborative-learning tasks (15 lessons, each 75min). In the design of the dashboards, four design principles were applied: supporting learners' awareness of their own and others' learning process; externalization of their own and others' learning process in a social plane; prompting the acquisition and activation of regulatory processes; and helping them follow the development of their cognitive, motivational and emotional strategies over time.
Repeted contextualized self-report data were collected through administration of a 4-item Likert-type questionnaire that had them rate their cognitive, motivational, and emotional status as well as group functioning. Pre- and post-test scores enabled calculating group-level self-regulated learning changes and formed a database for visualizing retrospective dashboards and making profiles of students’ cognitive, motivational, and emotional progress. Learning analytics was used for “feeding” the intuitive graphic dashboards for-teacher- co- and socially shared regulation support, which were implemented in EdltEd learning environment on iPads. Our findings indicate that visualization of situated-self report data with dashboards might have prompted self-regulatory awareness among the group members and contributed to enhancing learning outcomes.

Session Q 442
2 September 2017 10:30 - 12:00
Lyrna - K108
Symposium
Spatio-temporal focusing tendencies
Keywords: Assessment methods and tools, Cognitive development, Early childhood education, Educational Psychology, Mathematics, Primary education
Interest group: SIG 05 - Learning and Development in Early Childhood
Organiser: Joke Torbyeux, KU LEUVEN, Belgium
Organiser: Sophie Batchelor, Loughborough University, United Kingdom
Discussant: Minna Henrikk-Soromunen, University of Turku, Finland

Spatio-temporal focusing on Numerosity in Imitation and Verbal Task Contexts
Presenting Author: Sophie Batchelor, Loughborough University, United Kingdom
Co-Author: Jayne Pickering, Loughborough University, United Kingdom

Individual differences in children’s ‘Spatio-temporal Focusing on Numerosity’ (SFON) have been measured using imitation-based and verbal-based tasks. Performance on these tasks is positively associated with children’s arithmetic skills, but the SFON tasks themselves have been found to be uncorrelated. In this study, we explored the missing relationship between imitation and verbal measures by manipulating (i) the response mode (imitation vs. verbal), (ii) the number of competing non-numerical dimensions (few vs. many), and (iii) the stimuli presentation type (dynamic vs. static) of existing SFON tasks. Children aged 4.7 years completed 6 SFON tasks, 3 imitation and 3 verbal. Results showed that the correlations between all variants of these tasks were low. This suggests that there is limited convergent validity between SFON measures, which stems not only from differing response modes (imitation vs. verbal), but also from other task features such as the number of competing non-numerical dimensions and the stimuli presentation type. Given this pattern of results, we conclude that children’s SFON is heavily influenced by task context; thus it is important to elucidate the constructs that different tasks are measuring as well as how they relate to children’s early numerical skills.

Young children’s spontaneous focusing on Arabic number symbols
Presenting Author: Sanne Rathe, KU Leuven, Belgium
Co-Author: Joke Torbyeux, KU Leuven, Belgium
Co-Author: Berit De Smidt, KU Leuven - University of Leuven, Belgium

Young children’s spontaneous focusing on numerosity (SFON) has been identified as an important contributor to mathematical development. Previous SFON studies only focused on children’s spontaneous attention for symbolic representations of number and ignored children’s spontaneous attention for symbolic representations of number, such as Arabic number symbols. Research has shown that children develop a substantial knowledge of Arabic number symbols from an early age on, which suggests that a separate inclination to spontaneously focus on Arabic number symbols (SFONS) might exist in addition to SFON. The present study aimed to explore this hypothesis by studying children’s SFONS in relation to their SFON, mathematical abilities, and teacher rating of math competence. Participants were 111 kindergartners (Mage = 4 years 8 months) who completed five tasks: a SFON Picture task, a SFONS Picture task, a numeral identification task, a verbal counting task, and a counting objects task. Children’s math competence was rated on a 4-point Likert scale by their kindergarten teachers. In line with our hypothesis, our results showed that a separate SFONS tendency can be distinguished within children’s existing mathematical competencies in addition to SFON. Children’s SFONS was significantly associated with early mathematical abilities (i.e., numeral identification and counting objects ability) and teacher rating of math competence. Extending the research on SFON, this study showed that SFONS can be distinguished in addition to SFON, and is related to early mathematical abilities and math competence, and thus might be a potentially relevant contributor to early mathematical development.

Spatio-temporal Focusing on Quantitative Relations as a Predictor of Rational Number Knowledge
Presenting Author: Jake McMullen, University of Turku, Finland
Co-Author: Minna Henrikk-Soromunen, University of Turku, Finland
Co-Author: Erno Lehtinen, University of Turku, Finland

Recent evidence suggests that students’ spontaneous focusing on mathematical aspects of their environment is positively related with their mathematical development. This has been found with younger children’s spontaneous focusing on numerosity in relation to early numerical development, as well as older students’ Spontaneous Focusing On Quantitative Relations (SFQR) in relation to the development of rational number knowledge in both Finland and Belgium (Flanders). The present study aims to further validate the relation between SFQR tendency and rational number knowledge by examining potential mediators of this relation in new educational contexts. Results reveal that SFQR tendency predicted 331 US 6th and 7th graders’ rational number knowledge over a five month period, even after taking into account overall mathematical achievement, mathematical motivation, spatial reasoning, and non-verbal intelligence. These results provide further evidence for the relevance of SFQR tendency in the development of rational number knowledge and suggest that this relation is not entirely dependent on motivational factors nor educational context.

Spatio-temporal quantitative relational reasoning: additive or multiplicative?
Presenting Author: Tine Degrande, KU Leuven, Belgium
Co-Author: Leen Verschaffel, KU LEUVEN, Belgium
Co-Author: Jos Van Hoof, KU LEUVEN, Belgium
Co-Author: Corinne Van Rooij, KU LEUVEN, Belgium

Previous studies showed individual differences in how often children Spontaneously Focus On Quantitative Relations (SFQR). Whereas this previous SFQR research mainly investigated the extent to which children spontaneously focus on a specific type of quantitative relations, i.e., multiplicative relations, the present study aimed to investigate the additive or multiplicative nature of children’s spontaneous quantitative relational reasoning. For this purpose, a quantitative relational task that was open to both additive and multiplicative reasoning was developed and administered to 157 fifth and 122 sixth graders. Results revealed that children more frequently spontaneously reasoned additively than multiplicatively, but that additive reasoning was harder to verbalize than multiplicative reasoning, both results were more prominent for fifth than sixth graders.

Session Q 443
2 September 2017 10:30 - 12:00
Pinni B - B3109
Symposium
Higher Education

Studying interaction and collaboration in higher education through different analytical lenses
Keywords: Collaborative Learning, Higher education, Qualitative methods, Social aspects of learning and teaching, Social interaction, Student Learning, Teacher Professional Development, Video analysis Intervention, Intervention evaluation, SIG 09 - Social Interaction in Learning and Instruction, SIG 14 - Learning and Professional Development
Discussant: Maaike Eendebak, University of Twente, Netherlands

Students’ interactional meaning-making of assessment feedback viewed through a sociocultural lens
Presenting Author: Rachael Esterhazy, University of Oslo, Norway
Co-Author: Crina Damsa, University of Oslo, Norway

This sociocultural study examines the characteristics of the interactional meaning-making emerging when undergraduate biology students engage with feedback comments on collaborative assignments. Informed by sociocultural notions, we propose that students’ engagement with feedback comments leads them to engage in collaborative meaning-making activities. The interactional processes that are part of these collaborative efforts are essential for students’ learning processes and experiences thereof. Our empirical data is generated by an in-depth case study of three student triads working on feedback provided for assignments. To examine interactional processes of meaning-making, we employ a set of empirically sensitive notions that allow a micro-level analysis of the unfolding interactions and follow-up activities. This analysis led to detailed depictions and interpretations of the epistemic and procedural aspects of the on-going meaning making processes. The findings show that students move along a meaning making trajectory that comprises different stages. Each stage is characterized by different forms of interactions and a shifting focus between understanding the concrete content and the underlying domain knowledge. Certain trajectories lead to productive improvements in the assignment, while others end before implementation. With this study we contribute to the understanding of what constitutes productive meaning-making of feedback, thereby opening up new avenues of how to tailor our feedback practices better to students’ needs. Moreover, we show the potential of a sociocultural approach to analyzing interactions at micro level to unveil complex processes underlying productive engagement and meaningful learning in higher education contexts.

Process-oriented analysis of student teachers’ interaction during social regulation in collaboration
Presenting Author: Jaana Isotalo, University of Oulu, Finland
Co-Author: Pia Napiak, University of Oulu, Finland
Co-Author: Sunna Järvell, University of Oulu, Finland

In order to develop higher education students’ and student teachers’ skills for the interactive learning settings of the 21st century, it is necessary to understand the cognitive, social and socio-emotional dynamics of collaborative learning. More studies have begun to examine the multi-dimensional and temporally unfolding nature of collaborative learning, particularly in the area of social regulation of learning (e.g. planning and monitoring of one’s own, others’ and the group’s learning). New evidence suggests a relation between social regulation and students’ participation and socio-emotional interaction but their temporal emergence is unclear. This study explores how joint participation and socio-emotional interaction occur during episodes with and without social regulation. The participants were student teachers (N = 18) who collaborated in five groups in environmental science. 20 video recorded lessons (22 h) were used for interaction analysis. The videos were coded moment-by-moment for evidence of joint participation (joint task focus, active listening, active contributing and positive socio-emotional interaction (horm, socio-emotional support). The proportions of these interactions were compared between episodes with and without social regulation (planning, monitoring, evaluating). The results show that social regulation concurred with a higher prevalence of joint task focus, active contributing and socio-emotional support. This
reflects the role of interaction in moments when students need to coordinate their activities. Hence, students’ ability to engage in coordinated collaboration should be developed by supporting interaction and awareness of when regulation is needed.

Exploring higher education teacher team learning using text mining analysis
Presenting Author: Rike Bron, University of Twente, Netherlands
Co-Author: Maaike Eenderink, University of Twente, Netherlands
Co-Author: Bernard Veldkamp, University of Twente, Netherlands

Designing education that provides students with 21st century skills, also requires more collaboration between university teachers. More and more, faculty has to work in teams to design interdisciplinary and project-based education. Team learning is crucial for developing a shared conception of the team task, and previous survey research has identified the underlying processes sharing, co-construction and constructive conflict. However, insight is lacking in the nature of these processes and how they evolve at the workplace. It is therefore necessary to open the black box of team learning by studying team learning processes as they occur. The current study aims to explore the nature of sharing, co-construction and constructive conflict in the yet unexplored context of university teacher teams. Using a combination of qualitative coding and quantitative text mining techniques, 278 video-recorded and transcribed team learning conversational episodes were analyzed in terms of topics and team learning processes. The results indicate that the teams discussed a variety of content, organization, assessment- and design process-related topics, mainly by means of co-construction. Text mining analysis gave insight in distinctive features of the team learning processes. For example, constructive conflict was characterized by the use of knowledge of experts for supporting their arguments. The study shows the potential of machine learning techniques to build models to automatically classify team learning processes, based on distinctive linguistic patterns and other relevant features.

The use of social network analysis to uncover faculty’s teaching interactions in higher education
Presenting Author: Piet Van den Bossche, University of Antwerp, Belgium
Co-Author: Sara Van Waes, University of Antwerp, Belgium
Co-Author: Steven De Neve, University of Antwerp, Belgium
Co-Author: Nienke Moolenaar, Utrecht University, Netherlands
Co-Author: Peter Van Petegem, University of Antwerp, Belgium

Teachers’ professional development is shaped by the network of relationships that surround them. The relationships that teachers use to interact about their instructional practice form their ‘teaching networks’. To date, little is known about it and how these teaching networks can be strengthened. Building on social capital and workplace learning research, this study examined the extent to which teaching networks can be strengthened. Longitudinal network data of university teachers were collected over a two-year time period. An intervention was designed to evaluate whether the development of teaching networks was affected in terms of composition and content. Compared to the control group, the intervention group showed stronger development in network composition, specifically in size (larger networks, increased network dynamics) and diversity (more ties to other participants and the workplace), and in network worth (a wider network was consulted for solutions, meta-knowledge, problem reformulation and validation). This study highlights the potential of a social network approach to advance insights into teacher interaction and collaboration in higher education. Finally, it also yields several suggestions for practice and research on network interventions to strengthen professional development.

Session Q 444
2 September 2017 10:30 - 12:00
Luna - K1110
Symposium
Assessment and Evaluation, Teaching and Teacher Education

The role of spelling research in the advancement of public good.
Keywords: Assessment methods and tools, At-risk children; Cognitive skills, Early childhood education, Higher education; Learning disabilities, Literacy, Metacognition, Writing / Literacy Interest group: SIG 12 - Writing
Discussant: Cristina van Kinasjongen, The University of Queensland, New Zealand

A free screening in kindergarten to predict spelling proficiency in grade 1: does it make sense?
Presenting Author: Cristel Van Vreeswijk, University College Arteveldegheoschool, Belgium
Co-Author: Annemie Desoete, Ghent University & Artevelde University College, Belgium

Rapid naming (RAN), letter knowledge and phonological awareness were found to be the best predictors for reading and spelling skills across languages (Dandache et al., 2014; Verhagen, 2009). Recently, invented spelling seems to be an even better predictor, especially for transparent languages (Bigozzi et al., 2014). Few studies combine all these early predictors simultaneously in a longitudinal design. In this study 142 children (64 boys; 78 girls) of nine randomly selected classes measured at the end of kindergarten, predict spelling skills at the end of the first grade. In addition we investigated if these early literacy skills could be screened with a free and non-time consuming instrument. Each early literacy skill correlated significantly with spelling in grade 1. Regression analyses on all predictors simultaneously revealed that we could predict 29% of the variance in spelling. The significant kindergarten predictors were segmentation, rapid naming and letter knowledge. Taking economic circumstances into account, it might be a good idea to use such a short but effective free screen to detect kindergartners at risk and to give them the full support they need.

Improving conceptual knowledge in the writing system training: an intervention study
Presenting Author: Luca Bigozzi, University of Florence, Italy
Co-Author: Christian Tarchi, University of Florence, Italy
Co-Author: Giulia Pinto, University of Florence, Italy

This study assessed the efficacy of PASSI (Promoting the Achievement of Sound-Sign Integration), an intervention to improve children’s invented spelling in kindergarten. This construct can be defined as the systematic, non-conventional, matching of sounds in words with signs, and it is strictly associated with reading and spelling acquisition. One hundred and twenty-four Italian children participated in this study. Six teachers (and their respective three classes) were randomly assigned to the experimental group, and six to the control group. All children were tested in invented spelling of words and numbers, knowledge of the alphabet, orthographic awareness, visual-motor integration and drawing twice, before and after the intervention. Results of Generalized Estimation of Equations (GEE) with Huber-White standard error estimates confirmed the efficacy of PASSI in promoting children’s invented spelling, and related emergent literacy skills. Theoretical and educational implications of the results are presented and discussed.

Measuring spelling competence: Proofreading and editing, or production from dictation?
Presenting Author: Tessa Daffner, University of Canberra, Australia

In response to increasingly politicized decision making in schools comes increased responsibility for educators to consider measures of academic achievement in terms of their reliability, validity and practical utility. Concerning spelling assessment, this study examined relationships in spelling achievement data from the Australian National Assessment Program – Literacy and Numeracy (NAPLAN) Language Conventions Test and the Comprehension of Spelling Test (CoST) (a dictation based measure). Results of a series of multiple regression analyses were based on a sample of low-achieving and high-achieving spelers from the Australian Capital Territory (ACT) in Year 3 (n=145); Year 4 (n=117), Year 5 (n=153) and Year 6 (n=117). Findings revealed significant relationships between scores in the spelling domain of the NAPLAN Language Conventions Test and the phonological, orthographic and morphological subscales scores of the CoST. Further, the orthographic subscare of the CoST was generally the main predictor of NAPLAN spelling across year levels. Analysis also demonstrated that gender was not an influential factor. The findings suggest that heightened sensitivity to orthographic regularities plays an important role in learning to proofread and edit spelling errors, and that children require explicit instruction in the phonological, orthographic and morphological components of spelling. Stability in spelling performance was also found, underscores a need for educators to systematically utilize assessment outcomes in order to guide instruction, and in particular to provide early and targeted intervention for those students experiencing difficulties in spelling.

Writing skills and feeling of confidence of higher education students with dyslexia
Presenting Author: Wim Tops, University of Groningen, Netherlands

To have a clearer idea of the writing problems students with dyslexia may face during their studies, we compared writings of 100 students with dyslexia and 100 age matched control students in higher education. We also looked into differences in gender and educational level within groups and tried to find subtypes of dyslexia (isolated reading and spelling problems). We ran-correlation analysis to identify the relationship between spelling and underlying cognitive mechanisms such as phonological awareness, rapid naming and memory spans. Next, we studied the number and type of spelling errors, the quality of the texts produced, the use of words, and the handwriting, both in a pilcises writing task (writing a summary of an information text) and in a dictation task (sentence writing). Our results showed medium to large effect sizes for spelling errors, and medium effect sizes for punctuation and capitalization errors. Furthermore, blind experts judged the quality of the writing lower for students with dyslexia than for the controls, even though the number and types of words used by both groups were very much the same. There was no significant difference in the quality of the handwriting.

Finally, using Signal Detection Theory analysis, we observed that students with dyslexia only showed lower sensitivity and were no different from their peers as for response bias (metacognitive experience).

Session Q 445
2 September 2017 10:30 - 12:00
Pinto B - B3111
Symposium
Motivational, Social and Affective Processes in Mathematics Education

Keywords: Emotion and affect, Mathematics, Motivation, Motivation and emotion, Quantitative methods, Self-efficacy
Interest group: SIG 08 - Motivation and Emotion
Organiser: Karl Rakoczy, German Institute for International Educational Research, Germany
Organiser: Reinhard Pakus, Ludwig Maximilians-Universität (LMU), Germany
Discussant: Stuart Karabenik, University of Michigan, United States
Children’s Expectancy/Value Beliefs and Parental Valuing as Predictors of Worry in Math and Reading

Presenting Author: Fanni Laurermann, University of Bonn, Germany
Co-Author: Jacqueline S. Eccles, University of California – Irvine, United States
Co-Author: Rabinard Pekrun, Ludwig Maximilians-Universität (LMU), Germany

Children’s worrying about their academic performance has profound implications for their learning and well-being in school. Understanding the contextual and psychological antecedents of students’ worry thus represents an important area of research. Drawing on Eccles and colleagues’ expectancy-value theory and Pekrun’s control-value theory, the present study examined the motivational underpinnings of elementary school students’ general worry about performing poorly in mathematics and reading. In a large sample of 190, grades 3, 4, and 6 (M = 805, grades 3, 4, and 6). With one exception, the analysis confirmed that children’s expectations of success in and valuing of mathematics and reading interacted in predicting children’s worry about these domains. Children’s worry was stronger when they rated their subjective abilities and expected success in mathematics as relatively low but perceived these subjects as valuable. Moderated mediation analyses further suggested that when children’s self-concepts of mathematics and reading ability were low to moderate, students’ perceived parental valuing of their performance in these subjects indirectly positively predicted children’s worry via its positive predictive impact on children’s own valuing of mathematics and reading. Thus, when children perceived high academic performance as potentially difficult to attain, perceived parental valuing might negatively impact their well-being in school by increasing worry about mathematics and reading performance were included as control variables in all analyses.

No Interest in Pure Maths? Students’ Interest in Problems With and Without a Connection to Reality

Presenting Author: Johanna Rellenmann, University of Münster, Germany
Co-Author: Stanislav Schukajlow, University of Münster, Germany

Students’ interest in mathematics is important for their learning in mathematics, and for accurately judging students’ motivational orientation is important for mathematics teachers. To trigger students’ interest, teachers can select mathematical problems for instruction that students perceive as meaningful for their lives. The aim of this study was to answer the following research questions: (1) Is there a difference in students’ interest in solving problems with and without a connection to reality? (2a) Is there a difference in pre-service teachers’ judgments of students’ interest in problems with and without a connection to reality? (2b) Can pre-service teachers accurately judge students’ interest in solving problems with and without a connection to reality? To answer these research questions, we administered a questionnaire in which we asked 109 ninth graders about their task-specific interest after they solved problem with and without a connection to reality. We additionally asked 163 pre-service teachers to judge fictitious ninth graders’ interest in solving the same problems. Contrary to our expectations, students’ interest in real-world problems was lower than their interest in problems without a connection to reality when task difficulty was controlled for. Further, our findings indicate an important discrepancy between students’ interest and pre-service teachers’ judgments of students’ interest. Pre-service teachers overstated students’ interest in solving real-world problems, and they underestimated students’ interest in solving intra-mathematical problems. Moreover, the accuracy of pre-service teachers’ judgments of students’ interest was low and ranged widely across pre-service teachers. Implications for teacher education and classroom practice are discussed.

Level, strength, and facet-specific self-efficacy in mathematics test performance

Presenting Author: Karin Street, Oxford University, Norway
Co-Author: Lars-Erik Malmberg, University of Oxford, United Kingdom
Co-Author: Gudrun Stylianou, University of Oxford, Cyprus

Students’ self-efficacy expectations (SEE) in mathematics are associated with their engagement and learning experiences. Going beyond previous operationalizations of SEE we propose a new instrument that takes into account not only facet-specific (expectations related to particular competences or skills) and strenght (confidence of the expectations), but also level/predicted task difficulty of these expectations as proposed by Bandura (1997). In particular, we included level-specific items referring to perceived difficulty on a subsequent national test in mathematics. In total 756 Norwegian grade 5, 6, and 9 students completed the “Self-Efficacy Expectations of Difficulty Questionnaire.” We tested plausible multifacet-multimethod models using structural equation models. The best fitting model included three factors representing levels of perceived difficulty, and a priori specified correlated uniqueness representing four facets related to problem solving or students’ self-regulation skills during the test: (1) complete a certain number of problems, (2) solve tasks of a certain challenge, (3) concentrate, and (4) not give up for a certain amount of time. The results indicated that both test facets and levels of perceived difficulty are related to students’ SEE, which in turn are associated with scores on national tests in mathematics. Taking level (difficulty) into account broadens our understanding of the self-efficacy construct, because it allows the distinction between SEE for different levels of perceived difficulty, as well as investigation into the relationship between SEE and performance outcomes for each level.

Students’ Engagement Profiles in Mathematics According to Learning Environment Dimensions

Presenting Author: Helen Watt, Monash University, Australia
Co-Author: Colin Carmichael, Charles Sturt University, Australia
Co-Author: Rosemary Callingham, University of Tasmania, Australia

The Best Practice in Mathematics Education Project was funded by the Australian Office of the Chief Scientist, to examine promotion of students’ learning, engagement and aspirations in this core learning domain. We draw upon cross-sectional survey data from 501 students in grades 3 to 9 to examine how students’ mathematics engagement relates to key dimensions of their learning climate (mastery or performance orientation of their classroom), teacher enthusiasm, and school caring. Engagement is known to be associated with positive school outcomes and influenced by environmental factors. Less known is whether, and the extent to which, students have different profiles of engagement across component dimensions (Fredricks, et al., 2004); and, how profiles may differ according to experienced environment dimensions (e.g., perceived autonomy, prosocial, emotional, and cognitive engagement using multilevel latent class analysis, educing three profiles of “engaged”, “compliant” and “disengaged” students, who systematically differed on experienced environmental factors. Mastery focused classrooms, enthusiastic teachers and caring school environment were experienced most by engaged, and least by disengaged students; performance focused classrooms were unrelated to engagement profiles. Identified patterns will be of particular use to teachers in understanding how class, teacher and school influences together shape students’ own engagement in mathematics.

Session Q 446

2 September 2017 10:30 - 12:00
Pinni B - B4113

Symposium
Assessment and Evaluation, Cognitive Science, Developmental Aspects of Instruction, Learning and Social Interaction

Meta-analyses in Educational Research: Advances and Challenges

Keywords: Achievement, Computer-supported collaborative learning, Cooperative / collaborative learning, Educational Psychology, Learning approaches, Mathematics, Meta-analysis, Numeracy, Quantitative methods
Interest group: SIG Q1 - Assessment and Evaluation
Discussant: Lennart Schalk, ETH Zurich, Switzerland

What Predicts Mathematical Competence? A Meta-analysis on Numerical Magnitude Processing

Presenting Author: Freytag Vogel, Technische Universität München, TUM School of Education, Germany
Co-Author: Alix Baumeister, KU Leuven - University of Leuven, Belgium
Co-Author: Michael Schneider, University of Trier, Germany

There are large individual differences in mathematical competence and many studies have sought to investigate the cognitive origins of these individual differences. One domain-specific factor that has attracted a lot of attention in the last decade is the ability to process numerical magnitudes. Various studies have reported an association between this ability to process numerical magnitudes, typically assessed by the numerical magnitude comparison task, and broader mathematical competence. Most of these correlations were positive, but varied considerably in their strengths. We conducted a meta-analysis in order to statistically summarize this existing body of evidence and verify if this association was moderated by relevant third variables, including age and the type of measures. Effect sizes were combined by means of a two-level random-effects regression model. The literature search yielded 45 articles reporting 284 effect sizes found with 17201 participants. The overall effect size was r = .28, 95% CI [.24, .32]. The effect size was significantly higher for the symbolic and than for the non-symbolic measures and did not differ across different ages. The correlation was strongly moderated by comparison and mathematical competence measures. The results support the view that numerical magnitude processing is reliably associated with mathematical competence over the lifespan in a wide range of tasks, measures and mathematical subdomains. Because the association was stronger for symbolic than for non-symbolic measures, symbolic magnitude processing might be a more eligible candidate to be triggered by interventions and might be more easily assessed.

Self-Explanation Promotes Mathematics Learning: A Meta-Analysis and Its Implications for Education

Presenting Author: Bethany Rittle-Johnson, Vanderbilt University, United States
Co-Author: Abbey Leodh, Vanderbilt University, United States
Co-Author: Keiley L. Dunich, Vanderbilt University, United States

Promoting self-explanation (i.e., generating explanations for oneself in an attempt to make sense of new information) is a recommended study strategy and instructional practice. Although often effective, prompting for self-explanation did not improve, or even harmed, learning in some studies. Thus, we conducted a meta-analysis of the published literature on prompting self-explanation to improve mathematics learning (N = 26 experiments). Prompted self-explanation led to a small to moderate improvement in conceptual knowledge, procedural knowledge and procedural transfer when assessed immediately after the intervention. Moderator analyses indicated that the effect was stronger if scaffolding of high-quality explanation was provided. Finally, only seven studies have evaluated the effectiveness of self-explanation prompts in a classroom context, providing some evidence that prompted self-explanation in classrooms can promote procedural knowledge. Overall, prompting for self-explanation is an effective method for improving mathematics learning. Based on this meta-analysis, we propose mathematics educators scaffold high-quality explanation via training on self-explanation or structuring the self-explanation responses.

Supporting Domain Learning and Collaboration Skills with CSLC Scripts: A Meta-Analysis

Presenting Author: Bert De Smet, KU Leuven - University of Leuven - University of Leuven, Belgium
Co-Author: Ingo Kollar, University of Augsburg, Germany
Co-Author: Christel Wecker, Ludwig Maximilians-Universität (LMU), Germany
Co-Author: Frank Fischer, Ludwig Maximilians-Universität (LMU), Germany
Scripts for computer-supported collaborative learning (CSCL scripts) are designed to foster collaborative learning activities which are assumed to be beneficial for domain learning, i.e. the acquisition of knowledge and skills in specific domains. Beyond domain learning, scripts also aim at the development of collaboration skills based on an internalization of the sequence of activities suggested by the CSCL script. To this purpose, CSCL scripts specify and sequence activities, assign them to roles, and distribute them among the learners. In this meta-analysis we synthesized studies that investigated the effect of learning with CSCL scripts, comparing collaborative learning with a script to collaborative learning without a script on domain learning and collaboration skills. Furthermore, we compared effects of CSCL scripts targeting different script levels. Results show that learning with CSCL scripts has on average a small effect on domain learning ($d = 0.20$, $SE = 0.10$, $p = 0.02$) and a large effect on collaboration skills ($d = 0.95$, $SE = 0.20$, $p < 0.01$) compared to collaborative learning without a script. To support domain learning and collaboration skills, the use of scripts for computer-supported collaborative learning can be recommended. The results do not suggest that more specific CSCL scripts in general might hamper learning due to a too high degree of structure.

A Multilevel Meta-Analysis of the Links between Creative Potential and Academic Achievement

**Presenting Author:** Maciej Karwowski, Institute of Education, Poland
**Co-Author:** Dariusz Piotrowski, University of Warsaw

In this task we discuss the results of a large, multilevel meta-analysis (120 studies, total $N = 52,578$; 782 effects) examining the relationship between creativity and academic achievement in research conducted between 1960 and 2015. A significant correlation between creativity and academic achievement was estimated at $r = .22$ (95% CI [.19, .24]). An analysis of moderators revealed that this relationship was constant across time, but stronger when creativity was measured using creativity tests as compared to self-report measures and when academic achievement was measured using standardized tests rather than grade point average. Moreover, verbal tests of creativity yielded significantly stronger relationships with academic achievement than figural tests. We discuss methodological consequences of these findings, as well as methodological challenges related to meta-analyses.
In this paper we present an investigation into the use of visual cues during number-line estimation, and their influence on cognitive processes for reducing number-line estimation error. Participants completed a 0-1000 number-line estimation task pre and post a brief intervention in which they observed static visual or dynamic-visual cues (control, anchor, gaze cursor, mouse cursor) and also made estimation marks to test for change in number-line target estimation. Results indicated that a significant pre-test to post-test reduction in estimation error was present for dynamic visual cues of modeled eye-gaze or mouse movement. However, there was no significant performance difference between pre-test and post-test for the control condition or static anchor intervention condition. Findings are discussed in relation to the extent to which anchor points alone are meaningful in promoting successful segmentation of the number-line, and whether dynamic cues promote the utility of these locations in reducing error through attentional guidance. More broadly, we highlight the application of dynamic intervention cues to improve behavioural responses and the potential for this paradigm to provide a baseline measure of accuracy in following and interpreting gaze cursors.

Effectiveness of Eye Movement Modeling Examples: The Role of Instructional宜性

Presenting Author: Tim van Marlen, Utrecht University, Netherlands
Co-Author: Margot van Wermeekelen, Utrecht University, Netherlands
Co-Author: Halkita Maria Jarodzka, Open University, Netherlands
Co-Author: Jeroen de Ridder, Utrecht University, Netherlands

Eye movement modeling examples (EME) show students a demonstration of a task by another person (the model), with the model’s eye movements superimposed on the task. Earlier research has shown mixed results regarding the effectiveness of EME compared to regular modeling examples (ME). We hypothesize that this might be related to the ambiguity of the model’s verbal explanation, with EME providing more clear cut information when verbal instructions are ambiguous (i.e., not immediately clear what the model is returning to). Prior research showed no differences between EME and ME with unambiguous explanations on acquiring geometry problem-solving skills. We investigated in 57 university students whether EME would be more effective than ME when explanations are ambiguous. If so, EME would foster attention to the verbally referenced information during example study (evidenced by more, longer, and faster fixations) and lead to higher performance and faster response times on practice problems after example study. Results revealed that participants in the EME condition indeed fixated the verbal references more often and faster than participants in the ME condition. However, there were no differences in performance accuracy, and participants in the ME condition were faster at solving the isomorphic problems. These findings suggest that although EME helps guide visual attention towards the relevant information, which should theoretically foster integration of the visual and auditory information, this does not affect learning the problem-solving procedure. However, given that our participants had high prior knowledge, we are currently replicating this study in a younger sample.

Using Eye Movement Modeling Examples to support Learning with Multiple Representations

Presenting Author: Marie-Christin Kröbs, Leibniz-Institut für Wissensmedien, Germany
Co-Author: Anne Schueler, Leibniz-Institut für Wissensmedien (WM), Germany
Co-Author: Katharina Schelter, Leibniz-Institut für Wissensmedien, Germany

We investigated in two experiments whether Eye Movement Modeling Examples (EME) are beneficial for learning with multiple representations and if their effectiveness is influenced by characteristics of the learner and/or the model. In Experiment 1 (N=75), two groups received EME showing eye movements by a trained model, demonstrating multimedia-processing strategies on learning material with multiple representations. Before observing the EME, participants were informed either that the model was a successful learner (competent model) or another participant of the experiment (neutral model). A third group received no EME. After all learning activities completed a posttest. Results indicated an interaction between learner and model characteristics regarding learning outcomes: Only learners with prior poor learning performance from the EME group, but only when they received a neutral model. There was no EME effect for learners with higher prior knowledge. Experiment 2 (N=190) investigated the influence of prior knowledge on the effectiveness of EME in more detail. Furthermore, we addressed the influence of social comparison orientation. The procedure was similar to Experiment 1 except for the fact that participants were not informed about the performance of the model beforehand or on which model to focus. After each EME presentation, participants were asked to rate their self-efficacy, self-concept, and the degree of involvement concerning the domain related information (i.e., the learning process), while the other half of the participants received non-related information. Contrary to our findings in Experiment 1, the results indicated that all learners benefited from EME irrespective of the learners’ prior knowledge or their social comparison orientation.

Eye See What You Are Doing: Interfering Task Performance from Eye Movement Data

Presenting Author: Cornelia Ziegler, University of Vienna, Austria
Co-Author: Damien Litchfield, Edge Hill University, United Kingdom
Co-Author: Tamara Van Gog, Utrecht University, Netherlands

Eye movements provide a window into the mind: they show the center of people's visual attention, which is usually (though not always) what they are thinking about. However, inferring from a display of someone’s eye movements what they must be thinking, requires substantial interpretation, and little is known about how people make sense of visualizations of other people’s eye movements. Recently, we showed that people were able to interpret Wahab et al. (2018) eye movements in a way consistent with the participant’s intentions in a list-learning task. In the present study we take this line of inquiry a step further, using more complex cognitive tasks to investigate whether observers are able to infer the (in) accuracy of other people’s performance from their eye movements. Observers were presented with dynamic and static versions of movement displays and had to judge, based on this display, which option was chosen. Findings suggest that observers are able to judge above chance whether someone chose the right or a wrong answer based on their eye movements. However, judgment accuracy was affected by the distinctiveness of eye movement patterns, with high distinctiveness leading to better results on online and offline judgment tasks. In fact, participants showed higher judgment accuracy for low distinctiveness compared to static displays. Findings are promising for developing instructions (e.g., EME, see other contributions) or providing personalized feedback based on visualizations of eye movements.

Session Q 49

2 September 2017 10:30 - 12:00
Kne Bldg A - A4
Symposia

Cognitive Science, Motivational, Social and Affective Processes

Modeling key factors of students' writing performance

Keywords: Achievement, Attitudes and beliefs, Cognitive development, Cognitive skills, Higher education, Motivation, Self-efficacy, Writing / Literacy
Interest group: SIG 12 - Writing
Discussant: Vincent Cornilly, Oxford Brookes University, United Kingdom

Modeling the transcription-writing link: The mediating role of planning and translating

Presenting Author: Marine Tousée-Lima, University of Porto, Portugal
Co-Author: Rui Alexandre Alves, University of Porto, Portugal
Co-Author: Yuri Rezende, Oxford Brookes University, United Kingdom

Transcription, which draws on spelling and handwriting, is one of the first writing processes that children need to master. Mastering transcription is important because, once it gets sufficiently fast and accurate, writers are able to simultaneously activate key high-level writing processes, such as planning or translating. This study examined the relationships between transcription, high-level writing processes, and writing performance in Grades 7-8 (N = 90, 196). Structural equation modeling was used to test the direct effects of handwriting fluency and spelling accuracy on planning and translating, and of these other on writing performance, as well as the indirect effects of handwriting fluency and spelling accuracy on writing performance, via planning and translating. Results showed that the proposed model fitted the data extremely well, explaining 48% of the variance in writing performance. We found that higher handwriting fluency was associated with better planning skills (β = .50), higher spelling accuracy was associated with better planning skills (β = .59), and better planning and translating skills were associated with greater writing performances (β = .61 and β = .22, respectively). We found indirect effects of handwriting fluency and spelling accuracy on writing performance, respectively, via planning (β = .31) and translating (β = .12). These results suggest that transcription continues to impact on writing during teenage years, by constraining high-level writing processes. Therefore, as a building block of writing development, transcription should be taught and practiced from very early on, so that the acquisition of high-level writing processes is not compromised later.

Student Perceptions of Efficacy and of Being Taught in Writing

Presenting Author: Gabriela C. Almeida, The University of Auckland, New Zealand
Co-Author: Judy M. Parr, University of Auckland, Faculty of Education and Social Work, New Zealand

Self-efficacy is involved in controlling and regulating the writing process in order to communicate intent. Self-efficacy was measured specifically in relation to either dimensions of, or different communicative purposes for writing, as well as the different aspects of writing performance measured perceived extent of control. Self-efficacy and criterion measures were matched. Additionally, generic self-efficacy and writing were included in the model. A random sub-set of the sample involved in a national standardization exercise completed either part, dimensions or purposes, of the study (N = 1626, 1271, 1317, 2385, respectively for Years 9–12). Structural equation modeling yielded a good fit model of self-efficacy for different dimensions of writing in relation to writing performance and an acceptable fit model for writing for different purposes. The proportion of variance in performance accounted for was modest. Importantly, self-efficacy increased with perception of having been taught the dimensions of a quality performance, or how to write for a particular purpose.

Implicit theories about writing of initial teacher training program students and professors

Presenting Author: Isabella Zicardi-Diniz, Campus Vitoria, Chile

Academic writing is a key skill for quality learning development in initial teacher training and in the future teacher profession; nonetheless, according to the evidence, Chilean students have a poorer writing performance (INICIA Test, 2013).

Based on the foregoing, this work presents the results worked aimed at analysing the implicit theories of writing of teacher training students and professors and their relationship with writing performance, because Marín has pointed out the quality of writing (Baas, Brabrand & Shopf, 2014; Neely, 2014; White & Bruning, 2009).

Regarding the methodology, we used a quantitative methodology that included the participation of a representative sample of participant of teacher training students and professors (n= 300 n=100) in the Araucanía and Los Ríos Regions. A writing questionnaire to measure attitudes and a rubric to evaluate an essay were designed in order to review the theories and assess writing performance. Here also conducted the following statistical tests: Anova, Krukal Wallis and the Pearson test, to assess the correlation of the different types of conceptions and the student’s performance.
Finally, it was proved that students showed both conceptions simultaneously and that, compared to first year students, the conceptions of fourth year students had not changed. Likewise, it was confirmed that students with a higher level of transactional theories show better performance in writing.

Cognitive and motivational key factors of late primary students' writing performance
Presenting Author: Fran De Smidt, Ghent University, Belgium
Co-Author: Emmelien Mermie, Ghent University, Belgium
Co-Author: Mariska Barendse, Ghent University, Belgium
Co-Author: Yves Rosseel, Ghent University, Belgium
Co-Author: Jessie De Naeghel, Ghent University, Belgium
Co-Author: Hilde Van Keer, Ghent University, Belgium

Participating in our contemporary society increasingly requires the capability to write effectively. However, the complexity of writing is a challenge for students in this respect. Therefore, more insight is needed into both cognitive and motivational challenges of writing. Especially in-depth insight is wanted in: (a) how cognitive and motivational challenges mediate and correlate with writing performance and (b) whether and how these relationships vary for boys and girls and for writers of different achievement levels. In the present study, 795 fifth and sixth-grade students completed questionnaires regarding their self-efficacy for writing, writing motivation, and writing strategies and completed two writing tests, respectively focusing on the informational and narrative text genre. Based on multiple group structural equation modelling (MG-SEM) two models were put forward: (a) a MG-SEM model for boys and girls and (b) a MG-SEM model for high, average, and low achievers. The results underline the importance of studying writing models for different groups of students to get more refined insight on the complex interplay between motivational and cognitive challenges related to students' writing performance.

Session Q 450
2 September 2017 10:30 - 12:00
Main Building E - E301
Symposium
Motivational, Social and Affective Processes

Stimulating and Sustaining Interest: The profits and pitfalls of technology in education
Keywords: Cognitive skills, Computer-assisted learning, E-learning / Online learning, Educational Psychology, Educational Technology, Instructional design, Language (Foreign and second), Learning Technologies, Motivation, Motivation and emotion, Technology
Interest group: SIG 08 - Motivation and Emotion
Organiser: Luke K. Fryer, University of Hong Kong, Hong Kong
Organiser: Niels Døhr, Aarhus University, Denmark
Discussant: Jason Chen, College of William and Mary, United States

Opportunities for Exploratory Learning Online: Good for Interest (but Constrained by Utility Value)
Presenting Author: Carol Sansone, University of Utah, United States
Co-Author: Tamra Fraughton, University of Utah, United States

Experiencing interest while learning is important for persistence, learning, and re-engagement over time (Renninger, Nieswandt & Hidi, 2015). When an activity is not interesting but the value of persistence is high, individuals may strategically engage with the activity in ways that create an interesting experience if provided the opportunities (Sansone & Thoman, 2005). We examined this process within the context of an online college class in creating interactive web pages. We tracked students’ exploratory engagement with examples and exercises (i.e., degree to which they explored and experimented with codes in examples/exercises). We examined whether students differentially engaged in these behaviors as a function of a utility value intervention (to which students were randomly assigned) and prior programming experience. We also tracked self-reports of interest over the semester. Students’ use of examples/exercises intervention predicted lower degree of exploratory engagement with the examples and exercises. This pattern did not differ as a function of prior experience with web page creation. These data suggest that constructing opportunities for exploration and experimentation with the material when learning online was good for interest; but the context of learning (e.g., emphasizing the usefulness of learning) can unintentionally lead to less experimentation and exploration.

Students’ Interest in Scratch coding
Presenting Author: Niels Døhr, Aarhus University, Denmark

The ability to code computer programs is an important part of literacy in today’s society. This presentation reports from a case study in two sixth grade classes where Scratch coding was implemented in teaching of mathematics. The aim of the study was to investigate how students’ interest was triggered and maintained during this course. Data were collected by participant observations of the classroom, informal interviews, video recording by use of video recording classes, and questionnaire (pretest-posttest design). The results show that students’ average interest in coding mathematical tasks decreased through the lessons, as the effect size was slight negative. However, video and interview data show that situational interest was triggered in many coding situations. These situations were not related to the mathematical coding tasks but to re-use of existing games and animations, posted on Scratch. It appears clear that Scratch coding as an educational activity does not itself increase interest.Thus, the integration of non-curricular self-directed coding practices on Scratch into a formal educational setting is not a straightforward matter.

Interest development across a Massive Open Online Course (MOOC)
Presenting Author: Paula De Barba, University of Melbourne, Australia
Co-Author: Mary Aiken, University of Melbourne, Australia
Co-Author: Gregor Kennedy, University of Melbourne, Australia

In this research we explore patterns of interest development in one of the latest forms of online learning: Massive Open Online Courses or MOOCs. In particular we examine trajectories of interest development taking into account individual interest at the domain level, situational interest for the course at the outset and as maintained across the course, and interest in the domain at the end of the course expressed as intention to undertake future courses in the domain. Different trajectories of interest development were identified using Two-Step cluster procedures. Results showed three distinct trajectories, which we have been labelled as High-Decreasing, Low-Increasing, and High-Maintained. Findings suggest that differences in these trajectories were closely related to changes in students’ situational interest across the course. In addition, significant differences between trajectory groups were found for antecedents variables of general achievement motivation and autonomous learning skills as well as for the outcome variable of course performance. These findings will be discussed in terms of what they demonstrate concerning the association between different levels of interest in the domain and in the course, and how MOOC design may take this into account thereby providing better support for student learning.

Stimulating and sustaining interest: An experimental comparison of AI and Human task partners
Presenting Author: Luke K. Fryer, University of Hong Kong, Hong Kong
Co-Author: Mary Aiken, University of Melbourne, Australia
Co-Author: Andrew Thompson, Kyushu Sangyo University, Japan
Co-Author: Aaron Gibson, Kyushu Sangyo University, Japan
Co-Author: Linda Sherlok, Kyushu Sangyo University, Japan

Novel technology can be a powerful tool for enhancing students’ interest in many learning domains. However, the sustainability and overall impact of such interest is unclear. This study tests the longer-term effects of technology on students’ task and course interest. The experimental study was conducted with students in foreign language classes (n=122): a 12-week experimental trial that included pre- and post-course interest, and a sequence of task interest measures. Employing a counterbalanced design, at three week intervals students engaged in separate speaking tasks with each of a Human and “Chatbot” partner. Students’ interest in successive tasks and in the course (pre-post), were used to assess differential partner effects and course interest development trajectories. Comparisons of task interest under different partner conditions over time indicated a significant drop in students’ task interest with the Chatbot but not Human partner. After accounting for initial course interest, SEM indicated that only task interest with the Human partner contributed to developing course interest. While Human partner task interest predicted future course interest, task interest under Chatbot partner conditions did not. Under Chatbot partner conditions there was a drop in task interest after the first task: a novelty effect. Implications for theory and practice are discussed.

Session Q 451
2 September 2017 10:30 - 12:00
Pinni A - Pavao Koli
Symposium
Learning and Social Interaction

Participation and agency in instructional settings: perspectives of diagnosed children
Keywords: Conversation / Discourse analysis, Ethnography, Learning disabilities, Parental involvement in learning, Social interaction, Teaching / instruction
Interest group: SIG 19 - Social Interaction in Learning and Instruction
Discussant: Peter David Renshaw, The University of Queensland, Australia

One teacher – one child: Agency of the diagnosed child in a learning context
Presenting Author: Eva Hjorne, University of Gothenburg, Sweden
This presentation concentrates on the teaching-learning processes developed in special classrooms organised for children assigned with the diagnosis ADHD. There is a general assumption that children’s learning will increase through a placement in a special class with few pupils and more than one teacher. The issues explored in this study concern what educational practices unfold in these settings, what are the children learning and how do they become participants in the classroom community?

The empirical study is based on video-recorded classroom interaction in eight ADHD-classes during a period of seven years, in total about 200 hrs from all kinds of subjects. The results show that the general features of the instructional practices appearing in these settings are teaching and learning situations where one teacher instructs one child at a time. Another interesting finding is that these situations usually seem to follow the well-known and classical structure of IF-IF (Initiative-Response-Feedback) (cf. Mehari, 1979) that have been found to characterise regular classroom instruction. It is obvious that the teacher follows the institutional order of doing what is expected and which implies giving a lesson on a certain subject. The contributions from the children are generally minimal, and there is no indication that the student role in such dyads is more active. Thus, from a sociocultural perspective, which views learning as an emergent property of social interaction, there is little evidence that children become more active or assume a more participatory role.

Classroom participation and Identity Formations in a Special Support Classroom

Presenting Author: Ann-Carla Evladsson, Uppsala University, Sweden

This study takes its point of departure in a longitudinal video-ethnographic study in a special support school in Sweden analyzing how an individual student’s everyday classroom participation evolves during one school year. We are interested in how individuals follow unique ‘trajectories of participation’ across social contexts, sometimes in unexpected ways, and how this contributes to emergent identity formations (Dreier 2003; Wortham, 2004). For this purpose we explore unfolding trajectories of participation for an individual student with long-term school difficulties, Marimar, a 13-year-old girl diagnosed with ADHD, during her first year in a seven to nine grade class. In this evolving school content Marimar encounters specific instructional practices where she faces numerous emotional challenges and often, implicit expectations from the teachers regarding how the instructional practices may be conducted. We will show how the focal student by engaging (and disengaging) with the instructional practices moves from disruptive and affectively charged student conduct to gradually gain access to the communicative skills needed for managing her school life.

The analysis is based on integrated levels of descriptions combining socio-cultural approaches to identity formation with micro-sociological approaches to participation and identities as locally accomplished in interaction. By investigating unfolding trajectories of participation for an individual student this study addresses the situatedness of identity formation and thus, destabilises the seemingly static notion of learning disabilities’ as set of behaviors and attributes of individuals.

The ADHD category and family narrative on the child’s adverse school trajectory

Presenting Author: Juho Honkola, University of Jyväskylä, Finland

Co-Author: Tanja Vehkasoski, University of Jyväskylä, Finland

In this study we focus on how the ‘normal’ and ‘other’ as well as the paradox between inclusive education ideology and special education practice are construed by Susan, a 16 years old Finnish adolescent diagnosed with Attention Deficit Hyperactivity Disorder (ADHD), one of the most commonly diagnosed neuropsychiatric disorders among ‘poorly’ behaving and performing students, and her parents. The study explores how the membership in ADHD category is negotiated by Susan and her parents when they co-narrate Susan’s experiences of unfortunate and broken compulsory school trajectory characterized by various tensions between mainstream and special education classes, and different attempts to ‘treat’ her and her ADHD. This study questions educational policies and practices that uncritically rush to explain perceived problems in ‘normal’ achievement by individual characteristics and psychopathology, special educational needs, and the use of the language of deficit, disability and disorder. This paper asks whether we have how become so obsessed with categorizing students in accordance with the ideals of ‘normal’ achievement that we are blind to structures, conventions, ideologies and related teaching and learning practices in school that form the education unattainable and unachievable for students deemed deviant and disabled in the first place.

ADHD as lived Experience in School Contexts: Exploring Instruction and Participation

Presenting Author: Thysa Tegtmeyer, University of Southern Denmark, Denmark

The ambition of this paper is to study the in situ practices that emerge in inclusive classrooms in Denmark where children diagnosed with ADHD are participating and, as a part of this, to examine the situated experiences of the teacher. By analyzing the observational data of a case of instructional practice, the paper aims to contribute to shedding light upon the complex contextual factors of instructional approaches and learning for all in inclusive schools. A background for this interest is the many claims in literature and public debate regarding the impact of the presence of this group of children in mainstream classrooms, recently accentuated as a large number of children diagnosed with ADHD formerly referred to special education are now as, a result of the overall inclusion strategy in Denmark, attending mainstream schools. The sociocultural analysis of this paper focuses on processes of participation in school activities and on how the participation of diagnosed children is mediated by both instructional approaches and by the diagnosed children’s intentional agency. Findings show that the capacity of participation in learning activities of diagnosed children can change several times during a day relative to teachers’ instructional approaches, and that problems with peer play have im consequences on motivation and concentration for the diagnosed children. The implications for both instructional approaches and inclusion policy are discussed.

Session G 452

2 September 2017 10:30 - 12:30

Utrecht

Symposium

Motivational, Social and Affective Processes

Engagement from infants to secondary school: The effect of relationship with teachers and peers

Keywords: Achievement, Early childhood education, Meta-analysis, Motivation, Motivation and emotion, Peer interaction, Quantitative methods, Secondary education, Social aspects of learning and teaching, Social interaction

Interest group: SIG 05 - Learning and Development in Early Childhood; SIG 08 - Motivation and Emotion

Discussant: Lars-Erik Marién, University of Oxford, United Kingdom

Infant engagement in childcare centers: Associations with teacher-child relationship quality

Presenting Author: Joana Cadima, University of Porto, Portugal

Co-Author: Ana Isabel Mota e Costa Pinto, University of Porto, Portugal

Co-Author: Silvia de Barros, Politécnico do Porto, Portugal

Co-Author: Vera Coelho, University of Porto, Faculty of Psychology and Educational Sciences, Portugal

Co-Author: Ana Carolina Bley, University of North Carolina at Chapel Hill, United States

Co-Author: Manuela Pessanha, Instituto Politécnico do Porto, Escola Superior de Educação, Portugal

Co-Author: Jota Peixoto, Polytechnic Institute of Porto, Portugal

In this study, we examine levels of infant engagement in Portuguese childcare centers, and its associations with teacher-child relationship quality. Participants were 90 infants, their mothers and their teachers. Data was collected in two moments. In the first moment, observers conducted observations at home to assess home quality, infant temperament and development. In the second moment, observers conducted observations in childcare to assess teacher child relationship quality and infant engagement. A set of multiple regression models were conducted to determine whether classroom quality contributed to infant engagement in classrooms, controlling for developmental age, child temperment, mother’s education, and home quality. Results showed that, in higher quality classrooms, infants spent more time actively engaged and less time non-engaged, implications will be discussed in terms of how to better support teachers in fostering infant active engagement as part of high-quality daily experiences in childcare.

Teacher-student Relationships and Achievement: A Meta-Analysis on the Mediating Role of Engagement

Presenting Author: Debora Roorda, University of Amsterdam, Netherlands

Co-Author: Suzanne Jak, Research Institute of Child Development and Education, University of Amsterdam, Netherlands

Co-Author: Marjolein Zee, University of Amsterdam, Netherlands

Co-Author: Frans Cott, Research Institute of Child Development and Education, University of Amsterdam, Netherlands

Co-Author: Heim Koomen, Research Institute of Child Development and Education, University of Amsterdam, Netherlands

The present study took a meta-analytic approach to investigate whether students’ engagement acts as a mediator in the association between affective teacher-student relationships and students’ achievement. Furthermore, we examined whether results differed for primary and secondary schools and whether similar results were found in a longitudinal subsample. Our updated sample consisted of 190 studies (1862 observations in total), including students from preschool to high school. A distinction was made between positive relationship aspects (e.g., closeness) and negative relationship aspects (e.g., conflict). Meta analytic structural equation modelling showed that, overall, the associations between both positive relationships and achievement and negative relationships and achievement were partially mediated by student engagement. Subsequent analyses revealed that mediation is applicable to both primary and secondary school. Only the direct association between positive relationships and engagement was stronger in secondary school than in primary school. Finally, partial mediation was also found in the longitudinal subsample.

Quality of Teacher-student Interaction Contributes to Students’ Situational Engagement

Presenting Author: Sanni Pöysä, University of Jyväskylä, Finland

Co-Author: Kati Vassali, University of Jyväskylä, Finland

Co-Author: Anna Majä Pohke, University of Jyväskylä, Finland

Co-Author: Jari-Erik Nurm, University of Jyväskylä, Finland

The purpose of this present study is to expand current knowledge on lower secondary school students’ engagement by examining variation in students’ situational engagement. The aim is to explore the extent of which situational engagement is associated with the quality of teacher-student interactions (i.e., emotional support, instructional support, and classroom organization), and whether the effects are different depending on students’ gender. Participants were 709 seventh grade students (47.1% girls, 13-14 years). A total of 155 lessons (99 literacy and 65 mathematics lessons) were video-recorded during 11 weeks at spring 2014. At the end of each of the video-recorded lesson students reported their situation-specific engagement with the mobile-based RISU instrument. The data of 1,547 time-stamped ratings of students’ situation-specific engagement and the codings of teacher-student interaction from 155 lessons were analyzed with hierarchical modelling (Bayes estimation). The results showed that students’ self-reported situation-specific engagement was positively related to the quality of teacher-student interaction in the domains of high-quality emotional support and classroom organization. Furthermore, the results indicated that situational engagement of girls was significantly higher than that of boys, and girls appeared to benefit more from the classroom interaction with high-quality emotional support than boys. Overall, the results indicated that students’ situation-specific engagement in lessons can be fostered by supportive teacher-student interactions.
Session R 453
2 September 2017 13:00 - 14:30
Pensis B - B3116
Single Paper
Higher Education

Paper Presentation: Higher Education and Instruction

Keywords: E-learning / Online learning, Educational Psychology, Educational Technology, Higher education, Instructional design, Peer interaction, Quantitative methods, Reflection, Teacher Effectiveness, Teacher Professional Development, Teaching / Instruction

Interest group: SIS 04 - Higher Education

Chairperson: Idit Katz, Ben-Gurion University of the Negev, Israel

Curricular space: Defining it, studying it, and assessing its impact on learning

Keywords: Educational Psychology, Higher education, Instructional design, Reflection

Presenting Author: Maribel Blasco, Copenhagen Business School, United Kingdom

Co-Author: Emmanuel Manalo, Kyoto University, Japan

Curricular space pertains to spaces generated or foreclosed by the curriculum as experienced by students, including cognitive, autonomy, and reflective spaces. Despite space being known to be important in learning, it is generally neglected in curriculum design: there are very few authors who have referred to it, and often it is in relation to physical space or curricular organization to achieve certain objectives, rather than in relation to thinking processes and the promotion of learning. Moreover, in many countries, curricula in higher education are becoming increasingly compressed, content-heavy, and teacher-stereotyped, thus further reducing whatever little space students may have for learning-related thought processes. In this presentation, we will report on ongoing research aimed at building a conceptual framework and methodology for studying curricular space and its impact on learning. In an initial, exploratory study, we gathered data from 10 undergraduate students through focus group interviews (employing both open-ended and semi-structured questions) and a visual representation task. The student responses indicate that curricular space is a meaningful concept to them, and that the methods we used were effective in soliciting useful representations of student experiences of curricula. One important finding is that perceptions of lack of space were linked to negative experiences and negative impacts on learning.

Students’ engagement with digital microscopy: Pedagogical implications in distance learning

Keywords: E-learning / Online learning, Educational Technology, Higher education, Instructional design

Presenting Author: Christina Heidootou, The Open University, United Kingdom

Co-Author: Maria Aristidou, The Open University, United Kingdom

Co-Author: Simon Kelley, The Open University, United Kingdom

Co-Author: Eileen Scanlon, OU, United Kingdom

Virtual microscopes (VMs) enable samples (e.g., biology (images)) to be viewed by many students, reused and repurposed individually, used in assessment and continue access outside the laboratory. They have been embedded in the design of online modules to facilitate learning when a physical microscope cannot be used. No studies have yet examined students' perceptions about VMs and usage patterns, in particular, whether VM activities are pedagogically effective. In this study, we used the VM in activities in which students are asked to recognise samples. Learning analytics from 430 undergraduate students in an earth science and biology distance learning modules and survey responses revealed that students would like to use the VM in meaningful investigations and systematically across a module. This raises the need to modify existing pedagogy and integrate the tool in meaningful activities such as crowd sourcing investigations.

Peer observation as a faculty professional development strategy: a research review

Keywords: Higher education, Peer interaction, Teacher Professional Development, Teaching / instruction

Presenting Author: Luis Tinho, University of Lisbon, Portugal

Co-Author: Ernesto López Gómez, Universidad Nacional de Educación a Distancia (UNED), Spain

Evermore, Higher Education institutions worldwide develop programs allowing academic staff to undergo peer observation of teaching each academic year. In fact, several authors (Peal, 2005; Barnstein, 2008) emphasize that peer observation is a powerful tool to help instructors improve their practices. This review sets out to map recent (post 2010) research relating to the concept of peer observation when university instructors have the opportunity to observe lessons of another colleague. This review builds on journal papers included in the Web of Science, ERIC and EBSCO databases. The study uses documents analysis where the units of analysis are concepts of peer observation, research aims, methods, and main conclusions/implications of the studies. The review aims to answer the following questions: What are the main objectives of studies focusing in peer observation as a professional development strategy? Which methods/instruments are used? What are the main findings/implications resulting from these studies? A total of 28 articles were analysed. From the analysed studies it is clear that there are a number of research instruments and methods for investigating peer observation using a qualitative and or mixed-methods approach, but there is also a clear challenge to develop quantitative research designs. The discussion of the analysis emphasis the strong support for this practice from the participating faculty, identifying some of the key features contributing to the success of peer observation strategies including their valuing of this experience to support their professional development and classroom teaching practice.

Effects of different kinds of teaching methods in higher education – a longitudinal multimethod study

Keywords: Higher education, Quantitative methods, Teacher Effectiveness, Teaching / Instruction

Presenting Author: Elizabeth Fischer, University of Kassel, Germany

Co-Author: Martin Haarzé, University of Kassel, Germany

To investigate the effect of different kinds of teaching methods in higher education, observations of 80 university courses were combined with self-report data from 1716 students attending these courses. The trained observers documented the applied teaching methods, which were subsequently grouped to four clusters (teacher-guided methods, teacher-student interaction, student activities, student-guided methods). Self-reports of students were measured in the beginning (interest, self-efficacy, general study habits) and in the end (cognitive involvement, interest, learning achievement) of the semester. Multi-level regression analyses were conducted controlling for course format and subject discipline on course level and the students’ preconditions measured in the beginning of the semester on individual level. The analyses show that teacher-guided methods increased, whereas teacher-student interactions and student activities decreased the students’ cognitive involvement and interest. The variety of teaching methods negatively influenced these criteria as well. Self-reported learning achievement could not be predicted by any of the teaching methods. The effectiveness of teacher-guided methods challenges previous research that promoted the use of interactive and activating methods and raises questions about the quality of the student activating methods used in higher education teaching in Germany.

Session R 454
2 September 2017 13:00 - 14:30
Pensis B - B1100
Single Paper
Teaching and Teacher Education

Paper Presentation: Teaching and Teacher Education - B

Keywords: Attitudes and beliefs, Conversation / Discourse analysis, Instructional design, Mathematics, Pre-service teacher education, Problem solving, Qualitative methods, Reflection, Secondary education, Teacher Professional Development, Teaching / Instruction
Developing Student Teachers' Pedagogical Content Knowledge and Agentic Identities Through Reflection

Keywords: Conversation / Discourse analysis, Pre-service teacher education, Qualitative methods, Reflection

Presenting Author: Andrea Gefufo, University of Central Florida, United States

If our aim as sociologists is to improve student learning, then we need to cultivate the Pedagogical Content Knowledge (PCK) and the agentic capacity of our teachers. This study examined the development of student teachers’ PCK and agentic identities. The questions guiding this study were (1) What discursive practices create spaces for student teachers to reframe/develop both PCK and agentic identities? (2) What particular phrases does a teacher educator use to create such spaces? Positive Discourse Analyses revealed three distinct dialogic patterns that created opportunities for student teachers to reframe/develop both PCK and agentic identities.

Pre-University Teachers’ Knowledge, Beliefs and Practices Regarding University Preparation

Keywords: Attitudes and beliefs, Qualitative methods, Secondary education, Teaching / instruction

Presenting Author: Elis van Rooij, University of Groningen, Netherlands

Co-Author: Ellien Jansen, University of Groningen, Netherlands

For many students, the transition from secondary school to university is difficult and may even lead to drop-out or study delay. Pre-university teachers could ease this transition by preparing their students better for university. This study investigated pre-university teachers’ classroom practices that contribute to university preparedness and how these practices are shaped by teacher knowledge, beliefs, attitudes and background factors. Data of 50 interviews with Dutch pre-university teachers were analyzed using framework analysis. Results showed that knowledge about the current university environment, having a specific personal background factors led to the conscious integration of university preparation into everyday secondary school classroom practice, which mainly consisted of teachers sharing their own experiences in university, talking about degree programmes in their subject, and teaching self-regulatory skills. Reasons for teachers not to pay attention to university preparation were a lack of knowledge on the current university environment and a lack of time. Therefore, in order to increase university preparation practices in secondary school, it is important to provide teachers with knowledge about the current academic environment at universities and about what knowledge, skills, and attitudes universities expect from their incoming students. Furthermore, it would be helpful to investigate ways in which university preparation can be efficiently integrated into regular lessons.

Pre-service teachers as designers? Unravelling decision making in advertising literacy education.

Keywords: Instructional design, Pre-service teacher education, Qualitative methods, Teacher Professional Development

Presenting Author: Britt Adams, Ghent University, Belgium

Co-Author: Tammy Schellens, Ghent University, Belgium

Co-Author: Martin Vaiote, Ghent University, Belgium

Nowadays, children are often confronted with new advertising formats, such as advertising in games. Compared to rather traditional formats, young consumers have difficulties in recognizing these new advertising formats because of their integrated and interactive character. Scholars have repeatedly stressed the role of education to raise children’s awareness of advertising. Although a few advertising literacy programmes have already been developed during the past decades, new advertising formats are rarely highlighted. Therefore, in the context of this study, three teacher design teams (TDT) in pre-service primary education were set up to develop up-to-date and innovative learning material. Whereas it can be assumed that conversations in such teams offer opportunities for teachers’ professional development, the study’s aim is revealing which decisions pre-service teachers make when developing learning material about advertising. For that reason, this study combines a pretest on participants’ previous design experiences and expectations about TDT’s, with an analysis of the team discussions and pre-service teachers’ reflections about the design process. Preliminary pretest results show that the majority of the participants already had initial experience with designing learning material. Regarding professionalization, the participants believed that TDT’s would especially be interesting to gain insight into how to develop learning material, rather than a method for acquiring knowledge about advertising or getting inspired by didactic suggestions of team members. The analysis of the conversations taking place within the several TDT’s as well as implications for practice and further research will be presented at the conference.

Preservice teachers’ use of representations and visual-spatial abilities in problem solving

Keywords: Mathematics, Pre-service teacher education, Problem solving, Teacher Professional Development

Presenting Author: Bayza Olgun, Middle East Technical University, Faculty of Education, Turkey

Co-Author: Engin Adar, Bogazici University, Turkey

This study aimed to investigate preservice teachers’ use of representations, visual-spatial abilities, and their relationships with word problem solving performances. The sample of the study consisted of 113 preservice mathematics teachers in a private and four public universities. The results showed that there was no significant relationship between problem solving performance and visual-spatial abilities. Preservice teachers’ visual-spatial abilities only had a weak relationship with use of schematic representations among all the variables. While most of the solutions including schematic representations were correct, more than half of the solutions involving pictorial representations were incorrect. The findings suggested that the influence of representations on performance significantly differed in terms of the types of representations and visual-spatial abilities did not have an influence on preferences for problem solving methods. Preservice teachers’ learning experiences and aims for easy and quick solutions could be more decisive in their use of representations.

Keywords: Use of representations, visual-spatial abilities, problem solving.

Session R 455

2 September 2017 13:00 - 14:30

Main Building C - C8

Single Paper

Motivational, Social and Affective Processes

Paper Presentation: Motivation and Emotion - C

Keywords: Attitudes and beliefs, Citizenship education, Emotion and affect, Motivation, Motivation and emotion, Pre-service teacher education, Primary education, Psychometrics, Quantitative methods, Reflective society, Science education, Student learning, Survey Research, Vocational education

Interest group: SIG 08 - Motivation and Emotion

Chairperson: X. Christine Wang, United States

Does passion matter in education? Benefits and promoters

Keywords: Motivation, Student learning, Vocational education, Motivation and emotion

Presenting Author: Zuleica Ruiz Affonso, University of Las Palmas de Gran Canaria, Spain

Co-Author: Jaime Leon, University of Las Palmas de Gran Canaria, Spain

Does passion matter in education? What are the benefits of passion and how can teachers promote it? The aim of this study was to answer these questions by a systematic review of studies within the educational context. We conducted a search in major electronic databases and summarized the results. Articles reviewed revealed a great variety of passion’s consequences, such as students’ wellbeing, dedication or competence, and a diversity of promoters, such as positive relations, supportive context or autonomy support, among others. We conclude by revealing the educational significance of this research and with theoretical and methodological suggestions for future research.

Measuring pupils’ attitudes towards socio-scientific issues.

Keywords: Attitudes and beliefs, Citizenship education, Reflective society, Survey Research

Presenting Author: Juliette Watna van der Meulen, University of Twente, Netherlands

Co-Author: Kim Evers, University of Twente, Netherlands

This paper presents the results of a large-scale study to validate a questionnaire that measures pupils’ attitudes towards socio-scientific issues (the PASSI questionnaire). We define socio-scientific issues (SSI) as those topics that are about complex societal or technological developments that may induce ethical dilemmas. Although such topics will have an increasing impact on our future lives, most primary and secondary curricula hardly focus on engaging youth with SSI in a meaningful, multi-disciplinary manner. To fill that void, in a large intervention study, a number of Dutch primary and secondary schools are currently participating in projects that engage pupils with SSI. Apart from measuring changes in pupils’ knowledge and ways of debating SSI, the study also measures pupils’ engagement with and attitudes towards SSI. In order to measure these attitudes validity and reliably over time, we developed and tested a new measurement instrument. Based on a literature review within social and educational psychology and sociology, on topics such as attitude development, scientific citizenship, and social or civic engagement, we developed a framework that describes three dimensions with eight underlying components of pupils’ attitudes towards SSI. These eight components were translated into eight scales that comprise the PASSI. Results of a validation study among 1386 pupils (age 8-15), using both exploratory and confirmatory factor analyses, confirmed the eight-factor structure and showed good convergent and discriminant validity. These results will be presented, as well as some results of a correlational study that investigated potential differences between subgroups of pupils in the sample.

Evolution of pre-service teachers’ motivational/affective profiles during a science learning unit

Keywords: Emotion and affect, Motivation, Pre-service teacher education, Science education

Presenting Author: Deborah Pino-Pasternak, Murdoch University, Australia

Co-Author: Simone Volet, Murdoch University, Australia

Empirical evidence worldwide indicates that, despite primary teachers playing a critical role in triggering interest in science, they lack confidence and have negative attitudes towards teaching science with this trend starting during initial teacher training. In order to advance our understanding in this area this study mapped the entry and the evolution of motivational/affective profiles of a cohort of 108 primary education pre-service teachers undertaking a first-year unit aimed at enhancing their understanding of science concepts. All completed an online survey tapping on self-determination, grade motivation, self-efficacy,
difficulty in science, interest, enjoyment and anxiety before the commencement and at the end of the unit. Clustering methods were used to group students into homogenous motivational/affective science learning profiles. Subsequently, daughter profile analysis (Quinnell et al, 2012) was used to determine students’ migration and evolution of patterns between entry and final profiles. Four distinct profiles were identified (Optimal, Promise, Vulnerable, and Disengaged) with nearly half of the students exhibiting the least favourable profiles prior to the unit. Student migration after the unit accounted for 60% of the total cohort with migration occurring from a more to a less favourable (24%) profile and vice versa (17.6%). Implications for teacher education programmes in Science are discussed.

Children's beliefs about causes of success and failure at school Adapting the Causal Dimension Scale

Keywords: Attitudes and beliefs, Primary education, Psychometrics, Quantitative methods

Presenting Author: LAURENT BRUN, Université Grenoble Alpes, France
Co-Author: Benoît Dompnier, Institut des Sciences Sociales et Pédagogiques, Switzerland
Co-Author: Pascal Parsu, Université Grenoble Alpes, France

Research on causal attribution suggests that causal perception is essential for individuals, especially in learning contexts. The present research aimed to adapt and validate the Revised Causal Dimension Scale (CDSSI) for children. As the original scale, this adapted version of the CDSSI includes 4 subscales (3 items per subscale) corresponding to the 4 causal dimensions of locus of causality, stability, personal control and external control. Results of exploratory factorial analysis (Oblimin rotation) revealed that the scale was structured by four factors corresponding to the CDSSI four causal dimensions. Confirmatory factorial analyses revealed that a four factor model fitted the data to a satisfactory extent was better than unidimensional or three factor models. To conclude, results obtained in both studies support the reliability and the internal validity of the four dimensional scale of the Causal Dimension Scale (CDSSI) adapted for children. This scale seems relevant for understanding the structure of causal attributions of children in elementary school.

Session R 456
2 September 2017 13:00 - 14:30
Preni B - B3107
Single Paper
Learning and Special Education, Teaching and Teacher Education
Paper Presentation: Teaching and Teacher Education

Keywords: Attitudes and beliefs, Communities of learners, Competencies, E-learning / Online learning, Educational policy, Mathematics, Mixed-method research, Pre-service teacher education, Primary education, Problem-based learning, Social interaction, Teacher Professional Development, Video analysis

Interest group: SIG 11 - Teaching and Teacher Education
Chairperson: Haim Eshach, Ben Gurion University of the Negev, Israel

How Pre-service Teachers Internalize the Link between Research Literacy and Pedagogy

Keywords: Communities of learners, E-learning / Online learning, Pre-service teacher education, Problem-based learning

Presenting Author: Mary Gutman, Efirot College, Israel
Co-Author: Lynne Gensler, Efirot College of Education, Israel

Enabling pre-service teachers to develop a critical view of their practice and to acquire the higher order inquiry skills necessary for pedagogical research has been and continues to be a challenge. The present study presents a unique intervention in the training of pre-service teachers in research skills (research literacy) using a Problem Based Learning (PBL) approach. The intervention is implemented in two different Learning Communities (LC), one online and the other blended. Both immediate and long-term effects of PBL are investigated as are the effects of social and direct scaffolding within the LCs.

The study focuses on transmitting the following Research Literacy (RL) skills: identifying and defining a problem, formulating a research question, and designing a research method. The findings indicate an immediate effect upon all RL skills in both LCs. The long-term effect only appears in the online LC and only for two RL skills: identifying and defining problems. Additionally, there is greater use of social scaffolding in formulating and designing a research study in the online LC than in the blended learning community. Those findings are then interpreted in terms of retention capacity and scaffolding in blended and online LCs.

Prototypical educational settings from special education teachers in inclusive classes

Keywords: Primary education, Social interaction, Special education, Video analysis

Presenting Author: Jeannette Wilk, UZH, Switzerland

Following the Salamanca Statement of 1994, children with special needs are increasingly being taught in inclusive classes. This results in additional pedagogical personnel who compliment the work of regular teachers. Empirical research on educational activities by special education teachers in inclusive settings is scarce (e.g., Moser, 2013).

This contribution is part of a descriptive multi-method study which meets this need for research and aims at describing activities and role perceptions of special education teachers and regular teachers in inclusive primary schools in Switzerland.

The present study describes how inclusive teaching is realised in practice and characterises those arrangements on a superficial and deeper level. Special education teachers (N = 30) were asked to define prototypical inclusive educational settings in classes and to record them on video.

These prototypes of inclusive educational settings were categorised and analysed with respect to both their superficial and deeper structure. Firstly, five prototypes of educational settings could be identified: (1) group setting outside class, (2) group setting within class, (3) one-to-one setting outside class, (4) one-to-one setting within class and (5) mixed setting (combination of group respectively one-to-one setting outside and within class).

The second step of analysis focused on group settings within and outside class and the mixed settings. For these a low-inference coding system was developed based on the coding system for scaffolding by van de Pol (2012, 2013) and the classroom discourse model by Bak (1996) and applied to the analysis of them on a superficial and on a deeper level.

Relations between mathematics teachers' professional knowledge and their lesson planning skills

Keywords: Competencies, Mathematics, Mixed-method research, Teacher Professional Development

Presenting Author: Stefan Ufer, Ludwig-Maximilians-Universität (LMU), Germany
Co-Author: Sabine Hammer, Technical University of Munich, TUM School of Education, Germany

In mathematics instruction, the didactical quality of instructional tasks is an important predictor for effective learning processes (e.g. Baumert et al., 2010). Moreover, it is essential that teachers can identify high-quality tasks for instruction and prepare their enactment. Understanding the impact of teachers’ professional knowledge to their actions in lesson preparation and implementation is of importance for the design of teacher training. Blomeke et al. (2015) propose to analyse the processes which mediate the relation between professional knowledge and teachers’ observable behaviour. Within task selection processes, teachers must attend to and make use of features of instructional tasks in order to plan teaching. This requires the ability to notice and justify effective teaching elements which are usually described under the term ‘professional vision’ (Van Em & Sherin, 2002). The analysis of these processes should offer a more comprehensive assessment and holistic understanding of the complex teacher construct than only considering the resources that contribute to observable behaviour. Following this approach, we analysed the connection between mathematical teachers' professional knowledge, their task-selection processes during lesson planning, and the planning processes concerning the selected tasks. In a questionnaire study with N=119 future and active teachers of the secondary level, we found that teachers' professional knowledge affects the planning products and that this influence can be explained to a certain extent by the planning process, in particular by task-related noticing and reasoning processes during task selection.

Preservice teachers' beliefs about high-stakes testing: Implications for policy and practice

Keywords: Attitudes and beliefs, Educational policy, Pre-service teacher education, Teacher Professional Development

Presenting Author: Sharon Nichols, UTSA, United States

The purpose of this exploratory study was to examine preservice teachers’ attitudes toward their own high-stakes testing experiences and to examine the ways in which those experiences might relate to their subsequent views about the role and efficacy of high-stakes testing systems in education. Conducted in 2010 in Texas, this study offered a window into how preservice teachers’ experiences with high-stakes testing may relate to the subsequent understanding of and beliefs about high-stakes testing in their future professional practice. Data are based on a four-part survey with 380 preservice teachers. Descriptive analyses suggest that males and females have different views when it comes to high-stakes testing both in terms of how they view its purposes as well as what it was like personally to take these tests. Older preservice teacher candidates were more likely to have read about accountability and to understand it than younger candidates. And correlations suggest that candidates with higher test anxiety have more negative views of the roles and purposes of high stakes testing. Vignette data show that teachers most prefer teaching contexts with highly motivated students and least prefer contexts with high pressures to pass tests. Qualitative analysis of responses to vignettes show that preservice teachers see a causal connection between pressure to pass test and student motivation. Implications for policy and practice are discussed.

Session R 457
2 September 2017 13:00 - 14:30
Preni B - B3118
Single Paper
Cognitive Science, Instructional Design
Paper Presentation: Metacognition and Self-regulation - B

Keywords: Cognitive skills, Early childhood education, Intelligence, Metacognition, Mixed-method research, Motivation, Problem solving, Reading comprehension, Self-regulation, Student learning

Interest group: SIG 16 - Metacognition
Chairperson: Arnti Rajala, University of Helsinki, Finland
Associations between metacognition and executive functions in 2-5 year olds during problem-solving

Keywords: Early childhood education, Metacognition, Problem solving, Self-regulation

Presenting Author: Karen Marulis, Connecticut College, United States
Co-Author: Lindsey Nelson, Connecticut College, United States

Metacognition (Mc) and executive functions (EF) have evolved conceptually, in parallel for the most part, the former being more prevalent in educational research and practice; the latter more in cognitive science. Both constructs are correlated with school and life outcomes.

The current study focused on Mc (knowledge, monitoring and regulation of cognition) and EF as skills important for planning and engaging in complex, goal-directed activity, including working memory, inhibition, and cognitive flexibility) and associations between these processes in children aged 2-5 (cross-sectional). We targeted this important age when these skills are emerging contextually, developmentally appropriately, and meaningful tasks in a College lab school. Specifically, associations between children's metacognitive skills (observational measure targeting metacognitive behaviors during a challenge puzzle and an interview measure of children's metacognitive knowledge about the puzzle) and EF (task-based measure of EF similar to "Simon-say") were examined (controlling for language). Significant relations were found for 4 and 5-year old but not for 2 or 3-year olds indicating a clear developmental trend. This will contribute to theory and practice by explicating relations between these critical developmental capacities across early development.

Modeling relations between epistemic cognition, interest, and science knowledge across gender

Keywords: Cognitive skills, Metacognition, Motivation, Student learning

Presenting Author: Christian Brandmo, University of Oslo, Norway
Co-Author: Ivar Båtên, University of Oslo, Norway
Co-Author: Helge Strømme, University of Oslo, Norway

In the current study, we examined justifications for knowing in science and interest in controversial science topics as predictors of domain- and topic-specific science knowledge. Participants were 281 Norwegian upper secondary school students. Using previously validated measures and structural equation modelling, the results indicated that students' justifications for knowing predicted their science knowledge, with justification by multiple sources being a positive and justification by personal opinion being a negative predictor. Moreover, it was found that topic interest played a greater role for female than for male students. Finally, results indicated a positive relationship between justification by multiple sources and topic interest. Theoretical and practical implications are discussed.

The use and effects of motivational and metacognitive strategy hints

Keywords: Metacognition, Mixed-method research, Reading comprehension, Self-regulation

Presenting Author: Danny Kostons, University of Groningen, Netherlands

From recent review and meta-analysis research on the effectiveness of learning strategies, it seems a combination of cognitive, metacognitive and motivational learning strategies is most effective for self-regulated learning (Donker, De Boer, Dignath, Kostons & Van der Werf, 2014). The same research showed that whilst there is a plethora of studies on explicit cognitive and metacognitive strategy instruction, the number of studies focusing on motivational strategy use has been far more limited. Although studies often include motivational outcomes, such as self-efficacy, beneficial effects on these outcomes are more often attained through the stimulation of cognitive or metacognitive strategy use than through motivational strategy use. In this study, we compared the effects on text comprehension scores and MSLO scores on hints with regards to either metacognitive or motivational strategy use. Although the quantitative results of this pilot study did not show differences between the two types of hints, qualitative investigations of reports about the use of the hints yielded favorable results for motivational strategy hints.

Does mind wandering and metacognition predict verbal and figurual creativity in high school students?

Keywords: Cognitive skills, Intelligence, Metacognition, Self-regulation

Presenting Author: David Preiss, Pontificia Universidad Catolica de Chile, Chile
Co-Author: Domínguez Ortíz, Pontificia Universidad Católica de Chile, Chile

We implemented an individual difference study in a sample of 228 Chilean high school students. The main purpose of this study was to clarify whether mind wandering and metacognition impact verbal and figurative creativity. The results showed mixed evidence regarding the relationship between mind wandering and creativity. Mind wandering only predicted one of three tests of creativity, specifically the one measuring creative problem solving. It did not predict divergent thinking and figurative creativity. On the other hand, metacognition predicted the three creativity scores after controlling by fluid intelligence and attentional capacity and taking into consideration mind wandering. Reading difficulties were also accounted for in the models assessing the predictors of verbal creativity. Theoretical implications are discussed.

Session R 458

2 September 2017 13:00 - 14:30
Man Building C - CS
Single Paper
Learning and Special Education

Paper Presentation: Special Educational Needs - B

Keywords: Achievement, Educational policy, Metacognition, Mixed-method research, Peer interaction, Primary education, Quantitative methods, School effectiveness, Secondary education, Social interaction, Special education, Values education

Interest group: ISIS 15 - Special Educational Needs
Chairperson: Cristina Weise, Germany

A character strength intervention in four inclusive Finnish classrooms

Keywords: Mixed-method research, Primary education, Special education, Values education

Presenting Author: Lotta Uutialo Malmiavara, University of Helsinki, Finland
Co-Author: Kasia Vucinich, University of Helsinki, Finland

A character strength intervention in four inclusive Finnish classrooms

This paper presents one of the few structured positive pedagogy interventions in inclusive classrooms with students with a variety of special needs. A controlled 16-week character strength intervention was conducted for Finnish 5th and 6th graders (age 11-12 years, N=135) aiming to promote student well-being, self-esteem and social acceptance. Seven quantitative well-being measures (Schoolwork Engagement, Global happiness, School-related happiness, Social competence, Self-esteem, Grit and Self-rated Social Skills) comprised the pre-test - post-test battery. In addition, qualitative observation material was collected. The intervention group made progress in the control group in almost all measures. Qualitative data revealed increased joy of learning and school attending, appreciation of diversity and improved social bonding. In particular, students with special needs expressed improved love of learning and also teachers informed of greater enjoyment of instruction. This paper discusses a need for explicit teaching of well-being promoting, non-cognitive skills that support also cognitive learning.

Examining the social outcomes of students with autism spectrum disorder in ‘inclusive schools’

Keywords: Meta-analysis, Peer interaction, Social interaction, Special education

Presenting Author: Christoforo Mamas, University of California, San Diego, United States
Co-Author: Shana Cohen, University of California, San Diego, United States
Co-Author: Gabrielle Jones, University of California, San Diego, United States

Students with autism spectrum disorder (ASD) represent an ever-expanding group of students within general education settings or so-called inclusive schools. These students have particular challenges with social interaction and communication with others. Their inclusion in general education schools has been met with ambivalence, partly due to insufficient empirical evidence as to the effectiveness of inclusion. As a result, some have argued that the trend for more inclusive education should be encouraged, as these students gain social benefits from being educated alongside their peers. Others have argued that inclusion may lead to further social isolation, bullying and marginalization due to their inherent difficulties with social interaction or inability of school to deal with their complex needs. This paper addresses the social outcomes of students with ASD in general education settings. We have reviewed 31 empirical studies conducted from 2005 to 2015 aiming to begin deepening the complex nature of social inclusion of ASD students. The review revealed some encouraging findings with regards to social outcomes but, overall, students with ASD appear to be at higher risk of social isolation in ‘inclusive schools’. It has also been found that the concept of inclusion is highly contentious and is best explained described, in some of the studies, as mere placement of ASD students in general education settings. It is therefore not surprising that intervention studies yielded the most positive findings in terms of favorable social outcomes, as these studies included elements of transformative and instructional practice.

Mathematics Intervention for Low Achieving Middle School Students: Reversing the Trend

Keywords: Achievement, Mathematics, Quantitative methods, Secondary education

Presenting Author: Shirley Yates, TaturaItha Lutheran College, Australia
Co-Author: Michelle Cooper, TaturaItha Lutheran College, Australia

The Trends in International Mathematics and Science Study (TIMSS, 2011) and Programme for International Student Assessment (PISA) have highlighted a significant trend towards a decline in mathematics achievement in Australian students in the middle school years. In common with many countries, TIMSS results also show a substantial fall of under-performance in mathematics. While low achievement can be partially attributed to student factors, curriculum and pedagogical issues, there is considerable evidence that lack of procedural knowledge of basic addition, subtraction, multiplication and division operations is the most obvious obstacle to academic success in mathematics. A research-based QuickSmart (QS) intervention, focused on automatically, was trialed with low achieving Grade 7 and 8 students, matched with a control group of similar underachieving classmates. QS students evidenced statistically significant improvements in fluency, accuracy and mathematics achievement after the QS Multiplication section and at the end of the year long intervention. Over the same time-frame, the control group’s achievement and performance in Subtraction and Multiplication deteriorated significantly. However, this performance trend was reversed after the administration of the Multiplication section of the QS intervention to the control students over the following six months. However, the smaller number of sessions the Controls
received was insufficient to extend the reversal to their subsequent mathematics achievement. The increase in efficient and effective cognitive processing evident in both groups following the QI intervention affirms the place of intervention in contemporary pedagogy for students with low achievement in mathematics.

**The detection of plot structures and their relation to formal requirements**

**Keywords:** Educational policy, Mixed-method research, School effectiveness, Special education

**Presenting Author:** Matthias Meijn, University of Zurich, Switzerland

Inclusive education is also controversially discussed in Switzerland, in particular since the Swiss cantons had to elaborate concepts of inclusion in this context the canton of Soleure initiated a project to design, implement and evaluate a concept of inclusive education that includes rapportos between existing formal and empirical structures regarding the development of competence centres. For this purpose psychological, but also neo-institutionalist ecological systems theories founded research which is mainly dedicated to the extent stakeholders compete or compete given legal and institutional room. Analyses are based on legal and administrative documents and on a survey of 136 persons concerned with special education/Parametrisation of extracted structures (e.g. Degree-, Closeness-Centrality) and data analysis are based on topological network models and sampling methods. Results revealed a good quality of instruments and high relevance of teachers within the process of inclusion.

**Session R 459**

2 September 2017 13:00 - 14:30
Linna - K109
Single Paper

Higher Education, Learning and Instructional Technology, Learning and Social Interaction, Motivational, Social and Affective Processes

**Paper Presentation: Metacognition - C**

**Keywords:** Cognitive skills, Collaborative Learning, Doctoral education, Educational Psychology, Higher education, Metacognition, Motivation and emotion, Peer interaction, Self-efficacy, Self-regulation, Social interaction, Student learning, Survey Research

**Interest group:** SIG 16 - Metacognition

**Chairperson:** Julia Kosinar, University of Applied Sciences and Arts Northwestern Switzerland, Germany

**Development of a doctoral student well-being questionnaire**

**Keywords:** Doctoral education, Educational Psychology, Higher education, Survey Research

**Presenting Author:** Jiti Scevak, University of Newcastle, Australia

**Development of a Doctoral Student Well-being Questionnaire**

Previous studies examining the well-being of university students have targeted undergraduate populations or international students and have used mental health measures (Berwick et al 2008). Measures of mental health (e.g. Mental Health Inventory Five - MHIS), however, do not capture the personal, emotional and social as well as the cognitive, technical and institutional impacts on the research student experience. This study describes the development of a doctoral student well-being questionnaire. Doctoral students (n=136) were drawn from a larger study (n=1790) and were interviewed about those aspects of emotional students' research study that were personally important to them. Thematic analysis of the interviews informed the construction of items for the questionnaire and was validated with 333 students from four Australian universities. Students were asked how important each item was to their well being. A Principal Components factor analysis identified seven dimensions that had an impact on doctoral students' well-being: university, supervision, research task, my research self-efficacy, social-personal, work-life balance and future career opportunities. The questionnaire demonstrated good content validity and internal reliability. Identifying those areas of concern for a student represents the first step towards addressing them. Importantly there are implications for research student completion rates and their career outcomes.

**How modeling and feedback impact self-regulation during a laparoscopic knot tying simulation task**

**Keywords:** Metacognition, Self-efficacy, Self-regulation, Motivation and emotion

**Presenting Author:** Michael Dempsey, Boston University, United States

**Co-Author:** Douglas Kaufman, Boston University, United States

During the third year general surgery clerkship, medical students are required to develop laparoscopic knot tying skills. Research in laparoscopic knot tying skills often relies on objective variables (e.g., time, materials used, number of iterations) that lend themselves to pre- and post-intervention correlational analyses. The current study differs by examining how instructional interventions—role modeling and feedback—affect medical students’ skill acquisition, self-efficacy, and self-regulation during a laparoscopic surgical simulation training session. Seventy-eight surgical clerkship students were assigned randomly to one of a 2 x 2 factorial design. Participants observed one of two types of role modeling (expert vs. coping) and received either process-oriented or outcome-oriented feedback during a 30-minute laparoscopic training session. Participants also completed several surveys that assessed their interest in surgery, self-efficacy for laparoscopic knot tying and self-regulation. Both modeling and feedback types showed a significant influence on efficiency of students’ learning, their satisfaction with their performance, and their self-efficacy for laparoscopic knot tying. Qualitative interview data supplementing the quantitative results revealed that both modeling and feedback influenced students’ self-regulated learning. Our findings suggest that even in high-stakes learning environments, such as medical training, how training and feedback are given is an important consideration for skill development.

**Which students review their failures effectively? : The quality of "Lesson Induction".**

**Keywords:** Cognitive skills, Educational Psychology, Metacognition, Student learning

**Presenting Author:** Satomi Shiba, The University of Tokyo, Japan

It is effective in learning to review failures after problem solving. Although students review their own failure during study, all of them do not use good failure utilization strategies and therefore, do not learn from failures. This study focused on ‘Lesson Induction’, which is a metacognitive or failure utilization learning strategy. The purpose was to examine which students usually review their failure and can induce good-quality lessons after problem solving from two aspects: student’s characteristics and teacher’s instruction. 7th and 8th-grade students in Japanese public schools completed a questionnaire (n = 687) and lesson induction test (n = 187). First, a high school teacher and an undergraduate student made an evaluation criterion to score the quality of lessons. Then hierarchical multiple regression was conducted. The results showed that appropriate students’ characteristics and teacher’s instruction was a significant predictor for the quantity of review, and a main effect of appropriate learning belief and an interaction with frequency of explaining during study and teachers’ instruction was significant for the quality of lessons. The findings indicate that in order to induce good-quality lessons after problem solving, it is important for students to have appropriate beliefs for learning, explain to others what they learn and be instructed by teachers how to review their failures. In future study, teacher’s instruction should be examined because this study could not do so clearly, and factors of enhancing the quality of lesson induction should be considered for practical studies.

**Socially shared regulation of learning: Relation with engagement, exploratory talk and performance**

**Keywords:** Collaborative Learning, Metacognition, Peer interaction, Social interaction

**Presenting Author:** Valesha Grau, Pontificia Universidad Católica de Chile, Chile

**Co-Author:** Araya Lorca, Pontificia Universidad Católica de Chile, Chile

**Co-Author:** Carolina Araya, Pontificia Universidad Católica de Chile, Chile

There has been an increasing interest in the processes of socially-shared regulation of learning (SSRL) within collaborative activities in the classroom. The present paper aims to advance in the knowledge of different aspects of the literature that have not been sufficiently developed: (a) the development of a methodological framework to analyse SSRL including individual and group levels of the phenomenon, (b) the relationship of SSRL with other constructs such as quality of talk and attention and engagement and (c) the relationship between SSRL and group performance. 231 video-recordings of children working together in groups of 3 students were collected from 45 different schools. The groups were asked to solve a problem in collaboration that lasted between 15-20 minutes. Two types of analysis were developed to assess SSRL. The first analysis was conducted through a coding scheme focusing on the regulatory activity, considering individual utterances as the unit of analysis. The second analysis ranked the collective activity in terms of symmetry and reciprocity. Assessment of quality of talk, attention and engagement and performance were also collected. The main results of the study show that the groups exhibiting high levels of SSRL were significantly higher in exploratory talk, attention and engagement and achievement on the task. Theoretical, methodological and practical relevance are discussed.

**Session R 460**

2 September 2017 13:00 - 14:30
Vita - K109
Single Paper

**Assessment and Evaluation, Cognitive Science**

**Paper Presentation: Comprehension of Text and Graphics - H**

**Keywords:** Cognitive skills, Comprehension, Comprehension of text and graphics, Experimental studies, Mathematics, Multimedia learning, Quantitative methods, Reading comprehension, Self-regulation

**Interest group:** SIG 02 - Comprehension of Text and Graphics

**Chairperson:** Pablo Pernay-Dummer, Germany

**The Interplay between Verbal and Visual Cuing**

**Keywords:** Comprehension of text and graphics, Experimental studies, Quantitative methods, Multimedia learning

**Presenting Author:** Manuela Glaser, Leibniz-Institut für Wissensmedien (IWW), Germany

**Co-Author:** Stephan Schwan, Leibniz-Institut für Wissensmedien, Germany
The present study complements existing research on the extended multimedia and cueing principle of multimedia learning by examining in more detail the interaction between verbal and visual cueing strategies with regard to retention and localization of particular contents. Furthermore, the study compares classical multimedia cuing and filmic cuing which is, until now, rather neglected in multimedia research. Three film clips, each introducing a famous painting, were presented in one of three different forms: (1) the whole picture was presented continuously in long shot (no cuing), (2) named pictorial elements were highlighted in the picture with red-colored frames and lines (classic multimedia cuing), (3) named pictorial elements were highlighted in the picture by camera zooms and pans (filmic cuing). Retention and localization accuracy of unnamed and named pictorial elements were measured. The results confirm the extended multimedia effect for retention, however, the effect seems to occur to the disadvantage of localization processes. Filmic cuing was not effective with regard to retention, but showed a tendency to foster localization of unnamed pictorial elements.

Pathways to integration – contrasting a text-centered vs. a multiple-representations perspective

Keywords: Competencies, Comprehension of text and graphics, Reading comprehension, Multimedia learning
Presenting Author: Ulrich Ludwig, LEAD Graduate School, Germany
Co-Author: Katharina Scheiter, Leibniz-Institut für Wissensmedien (IWM), Germany

Text-graph integration has been viewed from text-centered and multiple-representations perspectives. For both perspectives, text-graph integration is the result of multiple cognitive sub-processes: (a) Understanding the visual special array of the graph, (b) graph interpretation, (c) sentence comprehension, (d) mapping text onto the graph, and (e) mapping graph onto text. However, the text-centered and multiple-representations perspective make different predictions about prerequisite relationships between these five cognitive sub-processes of integration. To investigate these predictions, we first developed two hypothetical knowledge structures that represent prerequisite relationships from either a text-centered or multiple-representations perspective. Secondly, we assessed individuals' ability to perform the five mentioned integration processes using five task types and three illustrated scientific texts. Thirdly, we compared the fit between hypothesized knowledge structures and empirical response patterns of 50 adult individuals. Our results show that the knowledge structure developed from a text-centered perspective revealed a better fit with the empirical response pattern, due to fewer violations of assumed prerequisite relationships. This result suggests that text-graph integration does not require the ability to comprehend graph and text separately. Text comprehension is a prerequisite, whereas graph comprehension is a result of integration and not a prerequisite of integration. Our results help to develop instructional support for text-graph integration processes. Furthermore, the proposed assessment can be used to assess an individual's strengths and weaknesses in text-graph integration.

The influence of text coherence and inference making on solving mathematical word problems

Keywords: Cognitive skills, Comprehension of text and graphics, Mathematics, Reading comprehension
Presenting Author: Sabine Stephy, University of Cologne, Germany

Research shows that there is a huge mismatch between solving numerical tasks and tasks in written form in math classes. Although it is widely accepted that language plays an important part in solving word problems, it is still vague which linguistic aspects affect this process. Unlike previous research that concentrated on lexical and syntactical features, the present study assumed that language-related difficulties are mainly caused by local and global inferences necessary to construct a coherent mental representation, a situation model. The key question is whether the construction of a situation model during reading a word problem can be supported by high coherent texts, so that there are less inferences to draw. This should facilitate the solving of word problems. To address this issue an experiment was carried out. Participants included 312 4th graders. A test consisting of four specifically designed word problems was created. Coherence level served as the independent variable. For each word problem a high and a low coherent text was generated. The construction of a situation model, measured by evaluating pictures and sentences matching the word problem, served as dependent variable. Results showed highly significant differences between high and low coherent word problems. Furthermore high coherent texts led to a higher frequency of correct solutions. In the paper this main finding will be further differentiated for different groups of participants and linked to working memory, reading competence and reading monitoring. The paper will also discuss the modifications of the word problems in detail.

Performance and Perception Across Multiple Text Task Conditions

Keywords: Cognitive skills, Comprehension of text and graphics, Reading comprehension, Self-regulation
Presenting Author: Alexandra List, Ball State University, United States

A consistent finding in the multiple text use literature has been that students assigned to write arguments perform better on multiple text tasks than do students asked to write summaries, narratives, or opinions. However, little is known about why argument-based tasks may facilitate multiple text task performance. In this study, we compare performance when students respond to two different types of tasks: one asking them to construct an argument and the other asking them to write a research report for an external audience. Students are further asked to self-evaluate their responses, to determine the criteria they think about when presented with different tasks. Students performed significantly better when writing a research report for an external audience than when asked to compose an argument. While the criteria students cited when self-evaluating their responses were found to differ across task conditions only to a limited extent, self-evaluation criteria were significantly associated with differences in response quality.

Session R 461
2 September 2017 13:00 - 14:30
Main Building C - C6
Single Paper
Motivational, Social and Affective Processes

Paper Presentation: Motivation and Emotion I - 1

Keywords: At-risk students, Attitudes and beliefs, Educational Psychology, Emotion and affect, Experimental studies, Higher education, Learning analytics, Mathematics, Motivation and emotion, Parental involvement in learning, Secondary education, Student groups, SIG1: Motivation and Emotion
Chairperson: Tim van de Zee, Leiden University, Netherlands

Who are these bored students? Profiles of learning emotions

Keywords: Educational Psychology, Emotion and affect, Higher education, Learning analytics
Presenting Author: Dirk Tempelar, Maastricht University, Netherlands
Co-Author: Alexandra Niculescu, European University of Swizerland, Switzerland

Learning boredom is both a silent monster (Goetz et al., 2014), as well as one of the most frequently experienced learning emotions (Pekrun et al., 2010). A setting where boredom and other negative learning emotions play a crucial role in learning, is the first year at university, especially in challenging, competitive courses (Niculescu et al., 2015). Yet, not much is known about what learning contexts given rise to boredom, and what students are in particular in danger of getting bored. In this empirical research into the learning experiences of about 6000 first year university students in a business and economics programme at a challenging course that introduces mathematics and statistics, we investigate profiles of learning emotions, based on the framework of Control Value Theory of Achievement Emotions (CVTAE; Pekrun, 2006). Latent-class analysis results in six classes that are consistently positioned in the space of learning emotions, with each higher positive emotions and lower negative emotions, with one exception: a single latent class with high levels of boredom and low levels of enjoyment, relative to the other levels of learning emotions. In a subsample analysis, making use of student learning disposition data generated by an application of dispositional learning analytics (Buckingham Shum & Deakin Crick, 2012), we investigate differences in learning dispositions between the latent classes, and find differences in students' epistemological views, their effort beliefs, expectancy-based learning attitudes, metacognitive regulation, goal setting behavior and learning motivation and engagement. Implications for education are discussed.

Gendered math career expectations: do perceptions of teacher support and expectations matter?

Keywords: Attitudes and beliefs, Mathematics, Secondary education, Teaching, Motivation and emotion
Presenting Author: Doriane Jaegers, Université de Liège, Belgium
Co-Author: Dominique Lafontaine, Université de Liège, Belgium

Drawing on the expectancy-value theory ( Eccles, 2011) and the three basic dimensions of instructional quality (Klieme et al., 2006), this study tries to understand gendered math career expectations by questioning, on the one hand, some motivational variables (self-concept, self-efficacy, interest, utility, anxiety and effort cost), and on the other hand, students' perceptions of teacher (academic or social) support and teacher expectations in mathematics. The sample consists of 1091 adolescents from 11th grade in French speaking community of Belgium. Results indicated that math self-concept is a critical predictor of math career expectations for girls. Despite the fact that girls perceive more the academic or social support, only their perceptions of teacher expectations could improve their self-concept, in area in which there were no gender differences.

Can a dot-probe task reliably detect attentional bias in students with test anxiety?

Keywords: At-risk students, Educational Psychology, Emotion and affect, Experimental studies
Presenting Author: Wendy Symes, University of Birmingham, United Kingdom
Co-Author: Dave Putwain, Liverpool John Moores University, United Kingdom

Individuals with a range of anxiety disorders typically display an attentional bias (AB) towards threat-relevant stimuli. Whilst a handful of dot-probe studies have found evidence of AB in students with test anxiety (TA), attempts to replicate these findings have proved difficult. This study examined whether this difficulty is the result of AB being conceptualised as a bias towards, as opposed to away from, threat in dot-probe tasks. Furthermore, it examined how TA itself might interfere with participants’ ability to complete the dot-probe task. 191 students participated in this experimental study which compared response times of high and low trait anxious students in high and low threat conditions. When an absolute measure of AB was used, participants with high TA were more likely to show an attentional bias in a high-threat condition. Furthermore, in the high-threat condition, there was a tendency for those in the high TA group to respond to both threat and neutral stimuli more slowly than in the low threat condition. The findings from this study have important implications for the use of dot-probe tasks to investigate AB in students with TA.
Students' time perspectives, short and long term, on a school and professional career are well-known as motivator for school, especially for students' motivated learning behavior. As person's time perspectives develops from early adolescence on, the development of the time perspective will probably be influenced during adolescence by the importance parents and friends attach to school and vice versa.

701 students in the first two years of all academic levels of secondary education in the Netherlands participated in this study: they filled in questionnaires on future time perspectives on a school and professional career five times and two times on perceived importance attached to school by their parents and friends. The relationships between the developments of time perspectives and the importance attached to school was assessed using multivariate cross-lagged models with Mplus. Multi-group models were estimated to assess differences between students from lowest and highest academic levels of secondary education.

The results showed that both parents and friends are important for the development of students' future time perspectives on a school and professional career. There were reciprocal effects in both ways between the long term time perspective and perceived importance attached to school by parents and friends. We found also reciprocal effects between the perceived importance attached to school by friends and students' short term time perspective on a school and professional career. However, the perceived importance attached to school by parents did not predict students' short term time perspective on professional career.

Session R 462
2 September 2017 13:00 - 14:30
Pori 1 - BAH 16
Single Paper
Cognitive Science, Instructional Design, Learning and Instructional Technology, Learning and Social Interaction
Paper Presentation: Metacognition and Self-regulation
Keywords: Achievement, Attitudes and beliefs, Collaborative Learning, Computer-supported collaborative learning, Conceptual change, E-learning / Online learning, Instructional design, Learning analytics, Motivation, Primary education, Psychometrics, Quantitative methods, Self-regulation, Synergies between learning - teaching and research
Interest group: SIG 16 - Metacognition
Chairperson: Valentina Caruso, Swiss Federal Institute for Vocational Education and Training (SFIVET), Italy
Resolving scientific controversies to promote epistemic change: Testing an intervention concept
Keywords: Attitudes and beliefs, Conceptual change, Instructional design, Synergies between learning - teaching and research
Presenting Author: Tom Rosman, ZPID - Leibniz Institute for Psychology Information, Germany
Co-Author: Anne-Kathrin Mayer, ZPID - Leibniz Institute for Psychology Information, Germany
Co-Author: Günter Krampen, ZPID - Leibniz Institute for Psychology Information, Germany
An intervention concept to foster students' epistemic beliefs (beliefs about the nature of knowledge and knowing) is presented. The concept is based on a multiple-texts approach. Students were presented short texts containing controversial scientific evidence on gender stereotyping in secondary schools. In contrast to more "traditional" approaches using controversial evidence, all contradictions may be integrated by identifying the contextual factors that a certain type of stereotype discrimination occurs in ("resolvable controversies"). We expected this approach to reduce absolute and multiplicit epistemic beliefs and to foster epistemically. The intervention concept was tested in a pilot study (15 fourth semester psychology undergraduates) followed by an intervention study (86 sixth psychology undergraduates).
A randomised field-experimental intervention study using a pre-post 33 design (5 intervention groups, 2 measurement points) was conducted. Data were analysed through t-tests and analyses of variance. In sum, the intervention proved suitable in reducing topic-specific absolute beliefs as well as in enhancing topic-specific and domain-specific epistemically belief. Our data thus show that the presentation of resolvable controversies is well-suited to reduce topic-specific absolutism through an increase in epistemically and without the risk of fostering multiplicity.

Measuring Collaboration Challenges and Weil-Dimension using a Collaborative Assessment Tool
Keywords: Collaborative Learning, Computer-supported collaborative learning, Psychometrics, Self-regulation
Presenting Author: Asinah Banthar, University of Victoria, Canada
Co-Author: Mylson Hadei, University of Victoria, Canada
Co-Author: Todd Milford, University of Victoria, Canada
Co-Author: Rebecca Edwards, University of Victoria, Canada
Given its complex structure, group work or collaboration is posed with multifacettes of challenges (e.g., Barron, 2003). However, methods of assessing and identifying those varied challenges are still underdeveloped, consequently reducing the effectiveness of efforts at supporting learners' regulation of those challenges. The purpose of this study was to (a) explore the types of challenges learners encountered in a collaborative task by (b) identifying activities that were perceived as either performed more collectively (WE-focused) or more individually (I-focused). A Collaborative Assessment Tool was used as a common method for tapping into challenge areas in collaboration, and its validity and reliability will be analyzed in this paper. Findings, thus far, indicate that learners were more successful at harnessing group effort in communication, followed by motivation and socio-emotional-climate. Activities pertaining to planning, strategic engagement, and using appropriate task knowledge were less WE-focused. Implications for supporting regulation in collaboration are discussed

Motivation, SRL and learner behaviour in MOOCs
Keywords: E-learning / Online learning, Learning analytics, Motivation, Self-regulation
Presenting Author: Renee Jansen, Utrecht University, Netherlands
Co-Author: Anouschka van Leeuwen, Utrecht University, Netherlands
Co-Author: Jeroen Janssen, Utrecht University, Netherlands
Co-Author: Liesbeth Kester, Utrecht University, Netherlands
Self-regulated learners actively plan, monitor and reflect on their learning and strategies. SRL is very important and in online forms of education, it is even more important than in traditional education, as students are provided with more autonomy online. In traditional education, it is known that motivation is related to self-regulated learning (SRL). In this study, the relation between motivation and SRL is investigated in a fully online, MOOC context. Log data of all collected learner behaviour in the MOOC to obtain insight in the nature of this relationship. Learners were clustered on their reported SRL, and it was found that different patterns in behaviour were present in the MOOC. Data on our motivation survey have been collected and the results show that learners are highly intrinsically motivated. During the EARLI conference findings will be presented of the relation between motivation and SRL, and of the sequential analyses of the SRL clusters. If students indeed behave differently in a MOOC dependent on their SRL then learner behaviour patterns may in the future be a method for determining learners' SRL.

Capturing SRL in primary school children: A data triangulation approach
Keywords: Achievement, Primary education, Quantitative methods, Self-regulation
Presenting Author: Sofie Neiweg, Ghent University, Belgium
Co-Author: Mona De Smul, University of Ghent, Belgium
Co-Author: Hilde Van Keer, Ghent University, Belgium
Co-Author: Geert Devos, Ghent University, Belgium
Recently, research on self-regulated learning (SRL) demonstrated that even young students are capable of regulating their learning. This resulted in increased attention for the measurement of SRL skills in primary school students. However, in this respect a debate is going on how to accurately assess SRL. As all existing measurement instruments and approaches have their advantages and restrictions, there is a demand for the use of data triangulation. In line with this, the present study measures the SRL competencies of fifth and sixth grade primary school children, combining a general self-report questionnaire, a task-specific self-report questionnaire, and think-aloud protocols. More particularly, the results for the different measurement approaches are presented, as well as compared and contrasted. Further, attention is given to presenting differences in SRL skills of students with different achievement levels.

Session R 463
2 September 2017 13:00 - 14:30
Vita - 109
Single Paper
Assessment and Evaluation, Lifelong Learning
Paper Presentation: Assessment Methods and Tools - B
Keywords: Assessment methods and tools, Cognitive skills, Competencies, Educational attainment, Lifelong learning, Mathematics, Meta-analysis, Pre-service teacher education, Secondary data analysis, Self-regulation, Student learning, Teacher Effectiveness, Teaching / instruction, Video analysis
Interest group: SIG 01 - Assessment and Evaluation
Chairperson: Jennifer Lambricht, University of Potsdam, Germany
The Quality of Feedback: Instructional effectiveness captured in video recorded classrooms
Keywords: Assessment methods and tools, Teacher Effectiveness, Teaching / instruction, Video analysis
Presenting Author: Lasbeth M Breivik, Department of Teacher Education and School Research, Norway
Internationally, little evidence of supporting purposes of classroom assessment exists. In the present study, we investigate feedback practices in language arts classrooms. By comparing video observations from 184 recorded language arts lessons across 46 secondary classrooms in Norway, this study considers the quality of feedback given orally by teachers, as well as from students to other students, and students’ self-assessment. The findings suggest that there are substantial differences in the quality of feedback across classrooms, with the majority of teachers providing feedback that is either absent or low. The present study contributes with systematic findings on the quality of feedback in the classroom, and enables an analysis within and across a large number of classrooms and lower secondary schools.

Pre-service teachers analyse classroom situations: Assessing a key aspect of professional competence

**Keywords:** Assessment methods and tools, Competencies, Mathematics, Pre-service teacher education

**Presenting Author:** Marita Friesen, Ludwigshafen University of Education, Germany

**Co-Author:** Sebastian Kuntze, Ludwigsburg University of Education, Germany

The competence of analysing classroom situations in the sense of identifying and interpreting events that are relevant for student learning is an essential prerequisite for making informed teacher decisions. In light of this, we examined how the representations of classroom situations, and the way they are represented within the mathematics classroom, are designed for assessing the pre-service teachers’ competence of analyzing the use of representations. Although the format in which classroom situations are presented might play a role when assessing this competence, evidence about the role of different formats such as text, comic and video is inconclusive. This study investigated, in a vignette-based design with six class situations, and six representations in the three formats, text, comic and video. Answering open-ended questions, N=164 pre-service teachers were asked to analyse the use of representations in the six vignettes. The results suggest that the investigated competence of analysing concepts empirically to a one-dimensional Rasch model and that there is a non-significant main effect of the vignette format on the item difficulties. Texts, comics and video-based vignettes appear to be comparably effective for the assessment of pre-service teachers’ competence of analysing the use of representations in mathematics classrooms.

A developmental progression of self-regulated learning

**Keywords:** Assessment methods and tools, Self-regulation, Student learning, Lifelong learning

**Presenting Author:** Narelle English, Melbourne Graduate School of Education, Australia

**Co-Author:** Susan-Marie Harding, The University of Melbourne, Australia

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**Co-Author:** Monjural Alam, The University of Melbourne, Australia

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**Co-Author:** Patrick Griffin, University of Melbourne, Australia

A developmental progression of self-regulated learning

**Abstract**

Students’ ability to learn how to learn, and in particular their ability to self-regulate their learning, will be a key skill in the knowledge economy. Given the range of student ability to regulate aspects of their thinking, behaviour and motivation during classroom tasks, a developmental progression of self-regulated learning (SRL) behaviour is an effective way to support teacher capacity to assess student SRL competence in order to make targeted interventions for students. This research focuses on the design of a questionnaire and the analysis of items for their facility to determine hierarchically ordered elements of SRL. Griffin’s (2007) structure of developmental assessment was used to develop capabilities, indicators and criteria to build a framework to inform questionnaire items that assess student self-regulation. The tool was piloted and adjusted for a larger sample of students to assess the reliability of the items in order to determine whether items were a fit for the Rasch model. The questionnaire was completed by 3741 students from 42 schools in Victoria, Australia. It was determined that the tool was a good fit and the order of items and thresholds of difficulty were used to determine a progression of self-regulated learning.

**How consistent are male and female variances in reading and mathematics?**

**Keywords:** Cognitive skills, Educational attainment, Meta-analysis, Secondary data analysis

**Presenting Author:** Sue Stothard, Durham University, United Kingdom

**Co-Author:** Helen Gray, Durham University, United Kingdom

**Co-Author:** Peter Timms, Durham University, United Kingdom

**Co-Author:** Louise Chappell, Durham University, United Kingdom

**Co-Author:** Lee Copping, Durham University, School of Education, United Kingdom

While the male-female attainment gap has decreased in magnitude on average (Leitz, 2006), the difference in variability appears to remain. Recent international research (Baye & Monsieur, 2016) suggests that the “greater male variability hypothesis” may be a reality, with males being over-represented in the top and bottom tails of the ability distribution, particularly in reading. This may at least partially explain the paradox of why similar mean scores of males and females do not explain the tendency towards males being more represented in special needs groups as well as being overrepresented in high achieving groups in our study, we examine differences in the variance ratios of male and female test results across a range of national and international data sets. We meta-analyse these results to determine the magnitude of this difference, and whether it is consistent over time, age ranges, nations and assessments. Our results suggest that while the mean differences may be similar, male scores are consistently more varied than females in the domains of literacy and numeracy. We therefore extend the findings of Baye & Monsieur to provide additional evidence to support the “greater male variability hypothesis”.

**Session R 464**

2 September 2017 13:00 - 14:30

**Viita - 114**

**Single Paper**

**Instructional Design, Learning and Instructional Technology**

**Presenting Author:** Pooja Soni, Manipal University Jaipur, Jaipur, India

A Motivational Perspective on the Effects of Alternating Example Study and Problem Solving

**Keywords:** Experimental studies, Instructional design, Motivation, Multimedia learning

**Presenting Author:** Mizu van Harstel, Avans University of Applied Sciences / Utrecht University, Netherlands

**Co-Author:** Vincent Hoogerheide, Utrecht University, Netherlands

**Co-Author:** Tamara Van Gog, Utrecht University, Netherlands

**Co-Author:** Peter Verkooijen, Avans University of Applied Sciences / Erasmus University Rotterdam, Netherlands

Research on example-based learning has demonstrated that instruction, consisting of example study or example study alternated with practice problem solving, is a more effective and efficient instructional strategy than practice problem solving only. However, it is as yet unclear how example study (E) and practice problem solving (P) should be sequenced to be most optimal in terms of student motivation and learning outcomes. We addressed this question in two experiments that had the same design, but a different student population: one for whom the tasks were in their chosen domain of study (Experiment 1) and one for whom the tasks were outside their domain of study (Experiment 2). In Experiment 1, students in higher technical education engaged in learning to solve integration problems in one of four instruction sequences: EEEE, EEP, PEP, PPEP, or PPPP. There were significant differences between EEEE and PPPP (EEE > PPPP), but in contrast to prior research there was no significant difference between EPEP and PEPE. Self-efficacy and perceived competence were higher in the example-study conditions (i.e., EEEE, EEP, PEP > PPPP). Experiment 2 is an exact replication of Experiment 1 but with first year primary education teacher training students. We expect for these students that – in line with prior research – starting with an example (EEE & EEP) will be more motivating and effective than starting with a problem (PEP & PPP). Results of Experiment 2 will be available before the conference.

A longitudinal study on 38 learning designs within and between disciplines

**Keywords:** E-learning / Online learning, Instructional design, Interdisciplinary, Learning analytics

**Presenting Author:** Quan Nguyen, The Open University, United Kingdom, United Kingdom

**Co-Author:** Bart Rienties, Open University UK, United Kingdom

**Co-Author:** Lisette Toetenel, The Open University, United Kingdom, United Kingdom

Learning analytics (LA) seeks to support learning processes through systematic measurements of learning-related data and to provide informative feedback to learners and educators. LA has the power to provide just-in-time support, especially when predictive analytics is married with the ways that teachers have designed their course, or so-called learning design (LD). Although recently substantial progress has been made in aligning LA with LD, there are still a lack of empirical evidence of how teachers act on conclusions from the research. This study investigated how LD was configured over time and its impact on student activities by analyzing longitudinal data of 38 modules with a total of 43,099 registered students over 30 weeks at the Open University UK, using social network analytics. Our analysis of the data revealed that LD configurations which allowed students to reflect on their practices in order to anticipate problems and make informed interventions. Furthermore, by controlling for the heterogeneity between modules, our results indicated that LD features were able to explain up to 60% of the variability in student online activities, which reinforced the importance of pedagogical content in LA.

Introductory Computational Thinking through Scratch Programming: A K-12 Classroom Perspective

**Keywords:** Achievement, Case studies, Educational Technology, Primary education

**Presenting Author:** Janne Fagerlund, University of Jyväskylä, Finland

Programming has arrived in the Finnish national primary school core-curriculum. One key educational expectation is the development in computational thinking (CT), which comprises understanding of algorithms and computational concepts in the context of programming among other domains. These issues have been studied relatively little in primary education while the support that educators may require has increased.

The purpose of this study is to investigate the learning of introductory CT through programming among students practicing Scratch programming in primary education. The research questions are: (1) What are the learning results in algorithms and CT concepts? (2) How are programming and computing perceived? (3) What are the dispositions towards learning programming?
The study will be conducted by accompanying programming courses in formal primary education. Data will be collected with class wide pre- and post-tests, interviews, programming projects, and video and audio recordings of students engaging in individual and pair programming.

Learning results will be examined based on answers provided in the tests. Abilities to understand, apply, and create algorithms in addition to understanding of CT concepts are evaluated. Student projects provide insight into experiences in using concepts in programming work. Perceptions of programming and computing in addition to dispositions towards learning programming will be analyzed based on answers written in the tests and interviews. Student experiences attained in interviews will be reflected in the learning results, perceptions, and dispositions in addition to variance among students will be explored and discussed. Pedagogical implications towards classroom practice will be drawn.

Motivational changes of distance learning students – a study over the course of one semester

Keywords: E-learning / Online learning, Instructional design, Motivation, Lifelong learning

Presenting Author: Nadja Müller, Ulm University, Germany
Co-Author: Rebecca Piaikka, Ulm University Institute of Psychology and Education, Germany
Co-Author: Tina Seufler, Ulm University, Germany

As distance learners have to highly self-regulate themselves, keeping motivated is important for successfully completing the course and also for learning success. To prevent distance learning dropout, it is important to investigate whether distance learners are able to keep their motivation on a constant level or whether motivational deteriorations occur. Therefore, we investigated first year distance learner’s motivation over one semester. Additionally, the relation between motivation and learning success (course grade) was investigated. Based on the model of current motivation, interest, probability of success, anxiety, and challenge were examined and students were surveyed four times during the semester. Results indicate deteriorations in distance learners’ interest and probability of success during the semester. Probability of success at the two measure points before the exam was positively associated with learning success.

Session R 465
2 September 2017 13:30 - 14:30
Main Building A - 42B
Single Paper
Learning and Instructional Technology

Paper Presentation: Learning and Instruction with Computers - D

Keywords: Case studies, Computer-supported collaborative learning, Content analysis, Cooperative / collaborative learning, Design based research, E-learning / Online learning, Educational Technology, Higher education, Language (Foreign and second), Multicultural education, Peer interaction, Qualitative methods, Quasi-experimental research
Interest group: SIG 97 - Learning and Instruction with Computers

Chairperson: Erica de Vries, Netherlands

Investigating the role of self-regulated learning in students’ approaches to open-ended online tasks

Keywords: Case studies, E-learning / Online learning, Educational Technology, Higher education

Presenting Author: Sue Bennett, University of Wollongong, Australia
Co-Author: Lori Lockyer, University of Technology Sydney, Australia
Co-Author: Vesper Kennedy, University of Melbourne, Australia
Co-Author: Barney Dalgarno, Charles Sturt University, Australia

Many students adopt ineffective approaches to learning at university. This is despite the introduction of student-centred online approaches intended to improve educational quality and access in higher education. These approaches require students to interpret open-ended tasks and independently self-regulate their learning. High quality task design and supportive teaching are critical to effective student-centred online learning, but are particularly challenging in an era when students entering higher education come from increasingly diverse backgrounds. Prominent conceptual models of university student learning have guided good teaching and design for the past 40 years, but there is a compelling need to extend theory to better account for how students learn when supported through online technologies, particularly to investigate and better understand the role of self-regulation. We will present five key findings from a mixed method collective case study which reveal how online task design and teaching organisation can support or hinder students’ task interpretation, and how students develop their ideas about open-ended online tasks, set goals and manage their study environments. We support each finding with data from the cases and suggest implications for practice and theory.

How collaboration scripts influence contribution quality in Wiki-based learning environments

Keywords: Computer-supported collaborative learning, Content analysis, Cooperative / collaborative learning, Qualitative methods

Presenting Author: Sven Heimbuch, University of Duisburg-Essen, Germany
Co-Author: Lisa Oehler, University of Duisburg-Essen, Germany
Co-Author: Daniel Bodemer, University of Duisburg-Essen, Germany

Knowledge construction assignments with Wikis can be found in various educational settings. However, Wikis are not inevitably suited to facilitate learning and thus requires additional guidance. Large Wikis such as Wikipedia have an inherent proposal on how to create and revise articles. This work-flow promotes a high frequency of individual article edits without the need further coordination (Be Bold, Revise, Discuss = BRD). As an alternative we propose a different script approach that is more in line with current research findings of the learning sciences. We aimed this alternative script at promoting participants to discuss any planned article edits and revisions upfront (Discuss, Deliberate, Revise = DOR). Therefore, in an experimental study we investigated the effects of these two collaboration scripts with different objectives during a two-week Wiki editing assignment supplementing our lectures about descriptive statistics. Results indicate that the DOR script encouraged students to actively participate in discussions, while the BRD script has mainly fostered pure editing activities and virtually no communication whatsoever. The quality of randomly sampled articles differed between scripted groups. In favour of the DOR script leading to less redundant and more coherent articles. Overall, it showed that collaboration scripts affect learning-related activities in Wiki-based knowledge construction.

PILL-VR Simulation Learning Environment for Teaching Medication Administration to Nursing Students

Keywords: Design based research, Educational Technology, Higher education, Quasi-experimental research

Presenting Author: Ilana Dubov, University of Haifa, Faculty of Education, Israel
Co-Author: Sharon T. Levy, University of Haifa, Faculty of Education, Israel
Co-Author: Efrat Dagan, University of Haifa, Israel

The purpose of this study was to evaluate the effectiveness of Pharmacology Inter-Leaved Learning-Virtual Reality (PILL-VR) simulation when applied to nursing education, as a tool for learning medication administration procedures in a three-dimensional virtual ward. A quasi-experimental pre-test intervention post-test design study was conducted. Participants consisted of nursing students who either learned with a PILL-VR simulation (experimental group; n=82) or who learned according to the traditional lecture based curriculum (n=47). The results revealed significantly higher conceptual and procedural knowledge learning gains following activity with the PILL-VR simulation compared to studying via traditional lecture-based curriculum. These results suggest that using VR simulations may provide affordable and flexible access to necessary practical skills in higher education, which is crucial to developing students’ expertise.

Multimodal, interactive, gamel-like e-learning concepts for the foreign language classroom

Keywords: Computer-supported collaborative learning, Language (Foreign and second), Peer interaction, Multicultural education

Presenting Author: Laura Pihkala Posti, University of Tampere / Tampereen koulu, Finland

In this paper central results of my cumulative inter-disciplinary PhD project are presented. The approach is based on ideas of action and design based research. Material and method triangulation was realized. Multimodal, collaborative, experiential, action-based and authentic web-supported concepts were developed for foreign language education. A central issue is to support the development of learner autonomy, agency and skills for intercultural communication. Different kinds of webl.0 tools and platforms, videoconferencing, the informal web game world Minecraft and the embodied, collaborative language learning environment Second Kindness were used in different kinds of interventions on different school levels, secondary school and university level, as well as in international cooperation projects. The goal was to find out, what kind of elements would work and should be included in order to reach a pedagogically meaningful whole.

The first results are promising, although critical issues emerged. A multi-faceted, pedagogically sketched approach offering different modality and media combinations seem to support the skill development of learners with different cognitive styles, but also the whole learning community.

Session R 466
2 September 2017 13:00 - 14:30
Pens B - 84/117
Single Paper
Lifelong Learning

Paper Presentation: Arts and Music Education

Keywords: Arts, Assessment methods and tools, Collaborative Learning, Competencies, Conversation / Discussion analysis, Informal learning, Lifelong learning, Self-regulation, Teaching / instruction

Interest group: SIG 14 - Learning and Professional Development

Chairperson: Bernhard Ertj, Universität der Bundeswehr München, Germany

Sight-reading by cellists: The role of positional knowledge and tonal strategies

Keywords: Arts, Assessment methods and tools, Competencies, Teaching / instruction

Presenting Author: Etsi Bochuser, Open University, Netherlands
Co-Author: Johan van Strien, Open University of the Nethandlands, Netherlands
Co-Author: Zxybarn Wolfs, Open University of the Nethandlands, Netherlands

The aim of this study is to answer these questions: Does position knowledge lead to better sight-reading by cellists? And how is technical level of musicians related to use of both tonal and positional strategies? In this study 79 amateur cello students participated, ranging in age (7 to 70), technical level (low, moderate, high), defined by the number of positions on the neck of the instruments the player
masters, and experience – years of having followed cello lessons (1 to 20). The project yielded valid measurement instruments and shows that both tonal and positional strategies play a role in sight-reading for cellists; they are not mutually exclusive. Furthermore, a paradoxical effect was found: pitch errors (writing wrong notes) are more affected by position knowledge and skill, while fluency errors (unintended long and short pauses) are more affected by tonal strategies and experience. The findings form a first step towards a cognitive theory on musical production, and seek to promote use of different strategies to improve sight-reading by string instrument players in music education. Can tonal knowledge and strategies indeed be discovered as the missing link in fluency during the process of mental goal imaging and psychomotor production while sight-reading?

Expert music educators as promoters of group-level regulation

**Keywords:** Arts, Collaborative Learning, Conversation / Discourse analysis, Teaching / instruction

**Presenting Author:** Tarja-Riitta Humre, University of Turku, Finland

**Co-Author:** Marjaana Puurunen, University of Turku, Finland

This study focuses on the regulatory processes of professional music educators while they guide teacher students through a given musical task. The aim is to identify the role the educators’ play in these collaborative tasks through detailed analysis of (1) the expert’s and students’ musical activities and verbal interaction and (2) the expert’s allocation of attention towards the students and the musical score. Two groups of one music educator and two pre-service teachers met twice in 45 minute sessions. In one session, the group’s task was to familiarize themselves with a given song, prepare an arrangement suitable for a group of nine year-olds, and make notes about their arrangement. The sessions were video recorded by 4 cameras covering the whole classroom area. In the qualitative video data, first, the participants’ musical activities and verbal interaction were categorized. Second, episodes depicting self-, co- and socially shared regulation were identified. In addition, the eye movement analysis was used to examine the music educators’ allocation of attention to the group members and the musical score. Based on the observations, we propose that in collaborative music-making, an expert seems to have a central role in initiating co- and shared regulation in collaborative music-making: Expert’s co-regulation and positive emotional support seemed to steer the group’s working, and her musical contribution allowed shared regulation to emerge.

How guitarists perceive support for expertise development from different ‘persons in the shadow’

**Keywords:** Arts, Informal learning, Teaching / instruction, Lifelong learning

**Presenting Author:** Manuel Laengler, University of Regensburg, Germany

**Co-Author:** Markus Nivala, University of Gothenburg, Sweden

**Co-Author:** Hans Gruber, University of Regensburg, Germany

‘Persons in the shadow’ may substantially affect how an individual acquires expertise, such as through guiding deliberate practice. In the domain of popular music, such persons in the shadow might be peers, parents and teachers. Little research exists on how individuals perceive the impact of persons in the shadow on expertise development, particularly in fields like popular music. This study investigates the perceived impact exerted by peers, parents and teachers on the expertise development of guitarists in the domain of popular music. Interviews were used to analyze nine case studies of guitarists at different levels of expertise (experts, sub-experts, amateurs). The main focus was on the roles of persons in the shadow concerning practicing, learning and motivation. The results show that experts differ from sub-experts and amateurs in the perception of support from persons in the shadow. In particular, peers and the formation of bands were perceived as strongly affective for practicing, learning, and motivation. The impact of parents and teachers on the expertise development in guitar playing was perceived as more ambiguous, and they were less important for the expert group.

Crossing educational and cultural boundaries in improvisational expertise development

**Keywords:** Arts, Self-regulation, Teaching / instruction, Lifelong learning

**Presenting Author:** Iwani Wipperf, Open University of the Netherlands, Netherlands

**Co-Author:** Els Boshuizen, Open University, Netherlands

**Co-Author:** Saskia Brand-Grünewald, Open University, Netherlands

This study aims to reveal environmental factors that affect successful and less successful improvisational expertise development. It explicitly focusses on boundary crossing in multiple musical contexts. The study compared improvisational skill development of a group of six elite musical improvisors to a group of five semi-elite musical improvisors by means of a multiple site, structured case study design. A biographical research method was used to collect data for cross case analyses. Data were analyzed using a combination of a theory-based categorization system and open coding searching for actors and factors that affected vicious and virtuous cycles of learning. Findings on learning during pre-conservatory, conservatory, and post-conservatory phases revealed distinct differences in boundary crossing activities between the elite and semi-elite improvisors. In order to develop musically the elite improvisors started to cross educational boundaries early in their musical careers and intensified this during and after the conservatory period (e.g., attending jam sessions on a regular basis). Semi-elite hardly mentioned engagement in such self-directed boundary crossing practice. This pattern was even more visible for cultural boundary crossing. Only the elite improvisors explicitly cited activities such as the participation in pluralistic music (i.e., multicultural) and artistic projects (e.g., those that aim to synthesize music and dance). Based on these findings we hypothesize that self-directed educational and cultural boundary crossing positively affect improvisational expertise, especially the development of a personal musical voice, a feature of musical professionalism that is imperative to survive in contemporary musical practice.

Session R 467

2 September 2017 13:00 - 14:30

Main Building A - A22

Single Paper

Learning and Social Interaction, Motivational, Social and Affective Processes

**Paper Presentation:** Motivation and Emotion - K

**Keywords:** At-risk students, Educational Psychology, Emotion and affect, Goal orientation, Higher education, Mathematics, Mixed-method research, Motivation, Motivation and emotion, Self-regulation, Values education, Vocational education

**Interest group:** SIG 59: Motivation and Emotion

**Chairperson:** James Kwan, Lancaster University, Singapore

**Motivation, well-being and transactional patterns in the prevention of unqualified academic drop-out**

**Keywords:** At-risk students, Mathematics, Vocational education, Motivation and emotion

**Presenting Author:** Elke Baten, University of Ghent, Belgium

**Co-Author:** Anemie Desoete, Ghent University & Artevelde University College, Belgium

**Co-Author:** Brigitte Decroene, Ghent University, Belgium

**Co-Author:** MarieClaire Vandeveld, Ghent University, Belgium

**Co-Author:** Edwin Hamson, Ghent University, Belgium

The aim of this study is to investigate the characteristics of students at risk for academic drop-out in vocational education. Therefore, 54 pupils of 9th and 10th grade and 40 of their teachers participated in a large assessment program of the City of Ghent. Measurements of preferential transactional patterns, autonomous vs. controlled mathematical motivation, well-being and fact retrieval mathematics were conducted in the pupils. Intelligence was taken into account as a control factor. For the teachers, preferential transactional patterns were assessed. Results revealed that 58.14% of pupils were motivated by pleasurable contact, whereas only 5% of teachers spontaneously focused on such a pleasurable contact, demonstrating a mismatch. Further, only 10.91% of the pupils had the best qualitative motivation (high autonomous and low controlled motivation), according to the Self-Determination Theory. In addition, for pupils with focus on facts, better mathematical proficiency was found. Finally, the self-esteem among the pupils was low. All these findings might be related to the large rate of early academic drop-out in this particular school. Limitations and educational implications will be discussed.

What types of life purposes do Finnish Bachelor of social service students identify with?

**Keywords:** Higher education, Mixed-method research, Values education

**Presenting Author:** Nina Manninen, University of Helsinki, Finland

**Co-Author:** Elina Ruusalo, University of Helsinki, Finland

**Co-Author:** Kirs Tim, University of Helsinki, Finland

This study identifies the life purposes of Finnish Bachelor of social service students (N = 151) during their studies at Helsinki Metropolia University of Applied Sciences. In their future profession the altruistic aims are considered important in the light of earlier research (Toress & Madar 2015; Leppänen 2010). In our study, the altruistic aims are regarded as part of the definition of purpose. The design of the study is a mixed method with both quantitative and qualitative data. The data was gathered with an online questionnaire including Roberts and Roberts (2006) life goals instrument and with essays where students wrote essays about their life goals. Results show that the students can be used to develop education of social service students with an emphasis on purpose in their professional development.

Exploring factors in student engagement that predict low versus high academic performance

**Keywords:** At-risk students, Educational Psychology, Higher education, Self-regulation

**Presenting Author:** Sarah Davis, University of Victoria, Canada

**Co-Author:** Rebecca Edwards, University of Victoria, Canada

**Co-Author:** Alyson Hadwin, University of Victoria, Canada

**Co-Author:** Todd Milford, University of Victoria, Canada
Student engagement has been identified as an important factor in academic performance, but research usually does not address the multidimensional aspects of engagement. The purpose of this mixed method case study is to explore specific engagement characteristics distinguishing students who entered the course with low prior academic achievement and remain in the low achievement band versus those who enter with low achievement levels and move into the higher achievement bands. For this study, engagement data comprised two primary sources: (a) learning analytics collected in activity and access logs gathered in a course management system, and (b) quality of ‘non-graded’ SRL engagement in course learning activities. Data sources were organized into five potential indicators of: (a) behavioral engagement, (b) cognitive engagement, (c) emotions experienced during learning, (d) agency or proactive approaches to studying, and (e) overall engagement. Findings indicated that (a) students who moved achievement bands showed higher levels of behavioral engagement, cognitive engagement, agency or proactive approaches to studying and overall engagement and (b) students who remained in the same achievement band showed higher levels of positive deactivating emotions.

Do students’ beliefs about errors vary as a function of their achievement goal orientation profiles?

Keywords: Emotion and affect, Goal orientation, Motivation, Motivation and emotion
Presenting Author: Ariki Pukka, National Defence University, Finland
Co-Author: Heta Tuominen, University of Helsinki, Finland
Co-Author: Anna Taipalas, University of Helsinki, Finland
Co-Author: Maria Tulla, University of Augsburg, Austria
Co-Author: Marinko Niemivirta, University of Oslo, Norway

This study examined how university students’ achievement goal orientations are associated with their error-related beliefs and responses. The participants were 145 first year students from the Finnish National Defence University (NDU). Students’ goal orientations (mastery-intrinsic, mastery-extrinsic, performance-approach, performance-avoidance, and work-avoidance) and their error-related beliefs and beliefs (beliefs about learning from errors, affective-motivational adaptivity and action adaptivity of error reactions, error anticipation, and error strain) were assessed at the beginning of their first year in the NDU. Latent profile clustering analysis was used to form groups of students based on the risk of early drop-out. A Rasch model was used to determine if there were differences between these groups in error beliefs and responses. Four groups of students were identified: mastery-oriented (focus on learning and improvement), 31%); success-oriented (focus on absolute and relative success, 11%), indifferen (no clear goal emphasis, 36%) and avoidance-oriented (focus on avoiding failure and effort, 22%). The goal orientation groups differed from each other on their beliefs about learning from errors as well as on affective-motivational adaptivity and action adaptivity of error reactions. The success-oriented and mastery-oriented students scored highest, especially regarding adaptive learning behavior and metacognitive activities, while the avoidance-oriented and indifferent students. There were no significant differences in error anticipation and strain. Our results increase understanding on how students with different motivational profiles interpret and respond to errors.

Keywords: achievement goal orientation, error beliefs, adaptivity of error reactions, person-centred approach

Session R 468
2 September 2017 13:00 - 14:30
Pensio B - B1097
Single Paper
Higher Education, Motivational, Social and Affective Processes

Paper Presentation: Higher Education and Achievement

Keywords: Achievement, Attitudes and beliefs, Collaborative Learning, Communities of learners, E-learning / Online learning, Educational Psychology, Higher education, Learning approaches, Learning Technologies, Mixed-method research, Psychometrics, Self-efficacy
Interdiscipain: Education
Chairperson: Kyoosuke Kakinuma, Doshisha University, Japan

Cognitive, affective, and behavioral engagement in small-scale teaching

Keywords: Achievement, Communities of learners, Higher education, Mixed-method research
Presenting Author: Jasperrin Brouwer, University of Groningen, Netherlands
Co-Author: Ellen Jansen, University of Groningen, Netherlands
Co-Author: Adrian Hofman, University of Groningen, Netherlands
Co-Author: Andrea Flache, University of Groningen, Netherlands

Small-scale teaching is increasingly implemented in university education. It is expected that this contributes to engagement and academic performance. The University of Groningen (UGoG) in the Netherlands implemented learning communities (LCs) for improving performance rates and the quality of education and replaced the so-called mentor groups gradually. The difference is that the learning community is a group of 12 students who attend all courses together during the first semester, whereas students in mentor groups meet only once a week. This comparative survey study addresses the following research questions: (1) To what extent are different dimensions of engagement, self-efficacy and study success related in small groups of first-year students, i.e. LCs and mentor groups? (2) How do first-year students experience the different dimensions of engagement in their LC or mentor group? (3) Do these experiences differ for students in LCs and mentor groups? For answering these research questions, we used a mixed method design in a sample of 407 students. The path analysis showed that all dimension of engagement are related to self-efficacy and study success. The multilevel analysis did not reveal any differences between these relationships for LCs and mentor groups. The preliminary qualitative data-analysis showed that all students were satisfied with the teaching in groups regardless of the number of contact hours, but in LCs the students were more affectively engaged, whereas in mentor groups the students were more behaviourally engaged.

Constructing instrument assessing students approaches to learning: Considering context

Keywords: Achievement, Higher education, Learning approaches, Psychometrics
Presenting Author: Pierre Mukendi wa Mpos, Université de Kinshasa, Congo, the Democratic Republic of the Co-Author: Jan Elien, KULeuven/Faculty of Psychology and Educational Sciences, Belgium

Students approaches to learning (SAL) are considered to be one of the most important factor in determining students learning outcomes in higher education. Instruments have been developed to assess SAL. Few studies in the literature have been done in an African context and no context-specific instruments to our knowledge, are available. So, research in this specific context faces the challenge of importing and or developing adequate tools. This paper is mainly based on the development of a new instrument assessing SAL. SAL have been assessed by the means of study processes questionnaire two factors validated by the CFA. This study also assesses the reliability and construct validity of the new instrument. The alpha of Cronbach values are respectively 64 and 65. Given those poor values on the one hand and also the differences between the original and the target context on the other hand; it has been decided to construct a robust and contextual instrument starting from interviews with students. The semi-structural interviews supported the elaboration of items. Cognitive interviews led to the adaptation of statements on the basis of students interpretations. The instrument was then piloted in a group of 153 first year students from psychology and education. The reliability as well as the validity of the new instrument are examined in this paper.

Keywords: Higher education - learning approaches

Course performance feedback as a source of university students’ sense of self-efficacy

Keywords: Attitudes and beliefs, Educational Psychology, Higher education, Self-efficacy
Presenting Author: Jeffrey Smith, University of Otago, New Zealand
Co-Author: Nicola Beaston, University of Otago, New Zealand
Co-Author: David Berg, University of Otago, New Zealand

This paper presents the findings of a set of three samples of students looking at the impact of receiving midterm grades on the sense of self-efficacy of those students in introductory accounting courses. The studies were carried out in two major universities in New Zealand. Students were surveyed concerning their sense of self-efficacy in weeks 3 and 13 of the course. At roughly week 8, students received their scores on the midterm examination of the course. A series of designed stepwise multiple regressions were then employed to examine the influence of the midterm examination result on student self-efficacy in weeks 3 and 13. The study results indicate that: (a) self-efficacy week 3 was a controlling variable in the regression, the self-efficacy week 3 was found to be factor analysed, yielding three factors, self-efficacy for overall achievement, ability to get organized for the course, and ability to seek help when needed. It was found that all three factors were significantly influenced by the score on the midterm examination. Positive mastery experiences are postulated by Bandura (1997) to be one of the four critical influences on self-efficacy. These results offer empirical support for Bandura’s hypothesis, as well as providing findings of substantial interest to lecturers working to provide optimal educational experiences in large course instructional formats.

Physical and virtual spaces in higher education

Keywords: Collaborative Learning, E-learning / Online learning, Higher education, Learning Technologies
Presenting Author: Marie Lejon, Malmö University, Sweden
Co-Author: Björn Lundgren, Malmö University, Sweden

This paper highlights interaction in physical and virtual spaces in a higher education HyFlex learning environment. HyFlex (hybrid and flexible) course design combines physical and virtual spaces and face-to-face with online learning. In a HyFlex learning environment several different spaces are shaped and in this paper we discuss four spaces that are connected in this type of learning environment. Furthermore, we show how three different teachers use strategies to design their lectures in a complex HyFlex environment. Teachers use strategies to help students find their way in the HyFlex model requires an increased didactic awareness in designing for learning and in the paper we discuss the need for team teaching and co-design. The result also pinpoint the fact that when designing for online, the setting might constrain the movement and the physical interaction in the campus activity. Rooms in a HyFlex learning environment could preferably be co-designed by the lecturer and facilitator including the physical space and the on-line space.

Session R 469
2 September 2017 13:00 - 14:30
Pensio A - Pazo Koll
Single Paper
Learning and Instructional Technology

Paper Presentation: Online Measures of Learning Processes - B
Reading rhythms: Eye movements of expert musicians and novices-in-training

This study investigates the visual processing of musical rhythm notation. In the experiment, 37 (education) students performed simple sight-reading tasks prior to and after a 6-month course on music didactics, while six professional music educators, who performed the task once, served as an expert reference group. In one session, each participant read four 16-bar long, simple passages of rhythm notation from a computer screen while tapping a rhythm pad. Eye movements during the reading were recorded. The analyses focused on (a) first-pass fixation durations, i.e., the time spent on the first inspection of symbols and (b) the eye-time span, i.e., the distance between the point of gaze and "concurrent point of musical time" in the score. Initial EEG analyses on the experts' data revealed that even in these simple tasks, the first-pass fixation duration allocated to a musical symbol varied according to the type of the symbol, the location of the symbol in a musical bar, and the symbols following the target. Findings based on the whole data set and on the eye-time spans at the target symbols will be presented at the conference. We stress the importance of examining the very basic elements of music notation prior to attempting to explain the visual processing of this complex "language" as a whole, and, by studying the steps in learning to interpret and execute musical symbols, hope to support the development of evidence-based methods for the teaching of basic musical skills.

A Gaze-Enabled System for Tracking the Reading Progress of Second Year Children in a Primary School

The application of learning analytics techniques to log data from Learning Management Systems (LMS) has raised increasing interest in the past years. Advances in this field include the selection of adequate indicators and development of research frameworks. However, log data-based analysis of course still poses some obstacles and challenges for researchers and practitioners in order to effectively improve and optimize learning processes. This paper highlights the challenges, and presents approaches that can help complement log-data based learning analytics. These approaches may be especially effective in collaborative settings, and include analysis of information flows, social interactions, and content analysis. This conceptual work aims to promote the debate surrounding the need for comprehensive and comparable studies and frameworks, and to foster advances in log-data based learning analytics.

Conceptual Ground and Findings Overview of the Polyphonic Analysis of Knowledge Building Dialogs

The paper utilizes a central role in learning processes, particularly in shared understanding and social knowledge construction. Based on the socio-cultural paradigm, the polyphonic model of dialog considers social knowledge-building as inter-annimation of voices in an analogy with polyphonic music, where novelty, creativity and coherence are assured by an interplay of dissonances and consonances, evolving towards a harmonious whole. In this analogy, voices are participants' newly introduced concepts and points of view. Automated tools implementing the polyphonic model cope with the high volume and complexity of data by relying on Cohesion Network Analysis, and applying advanced Natural Language Processing techniques. Corresponding tools were successfully used for automated dialog analysis in a wide variety of educational settings, ranging from formal philosophical discussions in text-based discussion forums to informal online blog discussions. Although the presented methods are proven to reliably predict comprehension of content and further participation in discussions, they are limited by the nature of text-based communication. Further development of the polyphonic model will be extended to gestures and body language, both in individual and group settings.

Session R 470
2 September 2017 13:00 - 14:30
Pils B - B3111
Single Paper
Learning and Social Interaction
Paper Presentation: Social Interaction in Learning and Instruction - E
Keywords: Arts, At-risk students, Communities of learners, Emotion and affect, Knowledge creation, Quantitative methods, Social aspects of learning and teaching, Social development, Social interaction, Survey Research, Teacher Professional Development, Video analysis
Interest group: SIG 10 - Social Interaction in Learning and Instruction
Chairperson: Cinia Demsa, University of Oslo, Netherlands
Adolescents' school engagement: Selection and influence effects of friendship and digital networks
Keywords: Communities of learners, Social development, Social interaction, Survey Research
Presenting Author: Shuji Li, University of Turku, Finland
Co-Author: Tuire Palonen, University of Turku, Department of Teacher Education, Finland
Co-Author: Noona Kuuru, University of Jyväskylä, Finland
Co-Author: Katarina Salmela-Aro, Helsinki Collegium for Advanced Studies, Finland
Co-Author: Kai Hakkarainen, University of Helsinki, Finland
This study investigated peer selection and peer influence effects on adolescents' emotional (i.e., flow in schoolwork), behavioral (i.e., truancy) and cognitive (i.e., persistence) engagement in a high school in urban area of Southern Finland. Social network analysis was used in the study. Students of the same grade (N=145, mean age=16) were asked to describe their own school engagement and nominate all their peers of the same grade to generate peer friendship network (i.e. with whom they spent time) and digital network (i.e. with whom they do interesting things together on Internet) at two time points (one year apart). Network analyses revealed that the degree to which peer selection and influence effects occurred varied by dimension of school engagement. Adolescents had a tendency to choose new peers in friendship network based on earlier similarly in emotional engagement, but choose new peers based on dissimilarity in cognitive engagement. Over time, adolescents became more similar to their grade peers in terms of behavioral engagement in digital network, but not emotional or cognitive engagement.

Keywords: adolescents, school engagement, peer selection, peer influence

Production and Perception of Classroom Disturbances
Keywords: At-risk students, Emotion and affect, Quantitative methods, Social aspects of learning and teaching
Presenting Author: Boris Eckestein, Universität Zürich, Switzerland
Co-Author: Urs W. Grob, University of Zurich, Switzerland
Co-Author: Kurt Reusser, University of Zürich, Switzerland
Norm violating behaviors produced by students during lessons, are often perceived as classroom disturbances by teachers as well as classmates. However, the degree of disturbance they perceive underlies several influences other than the behavior itself. Taking up research desiderata on this issue, the present study focuses (1) on forms and degrees of classroom deviance and (2) on the degree of disturbance as perceived by teachers and students – taking into account the respective instructional setting as the context of the production and perception of classroom disturbances. 85 teachers and their 1'412 students
Diagnostic competences are important in various disciplines. Numerous studies report instructional interventions with the goal of fostering diagnostic competences. However, it is still unclear with what kind of instructional approach diagnostic competences can be fostered best. A meta-analysis was undertaken to review empirical studies which used interventions to foster diagnostic competences among undergraduate students. Main research questions were whether diagnostic competences can be fostered through interventions and which kind of instructional approach (worked examples vs. problem-solving) would be more effective. A total of 86 studies is included in the sample. The study characteristics were double coded by a second trained person. A random effects model was applied. Results show a medium mean effect size (0.47) that was significant (p < .0001) with a confidence interval [0.35, 0.59]. Worked examples seem to be more effective than problem-solving QM (1) = 5.11, p = .02. Duration of the intervention was not a significant moderator indicating that even short interventions might be effective and sometimes long interventions might prove ineffective.

Session R 472
2 September 2017 13:00 - 14:30
Virta: 113
Single Paper
Developing Aspects of Instruction, Instructional Design, Learning and Special Education
Paper Presentation: Learning and Development in Early Childhood - F
Keywords: Achievement, At-risk students, Cognitive development, Comprehension of text and graphics, Early childhood education, Instructional design, Language (L1/Standard Language), Learning approaches, Primary education, Secondary data analysis, Self-efficacy, Special education
Interest group: SIG 05 - Learning and Development in Early Childhood
Chairperson: Marije van Amelsvoort, Tilburg University, Netherlands
The effect of mind mapping on listening comprehension and vocabulary in early childhood education
Keywords: Comprehension of text and graphics, Early childhood education, Instructional design, Language (L1/Standard Language)
Presenting Author: Chiel vander Veen, Vrije Universiteit Amsterdam, Netherlands
Co-Author: Monica Koster, VU University Amsterdam, Netherlands
Co-Author: Fatmke van der Will, Vrije Universiteit Amsterdam, Netherlands
Co-Author: Claudia van Kruismit, Vrije Universiteit Amsterdam, Netherlands
In a quasi-experimental study with a pre-posttest design we examined the effect of a mind mapping intervention on listening comprehension and vocabulary of preschoolers (aged 4-6) in the Netherlands. Two classes (n=35) participated in the study. In the intervention condition (n=17) the teacher applied repeated interactive book reading, accompanied with co-constructing a visual representation of the story in the form of a mind map. In the comparison condition (n=22) interactive joint book reading was applied. Results showed significant positive effects of mind mapping on both vocabulary (F(1,36) = 18.73, p < .001) and listening comprehension (F(1,36) = 5.88, p < .02, compared to the comparison condition. Hence, mind mapping seems a promising approach to improve preschoolers' listening comprehension and vocabulary.
Developers in teacher-child relationships and 2-6 year olds' academic adjustment
Keywords: Achievement, Cognitive development, Early childhood education, Primary education
Presenting Author: Annemie van der Veeren, Kohnstamm Institute, University of Amsterdam, Netherlands
Co-Author: Anneliem Veen, University of Amsterdam, Netherlands
The present study focuses on relations between developments in teacher-child relationships and academic adjustment for 2-6 year olds. High quality teacher-child relationships have been systematically found to contribute to children's school engagement and academic adjustment. The present study adds to previous research by studying relationship trajectories starting already in pre-school and by focusing on similarities between children in these trajectories. Data from four measurements of the ongoing national cohort study pre-Cool were used. In pre-Cool children are followed from the age of two. Assessments took place every school year. The first was in 2001/2002 and the fourth in 2014/2015. In the first two school years the children were in pre-school and in the third and fourth year of study they attended primary school. Data were used on the 1275 children for which pre-school teachers filled out questionnaires on the quality of the relationship with the child. Half of the children were female and over a quarter had a non-Western background. Results showed that for dependency two classes of students were found, one smaller group with low and increasing dependency (15%) and a larger group (85%) with higher and decreasing dependency. For closeness and conflict one class of students was found. The degree of teacher-child conflict as reported by the teacher at age two was negatively related to the level of maths achievement. Dependency at the age of two was positively related to the level of maths achievement and negatively with the degree of growth in maths achievement.
Quality in kindergarten and children's academic outcomes in kindergarten and grade 1 and 3
Keywords: At-risk students, Early childhood education, Primary education, Secondary data analysis
Presenting Author: Annemieke Veen, University of Amsterdam, Netherlands
Co-Author: Lone van der veen, Kohnstamm Institute, University of Amsterdam, Netherlands
Co-Author: Merlijn Karsnes, Kohnstamm Institute, University of Amsterdam, Netherlands
Summary (209 words)
At the entrance of the kindergarten at the age of 4 in the Netherlands, achievement differences between pupils at risk and not at risk are large. In particular, children of parents with a non-Western background start their school careers with large delays in both the areas of language and — to a lesser degree — math. Special ECEC-programs were introduced to help raise the educational quality in pre-schools and kindergarten. The performance gap has been found to decrease. The present study is aimed at answering the question whether the quality of education in kindergarten can contribute to narrow the gap between groups of pupils with different socio-economic and ethnic backgrounds. Data from four measurements of the ongoing national cohort study pre-Cool were used. In this cohort 1289 children from the age of four until the end of primary school were followed. To measure the quality in kindergarten a structured questionnaire for teachers was used to assess twice (in year 1 and 2) the developmental and educational activities provided in the kindergarten. Attention for math in kindergarten promoted language development. More language and social emotional stimulation in kindergarten however seemed to go at the expense of math achievement for at-risk students (non-Western and low educated) in grade 3.
Influence of Child Characteristics on Teacher Self-Efficacy in Early Childhood Special Education
Keywords: Early childhood education, Learning approaches, Self-efficacy, Special education
Presenting Author: Brook Sawyer, Lehigh University, United States
Co-Author: Ann O'Connell, The Ohio State University, United States
Co-Author: Nivedita Bhattacharya, The Ohio State University, United States
Co-Author: Laura Justice, The Ohio State University, United States
Co-Author: Julie Santoro, Lehigh University, United States
This study extends previous research on teacher self-efficacy (TSE) by examining the relations among TSE and student characteristics, namely disability status and learning behaviors. This investigation is of particular interest in the context of inclusive early childhood special education classrooms (ECSE) where teachers are challenged to provide differentiated learning opportunities to both children with disabilities and those who are typically developing. The study also examined the degree to which the relations between student characteristics and TSE remained consistent from fall to spring of the academic year. 38 teachers of inclusive ECSE participated in the study. In both the fall and spring, teachers completed the Student Specific Teacher Self Efficacy Scale (Zee & Koomen, 2015) and Preschool Learning Behaviors Scale (McDermott, Green, Stott, & Francis, 2000) on a randomly selected 2-4 students in their classrooms who represented students with disabilities (n = 51) and students who are typically developing (n = 56). Findings indicate that TSE was influenced by a number of children’s characteristics, particularly children’s attention and persistence. A greater number of child-level variables showed significant relations with TSE in the spring than the fall. Implications for professional development will be discussed.
Session R 473
2 September 2017 13:00 - 14:30
Linna - Linnà Linna (K104)
Symposium
Local and Global Social Interaction
Multiple Perspectives on Professional Development in ECEC
Keywords: At-risk students, Case studies, Collaborative Learning, E-learning / Online learning, Early childhood education, In-service teacher education, Mixed-method research, Qualitative methods, Teacher Professional Development
Interest group: SIG 05 - Learning and Development in Early Childhood
Discussant: Miriam Leuchter, University of Linz, Austria
Improving ECEC Quality in Chile: The Impact Results of A Model of Professional Development
Presenting Author: Diana Leyva, Davidson College, United States
Co-Author: Andrea Rola, Harvard University, Chile
Co-Author: Clara Barata, University of Lisbon, Portugal
Co-Author: Ernesto Treviño, Pontificia Universidad Católica de Chile, Chile
Un Buen Comienzo (UBC) is a coaching based professional development program for pre-kindergarten and kindergarten teachers in schools serving students from low-SES backgrounds in Chile. This study evaluates the effects of UBC implementation 2014-2015 on children’s language, social and emotional outcomes using a quasi-experimental design. Nineteen intervention and 31 control schools participated in the study. Findings indicate that UBC had significant and positive effects on children’s language, social and emotional skills. The results show that a professional development program that focuses on directly supporting teachers in their classroom practices for sustained periods of time can lead to important improvements in teaching quality and time on task, which in turn, translate into widespread positive effects on child development outcomes. Implications for professional development programs in Latin America and elsewhere will be discussed.

The Growth of Pedagogical Awareness of Teachers Attending a Professional Development Programme

Author: Anna Maia Pokkekou, University of Jyväskylä, Finland
Co-Author: Jenni Salminen, University of Jyväskylä, Finland
Co-Author: Marja-Kristiina Lethkanen, University of Jyväskylä, Finland
Co-Author: Kati Vaasalampi, University of Jyväskylä, Finland

Becoming aware of the perspectives of classroom interactions and pedagogy can contribute beneficially to teachers’ pedagogical practices (Even & Tirosh, 2002). Support and feedback on classroom practices via video-based observation provides a powerful way of increasing high-quality teaching and raising pedagogical awareness. Within this study we asked: What kinds of verbal accounts manifest growth in teachers’ pedagogical awareness while attending a long-term PD programme? How does the growth of teachers’ pedagogical awareness appear across the PD programme? Three teacher groups took part in the PD programme during the academic year 2014-2015. The six workshop meetings included watching and discussing clips of good pedagogical videos from practices that teachers had recorded independently in their classrooms. The transcribed group discussions were analyzed by utilizing thematic analysis (Braun & Clarke, 2006) along the spectrum of pedagogical awareness (Karttunen et al., 2005). Results indicate that participants in both groups started to express emerging pedagogical awareness already during the second workshop meeting. Teachers in both groups showed pattern of deepening pedagogical awareness, but the pattern of change was not linear across time, nor similar for both groups. Changes in pedagogical awareness became apparent via meaningful analyses (i.e., in-depth) and more frequent reflections on their own practices. The results contribute to PD research and in-service training by emphasizing the benefits of a longer engagement to PD programmes. The results also apply to pre-service training where practical examples aid student teachers in reflecting their own practices.

Description and analysis of successful PD in pre-k and k programs from 5 different countries

Author: Diana Leyva, Davidson College, United States
Co-Author: Hiro Yoshikawa, New York University, United States
Co-Author: Jimena Cosso, New York University, United States

This paper will describe five different ECE interventions around the world that show positive impact on children’s development taking. In describing those cases, we focus on two main themes: analysis of the process of teacher training and coaching system, and analysis of the strategies employed to design and implement curriculum. Especially the pre-kindergarten program Boston Public School (BPS) and the program Un Buen Comienzo from Chile provide good examples of effective PD in early childhood settings. The focus on PD is less prominent in the other three programs (Sigüenza Campaign in Colombia; The Dhami Project in India; and the PATHS project in the US), but these programs carry other highly effective elements that positively impact child outcomes. Each case will be discussed in the paper.

Web-based professional development in early childhood settings: Benefits and limitations explored

Author: Lotte Honnings, Utrecht University, Netherlands
Co-Author: Willejinck Schot, Utrecht University, Netherlands

Professional development in teachers has been put forward lately as a promising avenue to increase emotional and educational quality in early childhood settings. The rapid technological developments of our society provides new and exciting possibilities for innovative approaches to professional development. In this presentation, we present the result of a web-based PD program in early childhood settings. Twenty preschool and kindergarten teachers were involved in the project. They recorded their own video clips of educational in particular settings, related to a self-determined learning objective. These video clips were then uploaded to an online platform where an educational consultant would provide feedback on their educational practices. The project was inspired by the My Teaching Partner program (cf. Downer, Kraft Saye, & Pianta, 2009). Teachers completed eight cycles of uploading a clip, receiving feedback, incorporating the feedback into their educational practices, and record a new clip. In the presentation, we will elaborate on 1) the perceived and observed effect of the PD on the teacher’s educational practices; 2) the benefit and the limitation of using web-based coaching in early childhood settings.

Session R 474
2 September 2017 13:00 - 14:30
Main Building D - D13
Invited Symposium
Teaching and Teacher Education
Why should teachers engage in research? - examples from Learning study and Lesson study

Keywords: Action research, Phenomenography, Teacher Professional Development, Teaching / instruction
Interest group: SIG 09 - Phenomenography and Variation Theory
Organiser: Angelika Kulberg, University of Gothemberg, Sweden
Organiser: Peter Davies, University of Birmingham, United Kingdom
Discussant: Noel Entwistle, The University of Edinburgh, United Kingdom

Learning study, Chinese lesson study and the keys of learning

Author: Ming Fai Pang, The University of Hong Kong, China
Co-Author: Ferronie Martin, Göteborg Academy, Sweden

Learning study, Chinese lesson study and the keys of learning

Author: Ming Fai Pang, The University of Hong Kong, China
Co-Author: Ferronie Martin, Göteborg Academy, Sweden

Our paper has two purposes. First, we want to advance the thesis that lesson study should be considered the signature pedagogy of teachers. Shulman (2005) pointed out that different professions have different and unique ways in which novices acquire professional knowledge and attitudes, i.e. the "signature pedagogies". The three versions of Lesson study mentioned i.e., Japanese lesson study, Learning study, and Chinese lesson study, differ in their different aspects of format. Several teachers specializing on a subject and on a level within the subject plan, discuss, analyze, evaluate, and implement lessons, observe one of them interacting with students, as well as students interacting with each other. It is deemed a reasonable signature pedagogy for the teaching profession. Second, we argue that teachers should be involved in research, and the above three versions of Lesson study have in common that pedagogical knowledge is sought: How can we contribute to better learning in the sense of making it possible to discern aspects of the object of learning that are necessary for students to discern. Such aspects are critical for learning (a particular object of learning), they are the "keys of learning". If this is the case, we would need to develop pedagogical theories of how we can contribute to making it possible for students to discern the critical aspects. If we want to put pedagogical theories to test, teachers have to mediate the theories and make them his/her own. And doing so amounts to doing research.

Can public knowledge be created through practitioner research?

Author: Anna Vikström, Luleå university of technology, Sweden
Co-Author: Angelika Kulberg, University of Gothemberg, Sweden
Co-Author: Hélia Hilda da Silva, UNICAMP, Brazil

The purpose of this paper is to discuss the character of practitioner research in schools and the question asked is Can a specific form of teachers’ research produce practice-based knowledge relevant beyond the borders of the local school context? The possibilities for this have been questioned by for example Enthoven & de Brujin (2010) who in an extensive literature review focus the question of which role research and development have identified as enabling practice based knowledge production. They found that objectives and intended products are rarely clearly defined and operationalized in practitioner research conducted within professional communities. Instead, teachers’ collaboration seemed to be aimed at practical innovations and change through teacher learning, and not through evaluation of the innovations, and that the practitioners’ networks were not used to create public practice-based knowledg beyond the borders of the local school. On the other hand, Morris & Hebert (2011) have, by studying the quality requirement in health care science and lesson studies in Japanese schools, found three characteristic features that enabled the construction of knowledge products in practitioner research: 1. Shared problems across the system, problems that the products help to solve. 2. Small tests of small changes, with research methods that are associated with testing and revising the products, methods often ignored or dismissed in descriptions of scientific approaches. 3. Jointly created products where the knowledge used to build the products is harvested from participants with different kinds of knowledge and competence.

The Contributions of Learning study to teacher engagement in research in an Asian setting

Author: Wai Ming Chuang, The University of Hong Kong, Hong Kong
Co-Author: Stephanie Wing Yan Chan, The University of Hong Kong, Hong Kong
Co-Author: Kevin Ka-Hin Tsang, The University of Hong Kong, Hong Kong

Globalization leads to the increasing number of minority language learners (MLL) in Hong Kong classrooms with different languages and different language proficiencies who face great obstacles in learning Chinese. Their teachers also lack the capability to teach Chinese as a second language. Effective professional development for primary school teachers who strive to provide MLL with high-quality Chinese literacy instruction is clearly needed. A 2-layered Professional Development Model, inspired by the Learning Study and Lesson Study in in Chinese schools, has been developed to equip 69 teachers the capability teaching Chinese as a second language in 18 primary schools. The aim of this study was to explore the characteristics of this 2-layered professional development model for teachers that contributes to teacher engagement in research in Chinese education. The effectiveness of this model in terms of teachers’ culturally responsive teaching self-efficacy and the interview which has been found related to student outcomes and teaching behavior will be reported. The practical relevance and the interactions between these 2 layers of the model will also be discussed. This model shed light on a powerful model to professional development.
Teachers engaging in practitioner research most often to improve student practice and student learning while researchers to improve practice by building more knowledge, understanding and form theories to make sense of practice and its nature and meaning. In the age of reform demanding drastic change in classroom teaching, teachers are also engaged in research to more effectively implement curriculum with better understanding to inform their teaching and student learning as well as their own professional learning. This unified process of teacher learning from doing reform has been what teachers in Shanghag engaged in for the second phase of national (municipal) curriculum reform that called for inquiry based and student oriented teaching. This paper, through case study of five schools Shanghag based on school principals' master's thesis work at National Institute of Education, will focus on how Shanghag schools have developed new school-based teaching research practice in the form of lesson case research (lCR) and how it has taken capital on the public classroom lessons (similar to lesson study) in schools to engage teachers in studying and implementing the new curriculum and reflecting on their experience through repeated planning, observing and improving their classroom lessons and writing lesson cases. How lCr is formed and conducted as problem-based and project-led practices across different types and levels of schools in Shanghag provides both intriguing and meaningful cases to uncover the sociocultural mediations of this technology of practice and to help make sense of its seamless integration into the school routines and teachers' work.

Session R 475
2 September 2017 13:00 - 14:30
Linn - K103
Invited Symposium
Motivation, affect, and body in Instructional Design: Current theoretical approaches
Keywords: E-learning / Online learning, Educational Psychology, Educational Technology, Emotion and affect, Game-based learning, Instructional design, Learning Technologies, Multimedia learning, Science education, Self-regulation
Interest group: SIG 66 - Instructional Design
Organiser: Björn de Koning, Erasmus University Rotterdam, Netherlands
Organiser: Jean-Michel Blauheu, University of Dijon, LEAD-CNRS, France
Discussant: Jean-Michel Blauheu, University of Dijon, LEAD-CNRS, France
Embracing Embodied Technologies and Virtual Reality for Learning
Presenting Author: Mina Johnson-Glenberg, Arizona State University, United States

The first push to place educational content online amounted to little more than scanned textbooks. However, this next generation of content is being designed for multiple platforms and is taking embodied cognition seriously. The newest systems may engage learners more than ever before via immersiveness, new inputs (like gesture), and adapt to learners in real time. In this talk, we will explore how structure in the education context and games can be better designed for some of the emerging learning technologies like motion capture sensors, and augmented reality platforms, and the new head mounted displays for VR with hand controls. We will also discuss some relevant learning theories and end with a set of design principles.

Affective-Motivational Mediation in Learning from Complex Digital Simulations: Effects of Topic
Presenting Author: Cyril Brom, Charles University, Czech Republic
Co-Author: Filip Döschlerekrof, Faculty of Mathematics and Physics, Charles University in Prague, Czech Republic
Co-Author: Maria Floïova, Faculty of Mathematics and Physics, Charles University in Prague, Czech Republic
Co-Author: Marian Uher, Faculty of Mathematics and Physics, Charles University in Prague, Czech Republic
Co-Author: Edita Bromová, Faculty of Mathematics and Physics, Charles University in Prague, Czech Republic
Co-Author: Sidney D. Mello, University of Notre Dame, Department of Psychology & Department of Computer Science, United States

There is increasing interest in augmenting multimedia instructional materials to enable affective, activating affective-motivational states of learners in order to improve learning. The hunt is still on; so far, there have been partly successful and medial effects of affective-motivational states have not always been established. In the present study, university students (N = 69) from the Czech Republic, a country where beer is a source of national pride, were informed that they would either study how to brew beer (high intrinsic motivation) or how to prepare a citrus substrate (low intrinsic motivation). The 90-minute long experiment was about beer brewing in both cases, with superficial changes in instructions and graphics to disguise the topic manipulation. The high intrinsic motivation condition reported higher generalized positive affect, enjoyment, flow levels, and learning involvement (Cohen's d = 0.44 - 0.87) and had better learning outcomes when measured immediately (retention d = 0.48; transfer: d = 0.46) and a month later (retention: d = 0.66; transfer: d = 0.62). Yet, only learning involvement and flow positively mediated the influence of the topic manipulation on immediate learning outcomes.

The Importance of Student Variables in Supporting Self-Regulated Learning in Online Instruction
Presenting Author: Jacqueline Wong, Erasmus University Rotterdam, Netherlands
Co-Author: Martine Biaers, Erasmus University Rotterdam, Netherlands
Co-Author: Dan Davis, Delft University of Technology, Netherlands
Co-Author: Tim van der Zee, Leiden University, Netherlands
Co-Author: Geert-Jan Houben, Delft University of Technology, Netherlands
Co-Author: Fred Plass, Erasmus University Rotterdam/University of Wollongong, Netherlands

The proliferation of technology has provided more opportunities to learn. Massive Open Online Courses (MOOCs) push the notion of online learning environments further by delivering learning resources freely to anyone with an internet connection. Learning is no longer considered a monopoly of MOOC students but rather an open opportunity for all. MOOCs students are considered a heterogeneous group of students who are expected to be self-regulated in their learning to a certain extent towards the goal of successfully learning. In view of such heterogeneity and some importance of self-regulated learning (SRL), the authors conducted a systematic review of 35 studies on approaches to support learners in online learning environments and studied how these approaches address student variables. The objective of the paper is twofold: (i) to inform researchers, designers and teachers about the state of the art of SRL support in online learning environments and MOOCs; (ii) to provide suggestions for taking into account student variables when supporting self-regulated learning support. Findings from the systematic review showed that prompting SRL is a simple and effective way in supporting SRL. In addition, student variables play an important role in the efficacy of SRL supports. Therefore, to provide SRL supports that best fit individual learners, a better understanding of learners at a fine-grained level is imperative. Future studies can employ learning analytics as one of the approaches to gather information on student characteristics to determine the SRL support needed and to provide the differentiated SRL support.

INTERACT: A Process Model of Interactivity integrating behavioral, affective and cognitive aspects
Presenting Author: Helmut M. Niegermann, Saarland University, Germany
Co-Author: Staff Holl, Darmstadt University, United States
Co-Author: Ruth Schwartz, Quimper University, United States

Since the introduction of computers as tools for learning, interactivity has been much discussed as holding strong promise for educational use (e.g., Hannafin & Pock, 1998; Bransford et al., 1997; Renkl & Atkinson, 2005). But does interactivity in fact improve the quality and effectiveness of learning environments? Empirical investigations to date have yielded conflicting results (e.g., Moreno & Mayer, 2005; Moreno & Vicente, 2005; Schwab & Riemp, 2004), which does to some extent form the basis of our project and the objectives of the current article. Here, we ask: can the application of INTERACT as a model for investigating interactivity facilitate more rigorous empirical investigations, comparisons between studies, and the derivation of broad principles for the design of interactive learning environments? Additionally, constructs such as learner control, guidance, and feedback, commonly discussed with regard to interactivity, can be reconsidered using the INTERACT model.

Session R 476
2 September 2017 13:00 - 14:30
Pinni B - B1096
Film, television and the internet
Educational Policy and Systems
Community Led Educational Reform: co-defining futures, out of school learning & poverty proofing
Keywords: at-risk students, Citizenship education, Collaborative Learning, Cooperative / collaborative learning, Cultural diversity in school, Mixed-method research, Out-of-school learning, Parent involvement, Youth empowerment and thing
Interest group: SIG 21 - Learning and Teaching in Culturally Diverse Settings
Organiser: Liz Todd, Newcastle University, United Kingdom
Discussant: Mark Wray, Massey University, New Zealand
Out of school hours activities: looking at school staff, parent and pupil meanings and theories
Presenting Author: Karen Laing, Newcastle University, United Kingdom
Co-Author: Liz Todd, Newcastle University, United Kingdom

The first paper (Karen Laing and Liz Tod) explores the meaning that children, parents and teachers give to learning, both inside and outside of school, through choices about after school activities-the implications of the meanings given to learning, especially out of school activities, for community led educational reform are considered. The out of school activities of 11,762 young children aged 5-11 were looked at using data from the Millennium Cohort Study (MCS). The possible association with attainment was considered by linking the MCS to the National Pupil Database (NPD). Interviews were held with head teachers, teachers, parents, pupil and activity providers in 10 schools. A number of differences are found in the prevalence of activities between rich and poor. The association of these activities with attainment for different groups of children is considered in terms of implications for policy and practice. Comparing economically disadvantaged children with those who were not in the MCS, there was little difference in participation in certain activities after school and were less likely to have extra tuition or to attend a sports club. Attending after school clubs was associated with attainment for disadvantaged children. This research explored the theories that might account for the findings. The meanings given to activities by parents contributed to a richer understanding of the socialisation of childhood. Implications for community led educational reform are discussed.
forms and understandings of engagement in a co-operative school setting
Presenting Author: Deborah stalls, University of Manchester, United Kingdom

The second paper (Debbie Ralls) looks at what engagement means in an English co-operative school. Drawing on Warren's (2009) concept of relational engagement, staff, parents, students and community members were asked about their engagement experiences. Engagement in action was observed to compare with the accounts given by teachers. This study focused on engagement between a co-operative school and its key stakeholders: the students, their parents and the community:

- staff, parents, and community members were asked about their engagement experiences.

- engagement in action was observed to compare with the accounts given by staff.

The study was thus able to take account of any links between the groups whilst acknowledging contrasts in approaches or understandings and to query why such differences may have been occurring.

Reform from the bottom-up: A grass-roots, assets-based approach improving young people's outcomes
Presenting Author: Claire Forbes, University of Manchester, United Kingdom

Claire Forbes explores a possible process for bottom-up reform, the co-creation of a future agenda involving young people and professionals, and supported by an assets map. This paper considers the diverse and multiple realities of young people's lived experiences within areas of significant socio-economic disadvantage, in order to suggest opportunities to develop policy interventions that are contextually appropriate. Asset-Based Community Development (ABCD), a grass roots process developed in the United States, where existing but often unrecognized community assets are mapped provides a possible means of making sense of the places, spaces and people that children in our most marginalised communities have reason to value and why. 15 student researchers carry out focus groups with 250 young people aged 11–15. Young people are revealed as rich in social capital and rarely making use of professional led services, instead identifying other enabling assets such as family, friends and social media. A student created assets map is used to facilitate work between the student researchers and professionals from 15 organisations to develop a co-defined future agenda.

Poverty proofing the school day: bottom-up reform a potential for real change
Presenting Author: Liz Todd, Newcastle University, United Kingdom

Laurazzetti Smith and Liz Todd explore the involvement of young people, parents, teachers and governors in change with the aim of no longer stigmatising children who are living in poverty. Our research investigates the use of Children North East’s audit tool with 25+ primary and secondary schools to ‘poverty proof’ the school day. Methods included: observations of the process of working with young people in two schools; interviews with head teachers Children North East staff, and a Local Authority Advisor; observation of a staff training session; analysis of all parental, staff and governor questionnaire data; and analysis of all school action plans. This allowed the research team direct access to the process and/or the views of staff in six of the 13 schools that have participated so far and indirect access to data from all.

Similarties were found in the ways that schools inadvertently stigmatised pupils living in poverty and some imaginative solutions have been devised. These included extensive issues around ability/behaviour and setting, bullying, uniform, exams, extra-curricular activities, support for parents and families, food, homework, resources, transport, tutor groups/support for pupils, and school leadership and governance. This paper discusses the audit as a bottom up process with a potential for real change in schools. The action plans provide schools with recommendations to reduce stigma and cost within their school.

However, a number of the issues covered are arguably issues that local authorities, government and also society must address.

Session R 477
2 September 2017 13:00 - 14:30
Main Building D - D11
Invited Symposium

Diffferent approaches to improve the home learning environment and child outcomes
Keywords: Attitudes and beliefs, Competencies, E-learning / Online learning, Early childhood education, Educational policy, Experimental studies, Literacy, Parental Involvement in learning, Self-efficacy
Interest group: SIG 05 - Learning and Development in Early Childhood
Organiser: Vonna Anders, Free University Berlin, Germany
Discussant: Pamela Simons, University of Oxford, United Kingdom

Playgroups for inclusion: experimental impacts on caregiving environment and child development
Presenting Author: Vanessa Russo, ISCETE - Instituto Universitário de Lisboa, Portugal
Co-Author: M. Clara Barata, University of Coimbra, Portugal
Co-Author: Catarina Leite, University of Coimbra, Portugal
Co-Author: Bruno de Sousa, University of Coimbra, Portugal
Co-Author: Joana Alexandre, University Institute of Lisbon (ISCTE-IUL), Portugal

The project Playgroups for Inclusion was an innovative educational policy for Early childhood Care and Education (ECCE), targeting children aged 0-4 and their families, not participating in the currently available ECCE services in Portugal. This policy aimed to increase access to high-quality ECCE, providing two-weekly sessions to up to 10 children and caregivers dyads. Previous evidence about playgroups provided indication that such services improve a range of outcomes for children (Deutscher, Fowell, & Gross, 2006; Hackworth et al., 2013), and for parents (Evangelou, Brooks, & Smith, 2007).

However, weaknesses in the design of these studies limited the internal and external validity of findings. To date, Playgroups for Inclusion is the first randomized controlled trial of a playgroups-only policy.

Results of the experimental trial so far indicate positive but largely non-significant impacts of the intervention Playgroups for Inclusion on caregiving environment and child development. At EARL, we will discuss these results in light of low attendance, high dropout and quality monitoring, and illustrate the moderation of impacts by attendance, presenting treatment-on-the-treated estimates of impact.

EasyPeasy app: the effects of parental engagement on school readiness skills of 3-6 year old children
Presenting Author: Kathy Sylva, University of Oxford, United Kingdom
Co-Author: Fiona Jeylah, University of Oxford, United Kingdom

Self-regulation is important in children's readiness for school and future attainment. It is well-known that play has a vital role in the development of such skills, and that parents can make a valuable contribution in supporting children in the early years. The aim of this study was to investigate the effects on parents and children of the EasyPeasy app, which is designed to boost child development through encouraging parents to interact and play with their children at home. The app sends game ideas in the form of short video clips direct to parents' phones. An individual randomised controlled trial (RCT) was carried out with 144 families in 8 children's centres in a UK coastal town. Parents completed pre- and post-test measures on parenting self-efficacy, parenting stress, and their child's self-regulation. Parents in the intervention group had access to the app for 18 weeks. At post-test, there were significant improvements in favour of the intervention group on parents' self-efficacy regarding discipline and boundaries, and parent-reported child cognitive self-regulation. Implications and future directions are discussed.

The associations between maternal trust towards preschool teacher and child outcomes
Presenting Author: Ela Pálsson, University of Iceland
Co-Author: Marja-Kristina Lerkkanen, University of Jyväskylä, Finland

Preschool year is the optimal period to promote parent-teacher relationship which may enhance the development of child's academic skills and motivation to learn before school transition. This study investigated the associations between maternal trust in their child's teacher and child's academic and social outcomes at preschool. Finnish mothers (n = 1,550) filled in questionnaires measuring their trust in their child's preschool teacher. Children (896 girls, 984 boys) were tested twice on their pre-academic skills and were rated by their preschool teacher on their task-avoidant behavior and social skills. Children also rated their interest in reading and math at the end of preschool. The results of path analyses showed that maternal trust in their child's preschool teacher was positively associated with child's reading and arithmetic skills, with academic and cooperative skills as well as with interest in reading and math, higher self-regulation, less irritability, less impulsivity and dispositionalness. These findings emphasize the importance of maternal trust in their child's preschool teacher for child's pre-academic skills, social skills and interest in learning before school transition.

Successful ways of playgroups to involve parents in their children's learning
Presenting Author: Vonna Anders, Free University Berlin, Germany
Co-Author: Manja Fider, PlattQbU gGmbH, Germany
Co-Author: Nadine Wiedewelt, Free University Berlin, Germany
Co-Author: Hans Guenther Rossbach, University of Bamberg, Germany

It is well known that high quality preschool programmes which are influenced by the consideration of parents and family influence can have large and long-lasting beneficial effects on children's development. To date, only few studies have explored the regular provision which involvement strategies improve the home environment or children's development. In this study different ways of preschool settings use to involve parents in their children's literacy and language learning were explored. In addition, it was investigated which strategies have beneficial effects on the development of the home learning environment and children's language development. The analyses draw on data from the evaluation of the German federal programme 'Core Daycare Centres for Language & Integration' including 355 daycare centres and 1331 children and families. Professional support appeared to be crucial for effective strategies of involving parents. Multivariate regression analyses showed that tips parents receive from professionals for enriching the home environment have a net positive effect on the development of the quality of the home learning environment as well as on children's language development.
This study provides a strong argument for concepts of preschool quality which stress the importance of preschool-parent partnership. Language-specific strategies rather than domain-general strategies are most beneficial to promote children's language learning.

Session R 478
2 September 2017 13:00 - 14:30
Main Building A - A3
Invited Symposium
Learning and Social Interaction

A rise in migration: Dialogue, language and intercultural communication challenges
Keywords: Communities of practice, Cultural diversity in school, Cultural psychology, Culture, E-learning / Online learning, Language (Foreign and second), Learning Technologies, Qualitative methods, Second language acquisition, Secondary education, Social interaction
Interest group: SIG 21 - Learning and Teaching in Culturally Diverse Settings
Organiser: Sarah Crafter, The Open University, United Kingdom
Discussant: Charlotte Turque de Luxembourg, Luxembourg

Dive in – Diversity as Normality
Presenting Author: Yvina Lindberg, Jönköping University, Sweden
Co-Author: Isak Sandström, Jönköping University, Sweden

The paper presents a sub-study of the larger project Diversity as Normality. Dive in. The aim of the project is to investigate how diversity is constructed through social interaction across different disciplines in upper secondary school. Recent international research and the current debate in Sweden (2014-2016) show that diversity is a fuzzy concept often used in order to highlight societal challenges connected to marginalised groups, such as minorities, immigrants, and disabled people. Concerning the Swedish school, diversity is conceived of in connection to the recent migration wave and few results in international testing. It turns out that teachers feel unprepared to meet this experienced ‘new diversity’. Using decolonial and sociocultural lenses, this study aims to illustrate and problematize the ways in which the identity positions of marginalized groups get played out in the everyday lives of young adults in Sweden in the 21st century (Bagga-Gupta 2013). The project aims to describe the communicative practices in Swedish upper secondary school reflecting on and intertwining with the diversity in classrooms, including digital media. The study presents results from the first of a long set of digital mediated interactions, addressing categories of interaction, content and form, in connection to time, space and place. Preliminary results show how diversity emerge and ways in which diversity is made (invisible) through communication. The findings will further guide the project towards pedagogical tools for inclusive practices.

Mobilization of nomenclature related to language and diversity in learning and instruction
Presenting Author: Sangeeta Bagga-Gupta, Jönköping University, Sweden
Co-Author: Alessio Santi, University of Helsinki, Italy

The project aims to make visible a diversifying hegemony in how language and identity issues are currently framed in the educational sciences and the mismatch between this mobilization of nomenclature pluralism and human social practices. The paper traces the emergence of some central concepts in (i) language sciences (“bilingualism”, “interculturalism” and “trans-language”) and (ii) literature on migration studies and globalization (“super/multiculturality” and “immigrants/newly-arrived”), and illuminates the ways in which nomenclature shifts and “academic branding” contribute towards communication and diversity issues in the educational sector. By centre-staging analysis of both analogue and digital social practices where individuals in interaction with one another and tools are salient and where locality and spatiality are not always located to the four walls of institutional learning settings, we illustrate the “webs-of-understandings” that are normalized and that circulate within education. In addition to analysis of discourse, ethnographic and life-history studies, the project draws upon data that is collected by (i) current scholarship inside and outside Sweden, and (ii) directives from Swedish national school authorities and teacher education. The study, theoretically framed at the crossroads of sociocultural and decolonial perspectives, specifically asks how the webs-of-understandings related to key concepts like “bilingualism”, “trans-language” and “interculturalism” differ from social practices that comprise “normal language” – and what concepts like “super/multiculturality” and “newly-arrived” offer in comparison to “normal diversity”? By privileging social practices, we, in other words, ask what is the nature of normal language and normal diversity?

Intercultural Digital Narratives
Presenting Author: Giuseppe Rittella, University of Helsinki, Italy
Co-Author: Alessio Santi, Università degli Studi di Padova, Italy

The project presents Intercultural Digital Narratives (In.Die.e), a proposal for research and intervention for developing intercultural competences at school in the 21st century. In particular, our proposal aims at fostering an international community of teachers where participants jointly reflect on teaching practices to trigger educational innovation on the theme of cultural diversity. Research shows that the creation of a community of practice (Wenger, 1998) and specifically a community of teachers where participants jointly reflect on teaching practices and exchange ideas and good practices is an effective trigger of educational innovation. The theme of cultural diversity, in particular, is best addressed within an international community, where a wide range of identities, histories, practices can enrich the collective awareness and contribute to the building and scaffolding of intercultural sensibility. In.Die.e seek to address the issue of multiculturism in schools at the international level, improving schools’ capability to deal with cultural diversity and to develop cultural literacy in the young generation. In particular, we aim at building an international community of teachers at the European level, which will co-design and implement innovative intercultural teaching practices involving photo-voice and digital storytelling.

Learning to be in the new environment - a pilot project for youngsters in Luxembourg 2017
Presenting Author: Gudrun ZIEGLER, multi-LEARN Institute, Luxembourg
Co-Author: Jih Choi, multi-LEARN Institute, Luxembourg

“Learning to be in the new environment” is a learning initiative launched with regard to the increased number of migrants and refugees coming to Luxembourg since end 2015. Given the cultural as well as the linguistic backgrounds of these newcomers, innovative measures were designed to help the migrants as well as the host society to deal with issues of mutual perception, cooperation, tolerance and self-control. Drawing from previous findings on migrants or with other or poor literacy coming to the multilingual contexts of Luxembourg (Choi & Ziegler 2015) two key aspects govern the conception of six interconnected modules which cover a span of three months. Firstly, Luxembourg offers resources for newcomers, yet these resources are mainly written and require multilingual literacy with regard to the three administrative languages of the country. Secondly, migrants are often put in the position to ‘listen and learn’; yet, previous findings show that interactive measures are most efficient as they provide room to explore, enact and experience the ‘new environment’.

This study then provides insights on several levels, relying on a multi-method approach. On the conceptual level, we discuss the visual, interactive principles, which govern and interconnect the training modules. With regard to the participants, the study assesses the profiles of the newcomers with regard to their learning disposition, engagement and self-reported success within the program. Finally, the project reports the reactions towards the project and its participants with regard to acceptance and integration (http://helu.org)

Session R 479
2 September 2017 13:00 - 14:30
Main Building D - D10B
Invited Symposium
The research mission of the Frontline Learning Research Journal
Keywords: Action research, Case studies, Comparative studies, Content analysis
Interest group:
Discussant: Eino Lehtinen, University of Turku, Finland

Paper Presentation: Researcher Education and Careers
Keywords: Communities of practice, Doctoral education, Higher education, Motivation, Qualitative methods, Researcher education
Interest group: SIG 24 - Researcher Education and Careers
Chairperson: Nadine Spörrer, University of Potsdam, Germany

Rethinking researcher competitive identity at the crossroads of education, business and economy
Keywords: Communities of practice, Higher education, Qualitative methods, Researcher education
Presenting Author: Irina Lohitina, University of Central Lancashire Cyprus, Cyprus

This paper provides the findings of a narrative research study exploring the experiences of twenty Cypriot academics through the lens of Situated Learning Theory (Lave and Wenger 1991; Wenger 1998). The narratives which have been extracted from in-depth, semi-structured interviews illustrate the ambiguous nature of research practice and how established performance indicators influence the development of researcher identity. Moreover, rich insights into the impact of power inequities within academic communities upon shifting constructions of academic identity were gained.

The findings revealed that academics expressed their doubts regarding the way universities operated, commenting negatively on managerialism as a mediating factor of power imbalances between academics and university management, and emphasizing the need for debate and decision-making within the academic faculty as a whole. Academics also described their professional career as uncertain. They questioned the efficiency of the performance evaluation system and showed their willingness to accept a more transparent and less bureaucratic approach. However, there were academics who kept balance between desired and required research outputs in order to move on to more secure positions.
It was concluded that even though academic freedom is considered as a basic condition of knowledge development and the purpose of being in academia, the existing performance management system gives institutions a legitimate basis for control over resources and research outcomes. That is why academics' mutual engagement in shared practices (Wenger 1998) and mentoring arrangements for academics who are disadvantaged regarding their research practices are significant for their competitive identity construction and career development.

**Why are doctoral studies initiated? Comparison of Finnish, UK and Spanish PhD students’ Interests**

**Keywords:** Doctoral education, Higher education, Motivation, Researcher education  
**Presenting Author:** Jurri Petterson, University of Oulu, Finland, Finland  
**Co-Author:** Krisi Pyhältö, University of Oulu; University of Helsinki, Finland  
**Co-Author:** Montserrat Castells, Universitat Ramon Llull, Spain  
**Co-Author:** Lynn McAlpine, University of Oxford, Canada  

Motivation plays a major role in the doctoral studies experience. Doctoral student interest is affected by the socio-cultural context of doctoral education and hence can vary across countries. This study focused on exploring cross-cultural variation in doctoral students’ interests by comparing Finnish, UK and Spanish doctoral students’ research interests. Also, association between reported interest in doctoral studies and research group status, dropout intentions, satisfaction with doctoral studies and experience of burnout were explored. Altogether, 2,426 doctoral students from social sciences and sciences responded to the Doctoral Experience survey. Although doctoral students in general showed high levels of research and development interest, also differences across the three socio-cultural contexts were detected. Spanish students displayed higher levels of researcher interest than UK students, and also higher levels of instrumental interest compared to both UK and Finnish students. Finnish students on the other hand showed the lowest levels of instrumental interest. Spanish students suffered least from cynicism, whereas Finnish students experienced the lowest levels of exhaustion. Those doctoral students who showed high levels of research interest experienced less cynicism and exhaustion than others.

**Early researchers’ identity positions based on significant events in research**

**Keywords:** Doctoral education, Higher education, Qualitative methods, Researcher education  
**Presenting Author:** Eva Liesa, Ramon Llull University, Spain  
**Co-Author:** Antonio Badia, Universitat Oberta de Catalunya, Spain  
**Co-Author:** Carlos Monereo, UAB Universitat Autònoma de Barcelona, Spain  

The aim of this research was to explore what were the positions that emerge during the construction of the early researchers’ identity through the analysis of the significant experiences that appear in the doctoral journey. A phenomenographic research approach (Åkervik, 2012) and a narrative methodology (McAlpine, Amundsen, & Turner, 2013) were used. An intentional sample of five beginning social science researchers has participated. At participants were PhD students who started their PhD when the studies finished. The instruments to collect data were three: the journey plot, calculation cards and interviews during the process of writing the dissertation and after their presentation. The journey plot was used to get information about participants’ positive and negative experiences over time (Shaw et al. 2008; Sála-Buban & Castells, 2016; Turner, 2015) and Elliptic card allowed us to know more about the importance of these experiences (McAlpine & Amundsen, 2011; McAlpine, Amundsen & Turner, 2013). Finally, participants were interviewed twice to obtain more information about the role of each significant event. These significant events allow us to establish/define different early researchers’ positions during their trajectories (managerial, tutored student, subject content learner, academic writer, research designer, academic speaker and research community member). The more frequent positions are described.

**Session 5 481**

2 September 2017 14:45 - 16:15
Virta - 120  
Single Paper
Motivation, Social and Affective Processes  

**Paper Presentation:** Motivation, Emotion and Affect  
**Keywords:** Cognitive development, Cognitive skills, Collaborative Learning, Educational Psychology, Emotion and affect, Goal orientation, Motivation, Motivation and emotion, Self-regulation, Social aspects of learning and teaching, Social development  
**Interest group:** SIG 06 - Motivation and Emotion  
**Chairperson:** Engin Ader, Bogazici University, Turkey

The role of epistemic emotions during daily life problem solving

**Keywords:** Emotion and affect, Goal orientation, Motivation, Motivation and emotion  
**Presenting Author:** Sandra Becker, Ludwig-Maximilians-Universität (LMU), Germany  
**Co-Author:** Elisabeth Vogl, Ludwig-Maximilians-Universität (LMU), Germany  
**Co-Author:** Julia Haager, University of Regensburg, Germany

Epistemic emotions such as surprise, curiosity, and confusion, have been linked to general knowledge generating processes. To explore in more detail which role these emotions play for knowledge generating activities in daily life problem solving, we conducted a diary study over a period of 30 days. In a total of 1675 diary entries, 113 students reported about their emotions during daily life problem solving. In line with appraisal theories of emotions (e.g., Pekrun, 2006), correlation analyses revealed that control and value appraisals were associated with the experience of discrete epistemic emotions. In addition, epistemic emotions related to knowledge-generating activities used as cognitive problem-solving strategies. The findings highlight that not only positive epistemic emotions (e.g., curiosity) but also negative epistemic emotions (e.g., confusion, anxiety) can be connected to cognitive problem-solving behaviors that are generally considered as being adaptive. Our results add to the understanding of the origins and effects of epistemic emotions, which may open up possibilities for fostering cognitive processes in various contexts in which problem-solving skills are crucial.

Functions of Emotions for Mathematical Thinking

**Keywords:** Cognitive skills, Emotion and affect, Motivation, Motivation and emotion  
**Presenting Author:** Sandra Becker, Ludwig-Maximilians-Universität (LMU), Germany  
**Co-Author:** Reinhard Pekrun, Ludwig-Maximilians-Universität (LMU), Germany  
**Co-Author:** Stefan Ufer, Ludwig-Maximilians-Universität (LMU), Germany

We investigated the influence of emotions on mathematical thinking, specifically the functions of excitement and anxiety for the generation and evaluation of scientific conjectures. Excitement is hypothesized to support the cognitive processes aiding the generation of conjectures, because positive-activating emotions facilitate relational and flexible thinking. Anxiety, on the other hand, is hypothesized to support cognition in a way beneficial to the evaluation of mathematical conjectures, as negative-activating emotions have been found to support analytical algorithmic thinking. This experimental study supports these hypotheses and demonstrates that a brief emotion induction, prior to a mathematical task, can enhance performance. The findings suggest that emotions and cognition can be synchronized in ways supporting mathematical thinking. Illustrate how the subtle modulation of cognition, instigated by emotions, can support or hinder our thinking and therefore reveals fundamental principles on how emotions shape thinking.

Students’ perceptions about emotion regulation and a group awareness tool in collaborative learning

**Keywords:** Collaborative Learning, Emotion and affect, Self-regulation, Social aspects of learning and teaching  
**Presenting Author:** Arttu Mykkänen, University of Oulu, Finland  
**Co-Author:** Hanna Järvenoja, University of Oulu, Finland  
**Co-Author:** Marika Kouvuniemi, University of Oulu, Finland  
**Co-Author:** Sanna Jarvisid, University of Oulu, Finland

Students participating in collaborative learning activities might experience emotional challenges. These challenges need to be regulated as a group. However, group members’ emotional states might not always be salient to other group members. Group awareness tools can be used to clarify these issues to other group members and prompt further discussion. This research investigated students’ perceptions and use of group awareness tools. Especially the focus was on the perceptions the students had of the group emotion tool. Evaluation within the group and how the awareness tool supported the group in regulation activities. Participants of this study were second year teacher education students (N = 44). Data was collected during Math didactics course which lasted for two months. After the course the students were interviewed about the use of the awareness tool. Content analysis was implemented to summarize students’ perceptions. Results showed that students’ considered the tool to be beneficial to emotion regulation on one hand, but also laborious and disconnected from the actual learning task. Results suggest some ideas for further development of group awareness tools, such as how to better connect the use of tools to a part of the actual learning task and not just an additional work.

Curiosity and Well Being in Emerging Adulthood

**Keywords:** Cognitive development, Educational Psychology, Motivation, Social development  
**Presenting Author:** Thomas Reio, Florida International University, United States  
**Co-Author:** Joanne Sanders-Reio, Florida International University, United States  
**Co-Author:** Ma Hinkala, Florida International University, United States

The purpose of this study was to explore the relationship between curiosity and psychological well-being in 18- to 30-year-old individuals considering Arnett’s (2003) criteria for adulthood. In a group of 233 college students, a questionnaire battery was administered to measure cognitive and sensory curiosity, the Emerging Adulthood Criteria, and psychological well-being, as well as select theoretically relevant demographic variables (e.g., age, gender, and ethnicity). Hierarchical regression analysis revealed that among the emerging adulthood criteria, achieving role-transition was significantly and negatively related to psychological well-being, while experiencing high frequency of cognitive-curiosity and sensory-curiosity were positively, and significantly related to psychological well-being.

**Session 5 482**

2 September 2017 14:45 - 16:15
Main Building E- E222  
Single Paper
Cognitive Science, Educational Policy and Systems, Higher Education  

**Paper Presentation:** Cognitive Skills and At-risk Learners  
**Keywords:** Achievement, At-risk students, Cognitive skills, Educational attainment, Experimental studies, Higher education, Learning and developmental difficulties, Quantitative methods, Reading comprehension, School effectiveness, Secondary data analysis, Writing / Literacy
Using secondary data to analyse school improvement

Keywords: Achievement, Quantitative methods, School effectiveness, Secondary data analysis

Presenting Author: Daniel Mujia, University of Southampton, United Kingdom

In England, while pupil attainment in large cities such as London has improved substantially over the past decade, other parts of the country are still experiencing high levels of school failure. Attention has, in particular, shifted to so-called ‘coastal towns’, in which pupil attainment remains particularly poor. Nevertheless, even in such challenging circumstances there are schools that show significant improvement. In this paper we outline both the method of identifying these schools, and how to identify factors that could contribute to improvement using secondary datasets. For this study we draw on a number of secondary data sources. The first is the National Pupil Database. This is a database that contains information on attainment of pupils in national assessment at the end of primary and secondary school and on student background characteristics such as gender, ethnicity and poverty. The second dataset used is the Ofsted inspection dataset. This dataset provides the full inspection reports on each school in England. The third dataset used is the Schools Workforce Census. This is a national database of teachers and school leaders through which we can track variables like the staff composition of schools and the appointment of new leaders. Finally, we also have a number of datasets detailing schools participation in a number of government sponsored improvement projects. A three-stage research strategy is used: 1. identification of high performing schools, 2. matching to comparator schools, and 3. analysis of variables relating to improvement.

Stability of Reading Difficulties

Keywords: Cognitive skills, Learning and developmental difficulties, Quantitative methods, Reading comprehension

Presenting Author: Maria Pyrytdu, University of Jyväskylä, Finland
Co-Author: Minna Torppa, University of Jyväskylä, Finland
Co-Author: Asko Tolvanen, University of Jyväskylä, Finland
Co-Author: Anna-Maja Pohkeus, University of Jyväskylä, Finland
Co-Author: Maija-Kristina Leikkanen, University of Jyväskylä, Finland
Co-Author: Jari-Erik Nurmi, University of Jyväskylä, Finland

In the present study we examine the stability of the development of reading fluency (RF) and reading comprehension (RC) from grade 2 to grade 6 and whether kindergarten skills predict RF and RC differences.

The study is part of a Finnish longitudinal study in which approximately 2000 children participated. RF was assessed with three tasks and RC using a subset of a nationally normed reading test battery. The assessed kindergarten factors were: initial phoneme identification, naming letters, Peabody picture vocabulary, rapid serial naming of objects, number sequences, and listening comprehension.

First we estimated cross-lagged factor path models to examine the correlative associations between RF and RC across grades 2 to 6. Next, we focused on reading difficulties (lowest 1% in RF and/or RC) and their stability across time. Using the cross-lagged factor models as a basis, we simulated 200,000 cases, which provided a way to omit measurement error from the stability analysis. Finally, we modeled the relative contributions of the kindergarten factors to RF and RC in grades 2 and 6 in SEM framework by using Cholesky decomposition.

Our results indicated that RF is more stable than RC. In addition, our results suggest that reading difficulties (RD) are not stable across time since 6.9% of the children had late emerging RD and 6.5% had resolving RD. RF better linked with letter naming and rapid naming while RC with letter naming, phoneme identification and vocabulary. Our results suggest that children’s reading skills should be followed beyond the early grades.

The influence of first-year study yield on degree completion in Flemish higher education

Keywords: At-risk students, Educational attainment, Higher education, Quantitative methods

Presenting Author: Sebastiano Cincinato, Vrije Universiteit Brussel (VUB), Belgium
Co-Author: Eli Consuegra, Vrije Universiteit Brussel (VUB), Belgium
Co-Author: Nadine Engels, Vrije Universiteit Brussel (VUB), Belgium

In Flanders (Belgium), study yield in the first year of higher education, defined as the number of obtained credits compared to the credits enrolled, is regarded as crucial for success in higher education. Although intuitively appealing, we lack the research to corroborate this assumption. Therefore, in this study we examine the relationship between first-year study yield and degree completion in higher education. Furthermore, we examine whether the group of low-year students that obtain a degree is differently composed from those that do not. Our analyses are based on the Flemish Higher Education Database (DHO), an administrative database that keeps records of students higher education trajectory. The analysis carried out is Event History Analysis, a longitudinal technique for estimating the likelihood of events occurring. First, our findings corroborate the assumption that low study yield in the first year decreases the likelihood of degree completion. Second, our findings also indicate that among the students with low study yield, those that graduate are different from those that do not with respect to primarily secondary school characteristics (type and retention), but also background characteristics such as language spoken at home, educational attainment of the mother and sex. Future analysis will focus on factors that can effectively be influenced by higher education, since the present analysis only serve identification purposes – i.e., who are the students at risk. Of interest in this regard is how student reorientation might help students obtain a degree, especially among low-year students.

Capacity limitations, orthographic coding, writing fluency and dyslexia

Keywords: Cognitive skills, Experimental studies, Learning and developmental difficulties, Writing / Literacy

Presenting Author: Lorna Bourke, Liverpool Hope University, United Kingdom
Co-Author: Simon Davies, Liverpool Hope University, United Kingdom

The main aim of the current study was to investigate differences between dyslexic and non-dyslexic students to determine the role both orthographic coding and visual working memory influences have in explaining differences between dyslexic and non-dyslexic groups of. Forty university students (20 dyslexic and 20 non-dyslexic) participated in study. Initial analyses indicated that the non-dyslexic group performed significantly better on tasks measuring the speed and fluidity of handwriting. A change detection task tested relative performance accuracy for two types of visually presented stimuli (orthographic and novel symbols) as working memory demands on capacity increased from 3 to 7 items in relation to the type of change (e.g., word, letter, letter cluster) that occurred between memory and test displays. Participants were more accurate with orthographic stimuli and when the change detection was words or strings of novel symbols. Not surprisingly there was a general linear decline in performance as the length of stimuli increased and capacity limitations were reached. Of particular interest, theoretically, was the interaction between all four factors. This will be discussed in further detail in relation to the more pronounced differences in changes in strategy between the two groups when they were retaining novel visual stimuli at word and letter level. The findings provide a clear distinction between the types of processing engaged by both groups and the constraints in accuracy with which dyslexic students can orthographically code and visually process information can consequently impact on coursework and exam grades throughout university.

Session S 483
2 September 2017 14:45 - 16:15
Main Building D - D13
Single Paper
Learning and Instructional Technology

Paper Presentation: Computer-assisted and Online Learning

Keywords: Computer-assisted learning, E-learning / Online learning, Educational Psychology, Educational Technology, Emotion and affect, Experimental studies, Instructional design, Learning analytics, Learning Technologies, Mathematics, Secondary education

Interest group: SIG 07 - Learning and Instruction with Computers

Chairperson: Charoula Angelis-Valianou, University of Cyprus, Cyprus
Learning the Concept of Function With Computer-Generated Dynamic Visualizations

Keywords: Computer-assisted learning, Experimental studies, Mathematics, Secondary education

Presenting Author: Tobias Röfl, University of Koblenz-Landau, Germany
Co-Author: Jürgen Roth, University of Koblenz-Landau, Germany
Co-Author: Wolfgang Schnitz, University of Koblenz-Landau, Germany

In this paper we present a laboratory experiment with secondary school students who learned with dynamic visualizations. The control group worked solely with static representations. The learning setting was the concept of function. We used two different versions of dynamic visualizations in order to evaluate whether interaction had an impact on the learning outcome. In the group learning with an animated representation, the students could only start a dynamic visualization and run it as a whole. In the group using an interactive representation, the students control the visualization by their mouse actions. The result of the experiment was that students learned significantly better with dynamic visualizations. However, there was no significant difference in the learning effect of animated or interactive representation.

The effect of the acceptance and actual use of a virtual learning environment on learning outcomes.

Keywords: Computer-assisted learning, E-learning / Online learning, Instructional design, Learning Technologies

Presenting Author: Charlotte Larrouseau, KU Leuven (BE), Belgium
Co-Author: Marie Evens, KU Leuven (BE), Belgium
Co-Author: Fien Depaepe, KU Leuven, Belgium
Virtual learning environments (VLEs) are used more and more frequently in higher education. However, their effectiveness depends on their instructional design and how they are perceived and used by the students. The Technology Acceptance Model (TAM) is regularly used to investigate students’ acceptance of the learning environment and the impact on their intention to use the learning environment. Past TAM studies barely investigated students’ actual use of the learning environment, neither how this related to their learning outcomes. In this study, TAM is used to examine the effect of the students’ acceptance on their actual use of a VLE and their learning outcomes in the context of foreign language teacher education. We analyzed the log data to detect students’ actual use of the VLE and measured their learning gain through a pre- and posttest. The design of the VLE is based on the theoretically and empirically validated four component instructional design (4C/ID) model. We measured the students’ acceptance of the VLE by using the constructs perceived usefulness (PU) and perceived ease of use (PEOU) of TAM. Data were collected from 117 students of two teacher education institutes. A path analysis including indirect effects reveals that students’ performance on the posttest has a significant effect on PEOU. PEOU has an indirect effect on the relationship between the protest and PU. PUI has a significant effect on the actual use of the VLE. Furthermore, controlled for the pretest, results show that actual use has a significant influence on students’ posttest performance.

Dispositional Learning Analytics: a linking pin between LA and educational theory
Keywords: Computer-assisted learning, Educational Technology, Learning analytics, Learning Technologies
Presenting Author: Dirk Tankelar, Maastricht University, Netherlands
Co-Author: University, United Kingdom, United Kingdom
Co-Author: Bart Rointies, Open University UK, United Kingdom
This empirical study aims to demonstrate how Dispositional Learning Analytics (DLA) can provide the missing link between Learning Analytics (LA) and pedagogy. Where LA based models typically do well in predicting student performance and dropout, they lack automation when it comes to easily discover patterns with educational interventions. Using a case study based on the learning processes of 1065 students in a blended introductory quantitative course, combining demographic and trace data from learning-management systems with self-reports of several contemporary social-cognitive-theories, we analyze the use of worked-out examples by students. Students differ not only in the intensity of using worked-out examples but also how they position that use in the learning cycle. These differences can be described both in terms of differences measured by LA trace variables, as well as by differences in students’ learning dispositions. We conjecture that the second description has major advantages for designing educational interventions. Rather than focusing interventions on e.g. low learning activity, only a symptom of suboptimal learning, pedagogy-based interventions focus on potential causes of suboptimal learning, such as applying ineffective learning strategies.

Using interaction patterns in a visual problem-solving task to detect learners’ confusion
Keywords: E-learning / Online learning, Educational Psychology, Emotion and affect, Learning analytics
Presenting Author: Amael Arguel, Macquarie University, Australia
Co-Author: Kevin Chai, Curtin University, Australia
Co-Author: Mariya Pachman, Macquarie University, Australia
Co-Author: Lori Locker, University of Technology Sydney, Australia
Confusion is an emotion that learners can experience when they are learning complex content or trying to solve difficult problems. Confusion can sometimes be harmful when it leads to frustration; confusion can also be beneficial when it promotes engagement. This study aims to provide insights on the dynamics of emotions that are experienced during a problem-solving activity with a puzzle game, with a focus on the role of confusion in engaging learners in the activity. Understanding how confusion can be harmful should provide significant clues on how to improve learning outcomes in digital interactive environments. However, because confusion is an emotional state, it can be challenging to detect within digital environments. This study also evaluates a methodology based on the recording of the interactions of learners with the puzzle in order to identify specific solving strategies that are indicators of the level of confusion. For example, in the absence of predefined solving strategy, participants search widely for solutions and adopt an observable foraging strategy behaviour, which is linked to a high level of confusion. Applied to real-world digital learning environments, an extension of this methodology has the potential to provide real-time indicators of confusion, which could be employed to the management of learners’ confusion.

Session 5 4B
2 September 2017 14:45 - 16:15
Main Building A - A28
Single Paper
Learning and Social Interaction, Teaching and Teacher Education
Paper Presentation: Learning and Development in Early Childhood - B
Keywords: Cognitive development, Cognitive skills, Early childhood education, Educational Psychology, Inquiry learning, Reading comprehension, Reasoning, Science education, Social aspects of learning and teaching, Social Interaction, Teacher Effectiveness, Teaching approaches
Interest group: SS5 05 - Learning and Development in Early Childhood
Chairperson: Ladiaso Salmeron, University of Valencia, Spain
Keeping the spirit up: The impact of parent and teacher emotional support on working memory
Keywords: Cognitive skills, Educational Psychology, Social aspects of learning and teaching, Social interaction
Presenting Author: Dieter Baeyens, KU Leuven, Belgium
Co-Author: Loren Vandenbroucke, KU Leuven, Belgium
Co-Author: Janine Spilt, KU Leuven, Belgium
Co-Author: Karine Verschueren, KU Leuven (BE), Belgium
Working memory, used to temporarily store and mentally manipulate information, is important for children’s development and learning. It is therefore valuable to understand the development of working memory and the ways to influence this development. The current study investigated whether parent and teacher emotional support predict working memory performance by buffering the negative effect of stress. An experimental design was used to examine this research question, in first and second grade children (n=170, Mage=7 years 6 months, SOCD=7 months). Mild stress was induced in the children, followed by an auditory go/nogo task. Working memory was measured by the number of correct responses. Working and stress support manipulation. Questionnaires were used to assess children’s perceptions of the teacher-student and parent-child relationship. The initial finding are that, for some children, parents and teachers can promote working memory performance by being supportive for their children, improving the parent-child and teacher-child relationship might be helpful for children with working memory difficulties.

“Sometimes the Internet doesn’t know everything”: Children’s Epistemic Reasoning in Science Inquiry
Keywords: Early childhood education, Inquiry learning, Reasoning, Social aspects of learning and teaching
Presenting Author: X. Christine Wang, State University of New York at Buffalo, United States
This project investigates young children’s (ages 5–6) epistemic reasoning during science inquiry: What practical epistemologies (PEs) do young children demonstrate while engaging in their own science inquiry? What are the connections individual, peer and teacher actions on children’s demonstrated PEs? It was conducted in a kindergarten class where the teacher implemented a 12-week long science inquiry project. Data sources included videos of these group sessions, artifacts, and student interviews. Qualitatively we identified salient epistemic events during the inquiry sessions, and coded the interview along 6 categories: (1) general understanding of inquiry; (2) science content; (3) source of knowledge; (4) justification of knowledge; (5) certainty of knowledge; and (6) simplicity of knowledge. Quantitatively, we use statistical analysis (ISDA, Chi & Kho, 2005) to analyze connections between actions of his/her peers and teachers during science inquiry and children’s PEs. Our preliminary results show that kindergartners’ emerging understanding of knowledge and knowing are uneven across different domains of PEs in the context of science inquiry. The teacher is explicit guiding on PEs related reflection was positively related to PEs outcomes. Peers’ actions such as questioning and disagreement, and subsequent discussion of solving the disagreement were also affecting factors. This study illuminates the early development of PEs in the context of science inquiry. It addresses theoretical and methodological difficulties in studying young children’s epistemic reasoning. Practically, understanding the connection between children’s and science inquiry can inform possible early interventions, which can facilitate development of scientific reasoning and improve motivation for science inquiry.

Balancing blocks: Young children’s understanding of statics
Keywords: Cognitive development, Early childhood education, Educational Psychology, Science education
Presenting Author: Aline Maria Weber, University of Koblenz-Landau, Germany
Co-Author: Miriam Leuchter, University of Landau, Germany
Co-Author: Ina Plüger, WWU Münster, Germany
Balancing blocks: Young children’s understanding of statics
Young children have an intuitive understanding of basic physical concepts such as balance. With increasing experience, they start to form theories of how and why objects can be balanced. This process starts in preschool for most children and continues into primary school and even beyond. Interventions such as scaffolding and teaching children how to balance asymmetrical weights as asymmetrical objects could speed up said process. Seventy-five children between ages five to eight took part in the study. The sample was divided into two experimental and one control group. Both experimental groups received structured materials and the second group additionally received scaffolding in the form of verbal explanations about why different objects can be balanced. Physical knowledge concerning balance increased for both experimental groups after the intervention, whereas the control group showed no improvement. Furthermore, results showed an influence of prior knowledge on achievement at subsequent times of measurement. Thus, scaffolding as well as structured materials can enhance children’s physical understanding in the balance domain.

The Role of Teaching Practices in Reading Skills Development from Grade 1 to 3
Keywords: Early childhood education, Reading comprehension, Teacher Effectiveness, Teaching approaches
Presenting Author: Dorothea Ehrler, University of Jyväskylä, Finland
The present study aimed to examine the longitudinal effects of teaching practices on children’s reading performance. Thirty-two teachers were observed at grade 1 and the reading skills (reading fluency and comprehension) of 359 children were assessed yearly from grade 1 to grade 3. By using a person-oriented approach, teachers’ dominant teaching practices (i.e., teaching styles) were identified. The results showed, firstly, that Finnish teachers deployed three different teaching styles: child-centred style, teacher-directed style, and a mixture of child-centred and teacher-directed style. Further analyses showed that
If a student thinks "I'm not a math person", do teachers notice? Keywords: Attributes and beliefs, Mathematics, Mixed-method research, Pre-service teacher education Presenting Author: Helene Rischa, University of Freiburg, Germany Co-Author: Timo Leuders, University of Education Freiburg, Germany Co-Author: Georg Bruner, University of Education Freiburg, Germany Co-Author: Alexander Renki, University of Freiburg, Germany

Students’ beliefs about whether mathematical abilities are fixed or malleable have a strong impact on motivation, learning, and achievement. Thus, teachers should have conceptual knowledge about students’ mathematical beliefs, and skills for intervening in sensitive cases of dysfunctional beliefs. We explored teachers’ noticing of such beliefs as a prerequisite for teacher action. In our study, we used vignettes to determine whether pre-service teachers noticed belief-related problems, and whether they developed useful strategies for dealing with such problems. We analyzed what to extend they referred to theoretical concepts of teaching and learning. Additionally, we assessed their intuitive theories about mathematical ability. Our findings demonstrate that pre-service teachers’ noticing of students’ mathematical beliefs is insufficient. The majority of our participants did not notice problematic beliefs, nor did they develop useful strategies for dealing with them. Of those who did, few referred to theoretical concepts of teaching and learning. We further revealed that pre-service teachers’ noticing of students’ beliefs was positively related to the belief that mathematical abilities are malleable. Our research suggests that teacher education should foster teachers’ noticing, explaining and acting when encountering dysfunctional beliefs.

Session 5 486
2 September 2017 14:45 - 16:15
Virtual - 109
Single Paper
Higher Education, Learning and Instructional Technology
Paper Presentation: Higher Education - 1
Keywords: Assessment methods and tools, Communities of practice, Competencies, E-learning / Online learning, Educational Technology, Goal orientation, Higher education, Learning Technologies, Self-efficacy, Social interaction, Social sciences, Special education, Teacher Professional Development
Interest group: SIG 04 - Higher Education
Chairperson: Marie-Christine Opeka-Nkaka, University of Groningen, Belgium
Understanding functionality in Higher Education. Metasearch across disciplines in the 21st century Keywords: E-Learning / Online-learning, Educational Technology, Learning Technologies, Special education Presenting Author: Giulia Massina Dänberg, University of Skövde, Sweden Co-Author: Sandra Bäger-Aspat, Jönköping University, Sweden

Since the advent of the internet and the connectivity that it entails, digital technologies like personal computers, smartphones, tablets have enabled greater accessibility to educational content through e.g. open educational resources, massive online open courses, or institutionally framed online instructional activities. An emerging interest, in the last two decades, addresses a trend that frames education as potentially open-for-all, including the differently-abled, ‘anywhere at anytime’.

The study presented in this paper is part of the Swedish Research Council project PAL (www.ju.se/ict/pal). It explores trends in research illuminating the range and functions of different (digital) technologies deployed in the learning spaces of higher education (HE). Putting the spotlight on research published in journals in (2005-2015), this meta-study focusses the ways in which support services, for differently-abled students are studied and accounted for within HE. This meta-study identifies important dimensions in terms of the kinds and nature of support that exist and are wanting in courses where students in need of such support are members. The recent literature frames technology in terms of facilitating access to content, rather than facilitating communication and dialogue in HE learning and instructional contexts. We argue for the need to merge a positivistic approach in the study of technology that primarily focusses on the design of technology, that in turn, is frequently driven by marketing strategies and effects of market. Our study focusses on the design of technology that primarily focusses on the design of technology, that in turn, is frequently driven by marketing strategies and effects of market.

Career Education at the End of Higher Education: The Role of Structural and Real Factors Keywords: Competencies, Goal orientation, Higher education, Self-efficacy Presenting Author: Ike Gnoomans, KU Leuven - University of Leuven, Belgium Co-Author: Lesie Coertjens, Université catholique de Louvain (UCL), Belgium Co-Author: Eva Kyndt, KU Leuven - University of Leuven, Belgium

Implications for pre- and in-service teacher training will be discussed.
performance, but we did find a positive correlation between reader feeling of competence and performance when it is estimated by teachers, and also between parental involvement and reading performance.

Some educational implications can be drawn from this result.

Session S 486
2 September 2017 14:45 - 16:15
Linnna - K1110
Single Paper
Instructional Design, Motivational, Social and Affective Processes
Paper Presentation: Science Education
Keywords: Argumentation, Attitudes and beliefs, Cognitive development, Communities of learners, Conceptual change, Developmental processes, Inquiry learning, Metacognition, Model-based reasoning, Reasoning, Science education, Teaching / instruction
Interest group: SIG 03 - Conceptual Change, SIG 16 - Metacognition
Chairperson: Antonia Scholzmann, University of Hamburg, Germany

Revealing Learners’ Paths During Progression: A Conceptual Change Assessments Method
Keywords: Communities of learners, Conceptual change, Inquiry learning, Science education
Presenting Author: François Lombard, Université de Genève, Switzerland
Co-Author: Marie Mermoud, Université de Genève, Switzerland
Co-Author: Vincent Widmer, FPISE, Université de Genève, Switzerland
Co-Author: Daniel K Schneider, University of Geneva, Switzerland

Empirical data on learners’ conceptual progression is required in order to identify difficulties in learning, design curricula and learning environments or guide students. In this contribution we present an assessment method for revealing students’ conceptual progression in the context of an inquiry-based teaching design in high school biology classes.

This instrument identifies concepts and links expressed in students’ successive versions of their productions, and charts them onto a concept map visualizing the learning goal defined by the teacher. Time sequences in which concepts and links appear were measured with a prevalence index counting occurrences of each item across all versions for one topic.

Our results offer systematic data to discuss the learners’ diverse and often surprising paths towards the learning goal, and challenge the view of learning as a linear, predictable process. However, prevalence indexes, consolidated over 8 cohorts, reveal trends within this variability: some items consistently appear later than others. We briefly suggest possible causes for late-appearing items (cognitive construals, threshold concepts, design weaknesses…) and implications for curricula. We argue for important teaching implications, such as iterative engagement of learners, discussing incomplete understanding, and guidance in recognizing gaps and refining models. We finally discuss limits and perspectives.

Evidence-based model evaluation: Students’ interpretation of multiple pieces of evidence
Keywords: Argumentation, Inquiry learning, Science education, Model-based reasoning
Presenting Author: Hebah El Moallamy, Rutgers University, Graduate School of Education, United States
Co-Author: Nazma Av-Shalom, Rutgers University Graduate School of Education, United States
Co-Author: Clark Chinn, Rutgers University, United States

The model is a core scientific practice, which is supported by the comprehension and interpretation of evidence. The ability to recognize and use evidence that supports a specific model is actually critical to making good theory choices, yet little is known about whether students use such information and whether instruction improves its use. For this reason, we examined students’ use of evidence through a discussion of the results of a written assessment task that occurred before and after the implementation of a life science model-based inquiry curriculum with 7th grade students. The curriculum spanned the course of several months and included creating, evaluating, and revising models using a wide variety of evidence in form and quality. The assessment task asked students to choose between two comparable, competing models and write an argument in support of their chosen model. Five pieces of evidence were provided for this task and varied in whether they support both models (nondiscriminatory) or support one and not the other (discriminatory). We examined students’ use of evidence in relation to three key aspects of evidence-based model evaluation: (a) comprehending evidence correctly, (b) interpreting evidence in respect to both models, and (c) how students deal with discriminatory evidence. Our findings suggest that students improved in attending to and understanding key points of the evidence, relating evidence to models, but still have trouble understanding the significance of discriminatory evidence.

The development of scientific thinking from kindergarten to elementary school
Keywords: Cognitive development, Metacognition, Reasoning, Science education
Presenting Author: Susanne Koerber, University of Education Freiburg, Germany
Co-Author: Christopher Oesterhaus, University of Munich, Germany

How predictive are kindergarten’s competencies in scientific thinking for elementary school? And how important is children’s epistemological understanding for the emergence of experimentation skills? We investigated these two questions in a longitudinal study involving 64 kindergartners (6-year-olds) who were tested at two times of measurement (kindergarten, T1, and at the end of grade 1, T2) for their understanding of the nature of science (epistemological understanding), their experimentation skills, and their abilities in data interpretation using a 30-item instrument that was administered verbally. In addition, children’s language abilities were assessed as a control variable. The results revealed substantial competencies in kindergarden in all three components of scientific thinking. Significant intradividual development from kindergarten to grade 1 was observed for NOS (from 43 to 57%) and for experimentation skills (from 51 to 59%), not however for data interpretation. Significant correlations between nature of science understanding and experimentation skills, and between experimentation and data interpretation emerged at both times of measurement, suggesting a close relation between children’s epistemological understanding and their mastery of inquiry strategies. NOS and language abilities at T1 significantly predicted experimentation at T2; there was however no significant influence of experimentation at T1 on experimentation and T2. This result clearly supports the hypothesis that children’s epistemological understanding plays an important role in the emergence of broad scientific thinking skills, and it suggests that children’s epistemological understanding and their NOS may be prime abilities to target when trying to foster scientific-thinking skills in young children.

Students’ epistemic beliefs in Sweden and Germany: Correlations with classroom characteristics
Keywords: Attitudes and beliefs, Developmental processes, Science education, Teaching / instruction
Presenting Author: Andrea Bernhoff, Leibniz Institute for Science and Mathematics Education (IPhT), Germany
Co-Author: Nils Wenner, Università, Sweden
Co-Author: Maria Lindfors, Umeå University, Sweden

The study aims at describing students’ epistemic beliefs over school years 5-11, investigating differences between Sweden and Germany regarding the ‘trajectories’ of epistemic beliefs over the grades, and if classroom factors can explain these differences. A cross-sectional survey, covering grades 5-11, was distributed to 1501 students in Sweden and 2639 in Germany to assess their epistemic beliefs and perceived classroom environment in chemistry. Factor analysis revealed four valid constructs for students’ epistemic beliefs and perceived classroom environment, respectively. A common trend for both countries was an increasing sophistication over grades as to the Certainty of knowledge and an emphasis in all grades on the need for evidence from several sources to make claims of knowing (justification). Trust in authorities decreased over the grades in Germany, while Swedish students showed similar levels in all grades. Beliefs in dynamic and changing knowledge was strong in both countries, with an increasing trend in Germany while stable in Sweden. Significant correlations between epistemic beliefs and perceived classroom environment were found in both countries, but stronger in Sweden than Germany.

Session S 489
2 September 2017 14:45 - 16:15
Pinnis B - B3116
Single Paper
Instructional Design, Learning and Instructional Technology
Paper Presentation: Instructional Design - E
Keywords: Achievement, Educational Psychology, Educational Technology, Experimental studies, Higher education, Instructional design, Learning Technologies, Out-of-school learning, Problem solving, Student learning, Teaching / instruction
Interest group: SIG 06 - Instructional Design
Chairperson: Carmela Aprea, Friedrich Schiller University Jena, Germany
Providing Written or Oral Explanations? Modality Effects of Explaining on Students’ Learning
Keywords: Educational Psychology, Experimental studies, Higher education, Instructional design
Presenting Author: Andreas Lechner, Eberhard Karls Universität Tübingen, Germany
Co-Author: Matthias Nickles, University of Freiburg, Germany

Learning by explaining to (fictitious others) has shown to be an effective instructional method to support students’ generative learning. In this study, we investigated differential effects of the modality of explaining (written versus oral) on students’ quality of explanations and learning. Forty-eight students worked on a hyper-text about combustion engines. Afterwards, they were asked to explain the learning content either in written or oral format. Findings indicate that writing structured explanations was more beneficial for acquiring correct knowledge as compared to providing oral explanations, at least for low prior knowledge students, as writing triggered students to better organize the content of the explanations. In contrast, generating oral explanations triggered students’ elaborative processes to a more pronounced extent than written explanations which was more beneficial to acquiring transferable knowledge. Thus, we can conclude that the modality of explaining plays a critical role in learning-by-explaining approaches to differently support students’ knowledge acquisition.

Learning by tracing: A cognitive load approach
Keywords: Achievement, Educational Psychology, Experimental studies, Instructional design
Gestures using the index finger to point and trace have been found across a variety of studies to benefit learning. Macken and Ginns (2014) found traced enhanced performance on tests of terminology and comprehension following study of expository text and diagrams about the human heart, but process hypotheses concerning different sources of cognitive load were not supported. The two experiments presented here tested alternative methods for measuring cognitive load. In Study 1, 30 university students were instructed to gesture or not gesture while learning from materials about the structure and function of the human heart; single-item ratings of difficulty were used after each page of instruction to measure cognitive load. Participants in the gesture group performed significantly better than the non-gesture group on terminology and comprehension tests, but there was no significant difference in the average difficulty rating between the two groups. In Study 2 (n = 30), using the same materials, participants rated cognitive load both after each page, and following the instructional phase using a new multi-item instrument measuring both intrinsic and extraneous cognitive load. The experimental conditions did not differ in average difficulty ratings or in test performance, but a different difficulty focusing the tracing condition was found on post-instruction ratings of extraneous cognitive load. Taken together, the results of the two experiments add to the evidence base on tracing to learn, while also demonstrating the strengths and limitations of alternative measures of cognitive load.

The Role of Gender and Spatial Ability in Enhancing Static Pictures with Embodied Cognition

Keywords: Educational Psychology, Educational Technology, Instructional design, Learning Technologies
Presenting Author: Paul Ayres, University of New South Wales, Australia
Co-Author: Francila Gomes, The University of New South Wales, Australia

This study investigated whether instructional static pictures could be enhanced through the embodied cognition effects of gesturing and the observation of hands when learning to tie two knots; 32 male and 32 female university students were randomly assigned to one of four conditions (Gesturing with hands present in the pictures, Gesturing with hands present in the pictures, No-gesturing with hands present in the pictures). Participants watched a static presentation on a computer screen of the key frames for the first knot (Truckers Hitch) twice and were then required to construct the knot with a length of string. This process was then repeated for the second knot (Bowline). The spatial ability of each participant was measured using the Mental Rotations Test (MRT). Results varied according to differences in MRT. For lower MRT scores, gesturing was an advantage, whereas depicting static hands was a disadvantage. A number of interactions suggested that gesturing was more beneficial overall for females than males. For males the impact of gesturing depended on whether hands were visible or not. It was concluded that for this domain static presentations can be enhanced by gesturing, but their effectiveness is moderated by gender, spatial ability, and the depiction of hands.

Investigating the Impact of Time of Instruction on Learning in an Out-of-School Lab

Keywords: Out-of-school learning, Problem solving, Student learning, Teaching / instruction
Presenting Author: Valentina Nazoglu, Ruhr-University Bochum, Germany
Co-Author: Nikol Rumml, Ruhr University Bochum, Institute of Educational Research, Germany

The current study builds on a large body of research demonstrating the effectiveness of problem solving followed by instruction (PS-I) on learning in school. In contrast, so far little is known about effects of time of instruction in out-of-school learning. Out-of-school learning settings typically offer opportunities for inquiry-based learning that feature minimal or even no instruction. But research on out-of-school fieldtrips shows that including instruction in these kinds of out-of-school learning settings can increase their impact on learning. Also research on inquiry-based learning more generally illustrates that unguided or minimally guided problem solving often does not promote learning. The question arises where the instruction should best be placed: before or after students’ independent problem solving? To investigate impact of time of instruction in out-of-school learning, we conducted a quasi-experimental study with 212 10th graders in an out-of-school lab at a large German university. We compared two experimental conditions: problem solving followed by instruction (PS-I) and instruction prior to problem solving (I-PS). We hypothesized that the PS-I condition would outperform the I-PS condition on a posttest. However, against our hypothesis, our findings show that I-PS students outperformed PS-I students. The results are discussed in light of principles put forward by Leitl, Roll, and Rummel (2016) concerning when and how problem solving followed by instruction may support learning. In our discussion we consider the role that the prior knowledge as well as the intrinsic motivation of our participants may have played.

Session S 490
2 September 2017 14:45 - 16:15
Pinni B - B1097
Single Paper
Assessment and Evaluation, Higher Education, Teaching and Teacher Education

Paper Presentation: Assessment and Evaluation - C
Keywords: Assessment methods and tools, Competencies, Higher education, Metacognition, Peer interaction, Quantitative methods, Self-regulation, Social aspects of learning and teaching, Social interaction, Social education, Teaching / instruction, Vocational education
Interest group: SIG 01 - Assessment and Evaluation
Chairperson: Claude Mueller, Zurich University of Applied Sciences (ZHAW), Switzerland

Continuous and Multidimensional Representations of a Child’s Social Status Within its Peer Group
Keywords: Assessment methods and tools, Quantitative methods, Social interaction, Special education
Presenting Author: Pawel R. Kulański, University of Potsdam, Germany
Co-Author: Juergen Wilbert, University of Potsdam, Germany

Sociometric methods are widely used in educational research to measure positive and negative links between peers within a group. Sociometric data reflects a child's amount of likeability/dislikeability within its peer group. Sociometric information should be considered when describing a child's social status within its peer group. Like this is done with social status classification methods. With these procedures children are usually classified into five categorical groups (popular, rejected, neglected, controversial, average). The social status group affiliation constitutes an important predictor for children's behavioral outcomes. It is essential to overcome shortcomings which accompany group assignments in the current classification system. This can be achieved by replacing the arbitrary group assignment rules by a method generating more consistent social status information. To characterize a child's social status within its peer group more precisely the social status information should be continuous rather than categorical. Instead of a distinct classification, the social status information should represent the multidimensional nature of a child's social status.

To obtain a continuous (non-categorical) as well as a multidimensional representation of a child's social status within its peer group we will introduce a new approach for defining this kind of information. We will compare this new approach with a classical social status classification procedure and highlight advantages and disadvantages of both methods (also in terms of predictive ability in detecting externalizing child behavior). The Assessment of Collaborative Problem Solving Skills – Associations With the Big Five
Keywords: Assessment methods and tools, Competencies, Higher education, Vocational education
Presenting Author: Maita Mustate, University of Luxembourg, Luxembourg
Co-Author: personalised, University of Luxembourg, Luxembourg
Co-Author: Nick Schweitzer, University of Luxembourg, Luxembourg
Co-Author: Samuel Grief, University of Luxembourg, Luxembourg

The assessment of collaborative problem solving skills was incorporated in large-scale OECD PISA studies in which collaborative problem solving skills of thousands of students were assessed across over 50 countries. To validate the human-to-agent (H-A) PISA 2015 collaborative problem solving assessment approach, in the current study, we developed a computer-based human-to-human (H-H) collaborative problem solving assessment instrument that was similar to the H-A tasks used in PISA with the exception that one agent was replaced by a real student. In this presentation, we will introduce the two collaborative problem solving instruments and their theoretical foundation. We will also present data on the external validity of the H-A instrument, i.e., the association of collaborative problem solving skills with the big five personality traits. Our concrete hypothesis was that students’ collaborative problem solving skills would be more likely associated with openness to experience, agreeableness, and extraversion, and less likely with conscientiousness and neuroticism.

777 students from 36 classes from grade 9 and 10 in Germany and in Luxembourg from different grammar schools participated in the study. Structural equation models revealed that CPS was related to openness to experience and agreeableness and was not significantly related to the other personality traits.

With this study, we confirmed that external criteria such as personality are associated with the PISA 2015 assessed collaborative problem solving skills. We will discuss to which degree the H-A design resembled realistic human-to-human collaboration and outline the future challenges as well as potentials of computer-based collaborative problem skill assessments in educational settings.

Promoting Pedagogical Effectiveness Through Self-Assessment and Peer-Instruction: an Evaluation
Keywords: Metacognition, Peer interaction, Quantitative methods, Self-regulation
Presenting Author: Fabio Ricardo Arico, University of East Anglia, United Kingdom
Co-Author: Eva Susanne Fritzsche, Department of Teacher Education, Germany

This paper details the principles of an active learning teaching methodology aimed at fostering the formation of metacognitive skills along with learning. We combine Self-assessment and Peer-instruction with the aim to mutually re-enforce the positive effects generated by both pedagogies. Self-assessment and Peer-instruction are blended within a teaching algorithm that alternates a class discussion and
collaborative learning component, with a reflection and self-regulation component. Our teaching approach makes intense use of Student Response Systems (SRS) to facilitate both components, and to support
an easy implementation in large class environments. Does the combination of Self-Assessment and Peer-instruction support student learning and students’ meta-cognitive skills? We analyze data collected through SRS technology of N=250 students who participated in multiple active-learning sessions. Our preliminary results at class-level confirm the presence of a synergy between Self-assessment and Peer-
instruction, as we demonstrate that: (i) students develop good self-assessment skills (positive association of attainment and performance, Fisher Exact test, p<0.00), and (ii) experience learning gains through
Peer-instruction (regression analysis, p-value<0.05). Our results will feed into an appraisal of pedagogical designs that can simultaneously address the meta-cognitive skills along with learning.

Beyond means: Investigating classroom learning environments through consensus in student surveys

Keywords: Assessment methods and tools, Quantitative methods, Social aspects of learning and teaching, Teaching / Instruction

P4532
The University of Texas at Austin, United States

Co-Author: José Felipe Martínez, University of California, Los Angeles, United States

Co-Author: Meredith Lang, University of California, Los Angeles, United States

Student ratings are a critical component in current policy efforts to assess and improve teaching. Typically, information is collected from student using questionnaires, and inferences about teachers or
classrooms then based on aggregated student responses. Considerable attention has been paid to the reliability and validity of these aggregates as predictors of student achievement, or indicators of teacher performance or classroom practice. However, much less attention has been paid to what within-classroom consensus in student ratings may reveal about the classroom environment. This study uses data from hundreds of classrooms in the Measures of Effective Teaching Project (MET) to investigate how within-classroom consensus in student survey reports can enhance our understanding of features of instructional practice, and of learning environments more generally. The results suggest that consensus is related to student achievement as well as other measures of teacher effectiveness, to questioning strategies used by teachers, and to the demographic heterogeneity of students. The possibility of instructional substitutability and the implications for the use of overall averages in teacher appraisal is discussed, and directions for future research are proposed.

Session 5 491
2 September 2017 14:45 - 16:15
Main Building B - D11
Single Paper
Cognitive Science, Instructional Design, Learning and Instructional Technology

Paper Presentation: Comprehension of Text and Graphics - I

Keywords: Assessment methods and tools, Cognitive skills, Comprehension of text and graphics, Experimental studies, Instructional design, Mathematics, Multimedia learning, Primary education, Problem solving, Reading comprehension

Interest group: S6 02 - Comprehension of Text and Graphics

Chairperson: Inga Glogger-Frey, University of Freiburg, Institute of Psychology, Germany

Inside the workplace – a closer look on students' constitutional difficulties with word problems

Keywords: Comprehension of text and graphics, Mathematics: Primary education, Problem solving

Presenting Author: Vanesa Dresen, Institute of Psychology, UMIT, Health & Life Sciences University, Austria

Co-Author: Silvia Pixner, UMIT, Institute of Psychology, Austria

Co-Author: Erik Danly, Institute for Psychology, UMIT, Health & Life Sciences University, Austria

In primary education, mathematical word problems are one of the most typical type of puzzles in math class. It is sensible to assume that students take different approaches to solve such problems, which in
turn could account for different errors. While prior studies investigated single aspects of mathematical word problems, this study sets out to take a closer look on the defining features of word problems. To this end we tested 240 children of the 2nd–4th class elementary with items varying regarding the mathematical level: 1. operation (addition and subtraction), 2. combination (all together vs. one has) and 3. sequence of information, as well as regarding the language level: wording congruent (more – plus, less – minus) or incongruent (more – minus, less – plus) with operation, depending on point of reference. Data analysis will be two-fold: First we will look at what parameters influence correct solving of a problem, regardless of possible errors, second we will look specifically at the errors made by classifying them
categorically and then looking for possible relationships, first within the clockwork of word problems themselves and second in the children.

Four reading ability tests as predictors of multimedia document comprehension

Keywords: Comprehension of text and graphics, Experimental studies, Reading comprehension, Multimedia learning

Presenting Author: Juliette Dézirion, University of Geneva, Switzerland

Co-Author: Mireille Betancourt, University of Geneva, Switzerland

Co-Author: Erica de Vries, Univ. Grenoble Alpes, France

Although research on learning from multimedia documents acknowledges the importance of learners’ text comprehension ability, there is scarce investigation on how students’ reading abilities affect learning outcomes. In this study, pre-vocational students (N = 54) took four standard reading ability tests (vocabulary, fluency, inference and general literacy) and learned about the evolution of cocoa with a 6 page text-picture document in one of two versions (high vs. low cohesion level). Then they completed a post-test questionnaire for three levels of comprehension (text-based, local bridging inference, global bridging inference). Cohesion had no impact on any comprehension level and therefore the results for the two conditions were collapsed. Correlation analyses at the three outcomes levels showed significant correlations for all test scores except fluency which was removed from further analyses. A multiple multivariate regression analysis showed that the model with the three text tests significantly predicted comprehension performance but that only vocabulary scores significantly added to the model at the three levels of comprehension.

Young Students’ Reading of Partly Contradictory Texts: A Think-Along Study

Keywords: Cognitive skills, Comprehension of text and graphics, Primary education, Reading comprehension

Presenting Author: Wanike Mork Rogne, Volda University College, Norway

Co-Author: Helge Stremme, University of Oslo, Norway

Young Students’ Reading of Partly Contradictory Texts: A Think-Along Study

Abstract

In the present think-aloud study we investigated how thirty 7th-grade students read a set of partly contradictory texts on the course of events associated with a bicycle accident. Students’ text processing strategies were explored, and their relationship to students’ understanding of the contradictions and memory for important information were analyzed. Results showed that the majority of episodes of text processing were not elaborative strategies, whereas evaluations and paraphrases were the two other major categories of strategies. Both intertemporal and intratemporal elaboration and evaluation strategies
occurred in the verbal protocols. Elaboration strategies turned out as a positive predictor of students’ memory for important information, while paraphrasing predicted students’ detection of contradictions negatively. The results indicate that strategic processing of multiple texts improves young students’ memory for central text elements, and that more passive processing decreases attention to contradictions. In order to understand the story presented in the set of texts, students need to note both important information and potential contradictions. This is also often the case when students are exposed to multiple texts in and outside school, and teachers need to attend to how students work with such textual resources.

Adjusting Task Difficulty to Control Learner’s Intrinsic Cognitive Load

Keywords: Assessment methods and tools, Comprehension of text and graphics, Experimental studies, Instructional design

Presenting Author: Tina Seulstet, Ulm University, Germany

Co-Author: Sabine Woldt, Ulm University, Germany

Co-Author: Julia Westphal, Ulm University, Germany

A lot of studies exists on varying extraneous cognitive load and thereby testing different multimedia design principles. Studies on germane and especially on intrinsic cognitive load variations, are less popular. Most intrinsic load studies use a categorization of learners into novices and experts to vary intrinsic load, very often in relation to interactions with different treatment effects. In all these cases intrinsic load has not been levelled to learners skills individually. This may be due to the problem of producing treatment material, that adapts to the learner’s skills and prior knowledge. Therefore, in three experimental studies with learning and testing material originally coming from flow research, we tested intrinsic load variations by adapting the demands of the task to the learner’s skills and prior knowledge. In three studies different domains (mathematics, game-play, general knowledge) are addressed and the learning and testing material adjusts the level of difficulty to the participant’s skill level. Hence, three experimental groups are generated: (1) boredom (skills exceeding demands), (2) fit (skills matching demands), and (3) overload (demands exceeding skills). Preliminary results with n=58 students and the mathematical learning material show promising results that automatically adjusting the level of difficulty to the participant’s skill levels results in the expected level of intrinsic cognitive load, measured by a subjective differentiated questionnaire of cognitive load.

Session 5 492
2 September 2017 14:45 - 16:15
Main Building A - A2A
Single Paper
Cognitive Science, Instructional Design, Teaching and Teacher Education

Paper Presentation: Writing, Literacy and Language - B

Keywords: Attitudes and beliefs, Computer-assisted learning, Educational Psychology, Language (L1/Standard Language), Metacognition, Peer interaction, Secondary education, Self-efficacy, Teaching / instruction, Video analysis, Writing / Literacy

Interest group: SIG 12 - Writing

Chairperson: Carla Van Boeijen, University of Amsterdam, Netherlands

Fostering Personal and Social Insights in the Literature Classroom: A Review of Intervention Studies

Keywords: Attitudes and beliefs, Language (L1/Standard Language), Secondary education, Teaching / instruction

Presenting Author: Marloes Schrijvers, University of Amsterdam, Netherlands
The purpose of this review was to identify a set of educational design principles that may inform the design of literature education fostering adolescent students' personal and social insights. Sixteen intervention studies met our inclusion criteria. Quality assessment of these studies was conducted using a framework of eight quality categories, e.g., descriptions of and rationale for experimental and control conditions, instructor effects, implementation fidelity and reliability of measures. From an analysis of the studies we deduced three general design principles. To foster personal and social insights, effective literature instruction should (1) promote dialogic learning in a safe classroom context, in which students feel free to explore and share their authentic, affective and possibly contradictory responses; (2) use fictional texts that stylistically and thematically stimulate personal and social insights, e.g., including deviations from conventional language use while addressing moral or social issues; and (3) instruct students to focus on personal experiences triggered by texts or learning activities, which will help them to connect their reading to self-aspects and to their own lives. We present a hypothetical model of how these design principles may ideally be implemented in the literature classroom.

**Self-Efficacy for Metalinguistics and Its Relation to Writing Quality: Exploring the Translation Box**

**Keywords:** Educational Psycholology, Metacognition, Self-efficacy, Writing / Literacy

**Presenting Author:** Michael Dempsey, Boston University, United States

This study developed a metalinguistic self-efficacy scale designed to measure participants' confidence for engaging in metalinguistic tasks. More generally, this study was meant to better understand and describe the activity that occurs during the translation phase of the writing process. Participants were 115 undergraduate students. They completed the Metalinguistic Self-Efficacy Scale, read a news story, and então a professional letter in response to it. The self-efficacy scale represents the independent measure. There were two dependent measures, self-reported average grades on college papers, and a rating on the letter they wrote, specifically their demonstrated mastery of metalinguistic tasks. These three measures formed the core of this correlational study. The means for all items on the self-efficacy scale tended to be high. Factor analysis yielded two factors, which were labeled 'Ideation and Conventions', though more were originally hypothesized based on metalinguistic theory (Gombert, 1992). The two factors were highly correlated, the dependent variables correlated as well. Ideation and Conventions correlated with the dependent variables as expected with one notable exception: ideation did not correlate significantly with ratings. This study suggests that this population of writers can identify personal self-efficacy for metalinguistic task abilities generally. It also suggests that writers engage interactively with a range of metalinguistic dimensions as they write.

**Learning to write: a recursive process**

**Keywords:** Computer-assisted learning, Peer interaction, Secondary education, Writing / Literacy

**Presenting Author:** Klaske Elving, Universiteit Utrecht, Netherlands

**Co-Author:** Gert Pijljaarsma, University of Amsterdam, Netherlands

**Co-Author:** Huub Van den Bergh, Universiteit Utrecht, Netherlands

**ABSTRACT (173 words)**

In this intervention study, we tested the effect of a newly developed interactive online writing course for Dutch students in the upper grades of secondary education. The course aimed to enhance students' overall writing performance by offering them a general, recursive writing strategy. The first assumption was that diminishing the cognitive overload that goes with writing would create ‘space’ for learning to write, and therefore would lead to higher text quality. The second assumption was that offering two evidence based pedagogies, observational learning and peer interaction, would increase students' awareness of their writing processes, and therefore would lead to higher text quality. The intervention was implemented by two teachers in three classrooms of students aged 15 to 18 (N=89), using a switching replication design with two groups and three measurement occasions. Results show that students' writing performance significantly improved in both groups due to the writing course. These results are so promising that a follow up study on a larger scale already has started.

**What opportunities do students have to engage in writing during their language arts lessons?**

**Keywords:** Language (L1/Standard Language), Teaching / instruction, Video analysis, Writing / Literacy

**Presenting Author:** Marte Blikstad-Balas, ILS, University of Oslo, Norway

**Co-Author:** Kristi Kleite, University of Oslo, Norway

**Co-Author:** Astrid Roe, University of Oslo, Faculty of Education, Norway

In order for students to develop as writers, they must experience a supportive writing environment and be given time to engage in writing for a sustained period of time (e.g., Graham, Harris & Chambers, 2016). However, we know little about what writing opportunities students actually have embedded in their lessons. The present study draws on 180 video-recorded language arts lessons across 46 secondary classrooms in Norway. By analyzing these recordings using a language arts specific manual The Protocol for Language Arts Teaching Observation (PLATO), our study assesses to what degree students are provided with opportunities to engage in writing, and what kind of writing this time is spent on. A key finding is that in 85% of the events in our material, there is no opportunity to write for more than a short period of time. In line with other research, we find that many of the writing assignments are short and fragmented – that is, they are not followed up or developed further. However, our material also provides detailed insight into how some teachers include writing opportunities that are embedded in a lesson, with attention to specific issues of writing craft. These events provide powerful examples of successful writing instruction.

**Session 5 493**

2 September 2017 14:45 - 16:15

Main Building - A05
Single Paper
Learning and Special Education, Teaching and Teacher Education

**Paper Presentation:** Special Educational Needs and Teacher Professional Development

**Keywords:** Learning and developmental difficulties, Primary education, Quantitative methods, Self-efficacy, Social aspects of learning and teaching, Special education, Teacher Effectiveness, Teacher Professional Development

**Interest group:** SIG 15 - Special Educational Needs

**Chairperson:** Katja Scharenberg, University of Education Freiburg, Germany

**Student-specific teachers' self-efficacy related to students' special educational needs**

**Keywords:** Primary education, Quantitative methods, Self-efficacy, Teacher Professional Development

**Presenting Author:** Susanne Schwab, University of Wuppertal, School of Education, Germany

This study aims to show the importance for researchers to explicitly identify student-specific teacher self-efficacy to interpret teachers' self-efficacy regarding the implementation of inclusive education. Data from regular teachers and special needs teachers of about 500 fourth-grade students from 20-30 inclusive classes in Styria (Austria) will be analyzed. Teachers' sense of self-efficacy towards individual students was assessed with a German four-item short version of an adapted version of the Tschanen-Moran and Woolfolk Hoy's (2001) Teachers' Sense of Efficacy Scale (Zee, Koomen, Kellesmaa, & Geers, 2018). The preliminary results indicate that there is a relative high student-specific variance in teachers' student-specific teachers' self-efficacy. This underlines the importance of assessing student-specific teacher self-efficacy instead of general teacher self-efficacy. The preliminary data further show that self-efficacy towards students with special educational needs (SEN) is lower than towards students without SEN. As not all data are available yet (data collection and entry will be finished by the end of this year) further results of multilevel-analysis will be presented and discussed at the conference.

**Self-Efficacy beliefs as predictor to quit the teacher training?**

**Keywords:** Primary education, Quantitative methods, Self-efficacy, Teacher Professional Development

**Presenting Author:** Petra Hecht, Pädagogische Hochschule Vorarlberg, Austria

**Co-Author:** Constanze Kochschiefer, University of Graz, Austria

**Co-Author:** Georg Krammer, University of Teacher Education Styria, Austria

This presentation focuses on determinants causing the intention of teacher students to quit their teacher training. Studies addressing pre-service teachers' intention to quit at early stages of teacher training are still sparse. Furthermore, they do not address pre-experiences of teaching as influencing factor although master experiences are conceptualized as a main source of self-efficacy beliefs in the social cognitive theory (Bandura, 1997). We therefore aim to evaluate the intention of teacher training students to quit within a theoretical framework building on current influential models following expectancy-value theories according to the theory of planned behaviour (Ajzen, 1991) and self-efficacy theory (Bandura, 1997).

The data collection was embedded in a reorganization of teacher training education in Austria over five years - at least one year more than initially planned. This makes Austrian teacher training Universities and Colleges highly interested in acquiring the most adapted student to become teachers. We focus on data (N= 939) representing motivational and belief factors (Watt & Richardson, 2007), collected before entering the teacher training and half a year later.

Analyses show that teacher training self-efficacy beliefs (Schulte, K., 2008) contribute significantly in explaining variances of the intention to quit teacher training. However, there was no significant contribution from general teacher self-efficacy beliefs (Schwarzer & Schmitz, 1999). Further analysis – multi-group means and covariance structure analysis – were then carried out to compare students with pre-experiences in teaching students without such pre-experiences. The differences will be discussed in the proposed theoretical framework, and allow a better understanding of why students quit the teacher education training course.
The effect of class teachers' behavior management self-efficacy on classroom behavioral climate

Keywords: Quantitative methods, Self-efficacy, Teacher Effectiveness, Teacher Professional Development

Presenting Author: Olli-Pekka Malinen, Niilo Mikk Institute, Finland
Co-Author: Hannu Savolainen, University of Joensuu, Finland
Co-Author: Vesna Närhi, Niilo Mikk Institute, Finland

One of the most significant shortcomings in the existing teacher efficacy research has been the lack of studies investigating the connection between teacher efficacy and student outcomes. In addition, the few existing studies have significant research design weaknesses in their research design. The aim of this study is to fit this gap by studying the effect class teachers’ behavior management self-efficacy on classroom behavioral climate with a longitudinal dataset that includes responses from 668 students in 46 Finnish primary school classes, and 46 class teachers of these same classes. The initial results of a two-level cross-lagged panel model point to the direction that class-teachers’ behavior management self-efficacy may indeed predict student evaluation of classroom behavioral climate, but not vice versa. Nevertheless due to the small sample size in between-level, the standardized beta coefficient did not yet meet the criteria of statistical significance. Regardless of this limitation this study can be considered as an initial step to answer to the questions that to date has remained largely unanswered: Is higher teacher self-efficacy better also for the students?

Analysing challenges to improve support for students on the autism spectrum in inclusive schools

Keywords: Learning and developmental disabilities, Special education, Teacher Professional Development

Presenting Author: Andreas Eckert, Interkantonale Hochschule für Heilpädagogik Zürich (University of Applied Sciences of Special Needs Education), Switzerland
Co-Author: Carla Canonica, Interkantonale Hochschule für Heilpädagogik Zürich, Switzerland
Co-Author: Karolin Gruber, Ludwig Maximilians-Universität (LMU) München, Germany
Co-Author: Reinhard Markowitz, Ludwig Maximilians-Universität (LMU) München, Germany

In inclusive school settings general and special education teachers and teaching assistants are often faced with major challenges when teaching students on the autism spectrum. Empirical research investigating the professional management of this type of challenging behaviour in the classroom is needed, as the majority of research in this area is based on single case studies (Machalicek et al. 2007, Parsons et al. 2011).

First, we present and discuss the findings of an online survey of general and special education teachers (N=213), which provides information regarding the challenging situations in teaching students on the autism spectrum arising in their educational practice. In a second step, we present a framework model that intends to classify challenges and to help identify possible areas of action.

Session S 494

2 September 2017 14:45 - 16:15
Main Building A - A08
Single Paper
Cognitive Science

Paper Presentation: Early Childhood Education and Achievement

Keywords: Achievement, Cognitive skills, Early childhood education, Psychometrics, Self-regulation
Interest group: SIG 05 - Learning and Development in Early Childhood
Chairperson: Daniela Raccanieto, University of Verona, Italy

Behavioral Self-Regulation and Academic Achievement in Young Children in France

Keywords: Achievement, Early childhood education, Psychometrics, Self-regulation
Presenting Author: Blandine Hubert, University of Nantes, France
Co-Author: Megan McClelland, Oregon State University, United States

Several recent studies in the United States and abroad (i.e., Asia and Europe) have demonstrated that children’s behavioral self-regulation (which includes the cognitive processes of inhibition control, working memory, attentional control) significantly predicts their academic achievement. The current study investigated the psychometric properties of a measure of behavioral self-regulation called the Head-Toes-Knees-Shoulders-Revised (HTKR-R) in France by assessing convergent validity, including relations to behavioral self-regulation assessed by parents, learning-related skills assessed by teachers and observational tasks, and predictive validity to academic achievement. 114 children from preschool and prekindergarten (Mage = 50.23 months, SD = 6.37 months) were followed from the fall to the spring of the school year in France. The results support the convergent validity of the HTKR-R task and indicate that HTKR-R scores significantly predicted literacy and numeracy achievement concurrently in the fall and spring of the school year. In addition, the HTKRS-R was the only measure to significantly predict academic achievement after controlling for the other behavioral self-regulation measures. Results suggest that promoting strong behavioral self-regulation in young French children could be beneficial for their academic achievement.

The Influence of Executive Functioning on Academic Achievement among Elementary School Students

Keywords: Achievement, Cognitive skills, Early childhood education, Self-regulation
Presenting Author: Filum Uka, University of Freiburg, Germany
Co-Author: Arjte von Suchdolstetz, New York University Abu Dhabi, United Arab Emirates

There is a strong body of research supporting the relationship between executive functions (EF) and academic achievement. However, most research focused on the early years and on adolescence while less is known about how EF components influence academic achievement throughout middle childhood. Addressing this gap in the literature, the study investigated associations between components of EF (e.g., attention shifting, inhibitory control, working memory) and Grade Point Average (GPA) among first, third and fifth graders. In total, 298 children (51.5% male) from elementary schools in Kosovo participated. Students completed a battery of EF tasks, including Dimensional Change Sorting Task (Zelazo et al., 2003), Go/No Go task (Garavan, Ross, & Stein, 2000) and Working Memory test (Peterson & Pettermann, 2011). To assess children’s intelligence, we used Culture Fair Test (CFT 20-R; Weit, 2006). In addition, the GPA was calculated for each child at the end of the academic year. Regression analyses showed that each component of EF significantly predicted GPA after controlling for intelligence. Also, results showed that there are no significant differences across groups with regard to slopes and intercepts for working memory, attention shifting and inhibitory control on GPA. The results add to the literature on the importance of EF for academic achievement. Implications for the development of strategies to support EF among elementary school students will be discussed.

Developmental Pathways to Reading and Math: The Role of Attentional and Behavioral Control

Keywords: Achievement, Cognitive skills, Early childhood education, Self-regulation
Presenting Author: Dawaer ten Braak, University of Stavanger, Norway
Co-Author: Tjas Kleemans, Behavioural Science Institute, Radboud University, Netherlands
Co-Author: Ingunn Starksen, Stavanger University, Norway
Co-Author: Ludov Verhoeven, Radboud Universiteit Nijmegen, Netherlands
Co-Author: Eliaen Siegers, Radboud University/ University of Twente, Netherlands

The present longitudinal study investigated the unique direct and indirect contributions of two aspects of self-regulation - attentional and behavioral control - to the developmental trajectories of early reading and math. Eighty Dutch children were assessed on phonological awareness, early numeracy, and multiple direct measures of self-regulation in kindergarten, and decoding and mathematics proficiency in first grade. Path analyses showed that attentional and behavioral control both uniquely predicted phonological awareness and early numeracy in kindergarten, but that effects became more specific in first grade: Decoding was best predicted by attentional control, while behavioral control accounted for the most variance in math. Moreover, path analysis showed that the pathway from attentional control to decoding was mediated by phonological awareness, while behavioral control remained to have a significant direct effect on math in first grade. These results suggest that while self-regulation has a gradual influence on reading development - via phonological awareness - it continues to contribute directly to the development of mathematics in first grade. In addition, attentional and behavioral control seem to play specific roles for each developing skill: Awareness of the differential importance of attentional and behavioral control for early reading and math skills may contribute to improved and more targeted educational practice for children struggling with the acquisition of early reading or mathematics.

Executive Functions and Self-Control Contribute to Mathematics Performance in Elementary Students

Keywords: Achievement, Cognitive skills, Early childhood education, Self-regulation
Presenting Author: Catherine Gunzenhauser, Leipzig University, Germany
Co-Author: Henrik Staabach, University of Leipzig, Germany

Self-regulatory capacities are crucial for acquiring mathematical competencies in elementary school. However, different aspects of self-regulation (originating from different research traditions) have been investigated largely separately from one another. The present longitudinal study aimed at disentangling the relationship between executive functions (EF) and self-control capacity and at investigating their distinct and joint influences on mathematics achievement in third graders from Germany. Participants were N = 251 third graders (30.86 years, SD = 0.57; 50% girls) from East Germany as well as one parent per child. The project included two time points (6-month interval). At both time points, children’s EF, self-control capacity, mathematics performance as well as several control variables (nonverbal intelligence, mathematics self-concept) were assessed. Cross-sectional analyses of Time 1 data revealed that children’s EF positively predicted their self-control capacity, even after controlling for nonverbal intelligence and mathematics self-concept. Both EF and self-control capacity made unique contributions to children’s mathematics achievement. Moreover, there was a significant indirect effect of EF on children’s mathematics achievement through self-control capacity. Longitudinal analyses
including data of Time 1 and 2 will be presented at the conference. Preliminary findings suggest that programs designed to support children's mathematics achievement might benefit from taking into account children's individual strengths and difficulties with regard to both EF and self-control capacity.

Session 5 495
2 September 2017 14:45 - 16:15
Main Building E - 350
Single Paper
Educational Policy and Systems, Instructional Design
Paper Presentation: STEM and Educational Policy
Keywords: Design based research, Educational policy, Inquiry learning, Interdisciplinary, Mathematics, Quasi-experimental research, Science education, Teacher Professional Development
Institution: UG 20 - Inquiry Learning
Chairperson: Marge W.J. van de Wiel, Maastricht University, Faculty of Psychology and Neuroscience, Netherlands
Disciplinary boundary crossing: Abolition, permeability and colonization in STEM education
Keywords: Educational policy, Interdisciplinary, Science education, Teacher Professional Development
Presenting Author: David Clarke, University of Melbourne, Australia

The disciplines encompassed by STEM are currently distinguished by associated bodies of practice. Analogous distinctions apply in STEM education, extending to the signature pedagogies that characterize each of the disciplines. Current curricular design reflects restrictive conceptions of field-specialty and the unique integrity of bodies of knowledge encrusted as school subjects. Abortion must be paid to the affordances of affiliation and research undertaken to explore the legitimacy of the constituent STEM disciplines and STEM-related vocational communities functioning as communities of practice offering enhanced learning experiences through their interconnection. This paper employs the idea of boundary crossing to explore different theoretical conceptions of interdisciplinary by which STEM might catalyse a reconceptualization of the organizing principles of the curriculum. This presentation explores three forms of boundary crossing: the implications of vocational coherence as a boundary crossing device; the permeability of the boundaries that define and segregate the individual STEM disciplines and the educational significance of the constructs to which those boundaries are permeable; and, the dangers of colonization of the STEM domain by one or more of its constituent disciplinary members, sacrificing the affordances for innovation that interdisciplinary might offer. Interdisciplinary is not integration and the evident bases and signature practices of the constituent STEM disciplines can be quite different, maintaining disciplinary integrity. Education for collaborative specialisation requires international and disciplinary boundaries not their demolition. It is proposed that constructs such as Discourse, Artefacts, Reasoning, and Evidence can be used to re-design an interdisciplinary STEM curriculum that better addresses societal need.

Considering epistemological junctions when designing for interdisciplinary learning
Keywords: Educational policy, Interdisciplinary, Mathematics, Science education
Presenting Author: Richard Lehrer, Vanderbilt University, United States
Recent efforts in the U.S., reflected in the Next Generation Science Standards (2013) and the Common Core State Standards for Mathematics (2010) emphasize the importance of positioning students to participate in disciplined epistemic practices so that they develop some understanding of how practitioners of mathematics and science go about generating and revising knowledge. This presentation focuses on designing for interdisciplinary learning in light of the epistemic virtues of each discipline. The guiding assumption is to create opportunities for learners to participate in forms of activity where the ‘same’ concept participates in related, albeit distinct disciplinary ways of knowing. The intention is to achieve a junction between epistemologies.

Two cases will be discussed, both drawn from elementary classrooms. Both classrooms, Grades 3 and 6, respectively, were engaged in participatory design research involving a partnership among educational researchers, teachers, and disciplinary experts in science and in mathematics. In both cases, interdisciplinary engagement created opportunities for students to extend the reach and grasp of conceptual systems and to explore important aspects of scientific and mathematical practice. Keynotes in the study included an emerging appreciation of the role that particular practices in science, modeling, and how this practice was distinct from similar looking practices in mathematics. The sixth grade students, studying variability, experienced an opportunity to understand how mathematical tools for understanding signal and noise could be extended to consider natural variation as well. In addition, since their investigations and findings attracted the attention of local government, variability became infused with civic responsibility.

Integrating research and design in interdisciplinary STEM education
Keywords: Educational policy, Interdisciplinary, Mathematics, Science education
Presenting Author: Jan van Driel, University of Melbourne, Australia
Co-Author: Tessa Vossen, Leiden University, Netherlands
Co-Author: Inke Herze-Rietveld, Delft University of Technology, Netherlands
Co-Author: Marc Van Vles, Delft University of Technology, Netherlands
The need to acquire skills in research and design is a response to a demand for interdisciplinary STEM skills in the workplace. Also, research and design activities are expected to counter the decline of students' interest in STEM. In authentic STEM practices, research projects often require design activities, and vice versa. Therefore, research and design should be taught integrated, rather than separated. Recent curriculum innovations in the Netherlands are aimed towards this goal. However, teachers often have limited knowledge and experience about research and design, and their relationships. A study was done to see whether secondary teachers in this domain and at these levels have a common understanding of research and design as rather separate activities, focusing on experimenting and problem solving, and creating and testing, respectively. Implications for the design of curriculum materials and professional development will be discussed.

The effectiveness of multiple GILB-MIXP STEM learning environments on students’ performance.
Keywords: Design based research, Inquiry learning, Quasi-experimental research, Science education
Presenting Author: Marion Crauwels, KU Leuven, Belgium
Co-Author: Arnt Van Soom, KU LEUVEN, Belgium
Co-Author: Bart Reynvoet, KU Leuven, Belgium
Co-Author: Daan Meechmans, KU LEUVEN, Belgium
In recent years in science education, which demand for a more supporting pedagogy such as student-centred learning environments that authentically mirror scientific processes with the aim to enhance students' insights in and interest for STEM, we investigated the beneficial effects of a SFPL supported, guided-inquiry lab-based hands-on method (GILB-MIXP) in an authentic classroom setting. While earlier research suggested that the implementation of this innovative didactics does improve students' achievement regarding the nature of science (NGS), domain-general skills (DGS), domain-specific knowledge (DSK) and domain-specific skills (DSS) we only found a valid implementation lab-based design and a single one. We hypothesized that the students in the experimental condition with multiple GILB-MIXP interventions would outperform students of the control condition who participated in a single GILB-MIXP Intervention. Participants were 12th-grade senior high school students who participated in two GILB-MIXP intervention studies. Study one was designed to investigate the effect of the GILB-MIXP methodology on a pre-test and post-test. Our results show a significant improvement with regard to the domain-general skills and domain-specific knowledge in the multiple GILB-MIXP condition compared to the single GILB-MIXP condition. In addition, students' interest and self-efficacy also improved in the multiple GILB-MIXP condition. However, performance regarding aspects such as the nature of science did not further improve which requires further research. Our ultimate goal is to optimise the implementation of this innovative didactics into the STEM curriculum.

Session 5 496
2 September 2017 14:45 - 16:15
Pinn B - B317
Single Paper
Cognitive Science, Developmental Aspects of Instruction
Paper Presentation: Cognitive Development and Skills
Keywords: Cognitive development, Cognitive skills, Culture, Learning disabilities, Mathematics, Numeracy, Quantitative methods
Interest group
Chairperson: Lenka Schnaubert, University of Duisburg-Essen, Germany
Developmental changes in digit representations and their relation with arithmetic achievement
Keywords: Cognitive development, Cognitive skills, Mathematics, Numeracy
Presenting Author: Bert Reynvoet, KU Leuven, Belgium
Co-Author: Helene Vos, KU LEUVEN, Belgium
Co-Author: Delphine Sasanru, KU Leuven, Belgium
Digit comparison performance has been shown in a robust predictor of individual differences in more complex math processing in many different age groups. It is however unclear which underlying component of digit comparison is responsible for this association (i.e. digit identification, digit to number-word matching, digit ordering or general comprehension). In a previous study with adults, we showed that the relation between digit comparison and arithmetic was mediated by ordering ability, indicating that order relations between digits are responsible for the relation between digit comparison and arithmetic and not the magnitude of digits. In the current study, we addressed the same question in two samples of both first and second graders. In the younger children, who just started formal math education, we observed a different pattern than in adults; the relation between digit comparison and arithmetic was not mediated by ordering process. In contrast, the relation between order processing and arithmetic was mediated by digit comparison. The pattern of the second graders was however identical to the one of adults. The difference between both samples reflects the early development of how digits are represented.

The role of ordering abilities in early mathematical development and developmental dyscalculia
Keywords: Cognitive development, Cognitive skills, Learning disabilities, Mathematics
Presenting Author: Kings Morsanyi, Queen's University Belfast, United Kingdom
Co-Author: Patrick O'Connor, Queen's University, Belfast, United Kingdom
Co-Author: Bianca Van Bors, Queen's University, Belfast, United Kingdom
Co-Author: Teresa McCormack, Queen's University, Belfast, United Kingdom
Recent evidence (e.g., Lyons & Bellcock, 2011; Lyons et al., 2014) has highlighted the important role that number ordering skills play in arithmetic abilities. It has also been shown that memory for both arbitrary (e.g., Attia et al., 2014) and familiar (Morsanyi et al., 2016) non-numerical sequences is linked to arithmetic skills. Nevertheless, most studies that investigated the relationship between ordering and arithmetic skills have been conducted in a school context. This study presents new findings that demonstrate the importance of number ordering abilities in early numeracy development at the start of formal education. Specifically, in a group of ninety children (43 females; mean age at first testing +4 years 11 months), ordering ability at the age of 4 years 11 months predicted the arithmetic achievement of the child at the age of 6 years 11 months. This finding is in line with other relevant studies that investigated the numerical development of children with developmental dyscalculia (DD), and twenty-one children without mathematical difficulties participated (mean age=9 years 6 months). The results showed that children with developmental dyscalculia have order processing deficits (among other difficulties). Taken together, the novelty of these findings is to highlight the important role that non-numerical ordering abilities play in early mathematics development in the case of both typically developing children and in children with DD.

SNARC and MARC effects - insight from a large-scale online study
Keywords: Cognitive skills, Mathematics, Numeracy, Quantitative methods
Presenting Author: Krzysztof Cipora, University of Twente, Germany
Co-Author: Mojtaba Sojotariu, University of Twente, Germany
The SNARC (Spatial-Numerical Association of Response Codes) effect is a phenomenon that small magnitude numbers are responded faster on the left hand side, whereas large magnitude numbers are responded faster on the right hand side. In the present study, we aimed to investigate the SNARC effect in two different online settings as well as we tested for several domain-specific and domain-general factors which were hypothesized to influence SNARC. Additionally, we tested for another phenomenon – the MARC (Linguistic Markedness of Response Codes) i.e. left hand advantage when responding to odd numbers, and right hand advantage when responding to even numbers. In total 1056 participants were retained in the analysis. We observed strong and robust SNARC and MARC effects at the group level. The SNARC effect was modulated by whether participants started finger counting sequence from left or right hand (stronger in left starters) and by overall speed of reaction times (stronger in slower participants). Interestingly, there was no relationship between the SNARC and math grades. The MARC effect correlated with reaction times (stronger in slower participants), was smaller in individuals starting finger counting from the right hand. Additionally, it was reversed in left handers. Overall, these findings show that the SNARC and MARC effects are robust and can be investigated in online experiments. Furthermore, the results suggest that sources of individual variability in these phenomena need to be further investigated, and call for further replication efforts.

Numerical abilities of English and Chinese children

Keywords: Cognitive development, Cognitive skills, Culture, Mathematics
Presenting Author: Ann Dowker, University of Oxford, United Kingdom
Co-Author: Anthony Li, Oxford University, United Kingdom

Most international comparisons have shown that Chinese pupils perform significantly better than Western pupils in mathematical tests. Reasons may include cultural and educational factors, and also more specifically the greater transparency of the Chinese counting system. The present study involved seventy-five 6 to 8 year-old Chinese Cantonese-speaking children in Hong Kong and 35 English-speaking children in Oxford. They were given a standardized arithmetic test, and also tests of two-digit number comparison and number line estimation. There were no group differences in general arithmetic performance or number line estimation, but Chinese children were faster and more accurate at number comparison. This contradicts the hypothesis of better overall performance in mathematics by Chinese children, but supports earlier findings of specific effects of counting system transparency on multi-digit number comparison. Implications for theory and practice are discussed.

Session 5 497
2 September 2017 14:45 - 16:15
Linnra - K108
Single Paper
Developmental Aspects of Instruction

Paper Presentation: Achievement

Keywords: Achievement, Educational attainment, Educational policy, Educational Psychology, Goal orientation, Intelligence, Language (Foreign and second), Learning approaches, Secondary education, Self-regulation
Interest group:
Chairperson: Heidi Hyttinen, University of Helsinki, Finland

Educational tracking in early adolescence: To what extent does intelligence prevail?

Keywords: Achievement, Educational policy, Intelligence, Secondary education
Presenting Author: Elisabeth Stern, ETH Zurich - Research on Learning and Instruction, Switzerland
Co-Author: Esther Ziegler, ETH Zurich, Switzerland
Co-Author: Sarah Isabelle Hoger, TU Munich School of Education, Germany

In Switzerland, about 20% of the secondary school students attend the highest track of the educational system (Gymnasium), which is supposed to prepare for university education. Access to this track takes place between the ages of 12 and 14 and is based on achievement in core subjects at the end of elementary school or in early secondary school. The goal is to select the 20% most capable students for academic career tracks. However, measures of intelligence are not considered. In case of a very strong correlation between school achievement and intelligence, the vast majority of the Gymnasium students would be supposed to have an IQ ≥ 113 corresponding to an IQ above the 80th percentile. We analyzed two data sets that included measures of intelligence to determine the percentage of students who fall into this range: In a sample of N = 995 Gymnasium students (mean age 15.6 years) this was the case for 54% of the students. A sample N = 535 elementary school children was presented with an intelligence measure at age 12.5. Among those students with a percentile rank > 80 only 49% were designated for the Gymnasium whereas 51% were not. The results indicate a considerable selection bias to the disadvantage of intelligence when decisions for university education are already made at early adolescence.

Epistemological beliefs have direct and indirect effects on learning and teaching. Therefore, understanding teacher students’ beliefs and linking epistemological beliefs to unique aspects of learning is essential. The central research objective of this study is the development of an instrument for the assessment of undergraduate teacher students’ epistemological beliefs concerning their learning with professional texts in pedagogy (SIEB). First, 5 scales with a pool of 126 items were created. A panel of 10 experts assessed the 126-item SIEB inventory for content validity, which resulted in an optimized 98-item version. The theoretically assumed 5-factor solution as well as a statistically implicated 6-factor solution were subjected to exploratory factor analysis (EFA) in an undergraduate sample (n = 217). EFA results supported a multidimensional, 5-factor, 5-factor solution.

Keywords: epistemological beliefs, teacher students, instrument development, exploratory factor analysis

Evaluating the Instructional Sensitivity of Test Items in Consideration of Student Characteristics

Keywords: Assessment methods and tools, Educational Psychology, Psychometrics, Student learning
Presenting Author: Stephanie Musow, University of Teacher Education St.Gallen, Switzerland
Co-Author: Jan Hochweber, University of Teacher Education St. Gallen, Switzerland
Co-Author: Alexander Naumann, German Institute for International Educational Research (DIPF), Germany
Co-Author: Johannes Hartwig, German Institute for International Educational Research (DIPF), Germany

Instructional sensitivity is the psychometric property of a test or an item to react sensitive to the content and quality of instruction (Pollitt, 2010). Previous research has conceived instructional sensitivity as a direct indicator of the instructional context (e.g., Poltrock, 2014). Referring to the concept of test validity which conceptualizes student learning as the utilization of learning opportunities offered during instruction, we suggest that this common perspective on instructional sensitivity is oversimplifying. In this contribution, we address the questions a) how student characteristics determining the use of learning opportunities (e.g., prior knowledge) should be incorporated in statistical models to provide a more comprehensive evaluation of instructional sensitivity, and b) to which extent empirical relationships can be found between these student characteristics and indices/indicators of instructional sensitivity. Our sample consists of 951 students from 48 fifth-grade classrooms, participating in mathematical tests (arithmetic) and completing student questionnaires at four time points throughout the school year 2016/2017. All analyses will be carried out based on the longitudinal multilevel (LML) DIF approach to operationalizing instructional sensitivity proposed by Naumann, Hochweber, and Hartig (2014). Preliminary results based on already available data from the first time point (pre-test) indicate that a considerable percentage of variation in the item response variables is located at the classroom level (7% to 31.7%). Hence, as would be expected in evaluations of instructional sensitivity, instructional variables might explain a considerable amount of variation in student achievement.

Investigating the Impacts of Characteristics of Science Contextualized Items on Student Performance

Keywords: Achievement, Assessment methods and tools, Psychometrics, Science education
Presenting Author: Min Li, University of Washington, United States
Co-Author: Dongsheng Dong, University of Washington, United States
Co-Author: Maria Araceli Ruiz-Prime, Stanford University, United States
Co-Author: Jim Minnich, Facet Innovations, United States

Despite the widespread use of tests in science testing, their utility, practice, and underlying assumptions have been called into question. As contexts used may interfere with the target construct and lead to inaccurate inferences about student learning, it is important to carefully construct and evaluate the contextualized items to ensure the items provide valid inference. In this paper, we proposes a conceptual framework for evaluating the quality of contextualized items and provide empirical evidence by constructing three types of items: (1) contextualized items without an illustration, (2) contextualized items with an illustration, and (3) abstract items. We administered 40 physics items of 394 students at grades 7-8. By applying the cognitive diagnostic modeling procedure with student responses on the three versions of items, our principle analysis found students’ performance did not differ between the two versions of with versus without an illustration. Findings of additional analysis will be reported and implications for item construction and validation will be included.

Session 5 501
2 September 2017 14:45 - 16:15
Pens B - BA413
Single Paper
Assessment and Evaluation, Higher Education, Teaching and Teacher Education

Paper Presentation: Assessment and Higher Education

Keywords: Assessment methods and tools, Case studies, Competencies, E-learning / Online learning, Educational Psychology, Higher education, Mixed-method research, Secondary data analysis, Teacher Effectiveness, Teaching / instruction, Teaching approaches, Vocational education
Interest group: SIG 01 - Assessment and Evaluation
Chairperson: Minna Pajunoja, INS HEA, Finland

Type and timing of feedback in an online environment: relation and implications for learning

Keywords: E-learning / Online learning, Educational Psychology, Higher education, Teaching / instruction
Presenting Author: Teresa Giusach, Open University of Catalonia (UOC), Spain
Co-Author: Anna Espasa, Universitat Oberta de Catalunya, Spain
Co-Author: Rosa M Maymústom, Open University of Catalonia (UOC), Spain
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In online learning environments, monitoring students’ progress closely and providing them with continuous support is of paramount importance. In relation to this, it is vital to understand how feedback timing and feedback type are related to learning. This is precisely the aim of this study, which on the one hand seeks to establish what correlation exists between feedback timing and feedback type and on the other hand, attempts to analyse their impact on learning. A survey was conducted among a sample of teaching staff involved in various undergraduate and postgraduate courses across all fields of knowledge in an online university whose pedagogical model is based on asynchronous and written communication. Results showed that 35% of respondents offered feedback at three different moments (before submission of an assignment, on submission, after marking). When feedback is given before submission, there is a significantly higher incidence of comments A correlation was also found between feedback timing and academic attainment rate on the courses: providing feedback before submission of an assignment resulted in a greater attainment rate (95.2% on average) and consequently, providing feedback in the three moments or before submission and after marking also led to higher attainment rates (95.5% and 95.3% respectively). These results allow for a better understanding of feedback practices and thus inform teachers in designing more effective and tailored feedback in online learning environments.

Simulated Conversations for Assessing Professional Conversation Competence

**Keywords**: Assessment methods and tools, Competence, Higher education, Vocational education

**Presenting Author**: Johannes Bauer, University of Erfurt, Germany

**Co-Author**: Anne Wiesbeck, TUM School of Education, Germany

**Co-Author**: Martin Gartmeier, Technische Universität München (TUM), Germany

**Co-Author**: Manfred Preziosi, Technische Universität München, Germany

Simulated conversations (SC) with trained actors are a performance-oriented method for assessing communicative competences in authentic task situations. This study evaluated the psychometric properties of parallel designed SC in a cross-professional setting: in teacher-parent and physician-patient conversations. Specifically, we addressed three research questions regarding the reliability and construct validity of the SC: (1) whether trained observers rate a satisfactory interrater reliability in rating examinees’ performance; (2) whether correlations among three types of ratings (external observers’, SC partners’, and students’ self-ratings) correspond to expectations; (3) whether hypothesized correlations with external criteria (prior communication training, semester, abitur grade) could be found. To answer these questions, n = 72 undergraduate medical students and n = 96 pre-service teachers conducted simulated conversations. Results showed sufficient interrater reliability (ICC = 0.71). Moreover, the pattern of correlations among the observer ratings, the other two types of ratings, and external criteria was as expected. These results provide initial evidence for the reliability and the validity of the developed SC assessment.

Pros and cons of student evaluation of academic teaching: a synthesis of strengths and challenges

**Keywords**: Higher education, Mixed-method research, Secondary data analysis, Teacher Effectiveness

**Presenting Author**: Liliana Silva, Alma Mater Studiorum Università di Bologna, Italy

**Co-Author**: Maria Lucia Giovanni, Alma Mater Studiorum Università di Bologna, Italy

The main instrument adopted to engage into the assessment process of academic teaching is the questionnaire proposed to students to collect their opinions. Aims include identify problem areas that can be identified in research on the use of students’ recipient questionnaire as part of the evaluation of university education, with particular reference to the perceptions of students and university teachers. The objectives of this study were to: (a) present and synthesize the findings by a protocol systematized by authors; main results are (a) the answers on a common classroom and synthesize the findings by a protocol systematized by authors; main results are (b) the answers on a common classroom and synthesize the findings by a protocol systematized by authors; main results are (c) the impact of factors related to students, courses and teachers on detecting students’ opinions; (d) a reference to the diversity of contexts; (e) the gain of results is often not timely, and therefore of little use for the improved teaching performance; (f) the context of analyses on the, aimed at detecting evidence in support and against the feasibility of improving teaching evaluation by the students shifts opinions in favor of the latter. But only when accompanied by the use of other assessment tools and especially when it involves students and teachers, who should receive adequate training to a more informed assessment.

Sharing Learning Goals with Students: Capturing What Teacher Do Everyday

**Keywords**: Case studies, Mixed method research, Teaching / instruction, Teaching approaches

**Presenting Author**: Maria Araceli Ruiz-Primo, Stanford University, United States

**Co-Author**: Heidi Kroog, Smarter Balanced, United States

The paper reports a study focusing on a critical activity in formative assessment, clarifying learning goals.It was guided by the questions: What are the strategies teachers use to share the learning goals with students on the everyday basis? and How do these strategies vary from day to day? We collected in 2015-16, 10 classroom and 10 science teachers during the implementation of 24 units. An important finding is that in 69% of the 420 days coded across the 24 units, teachers did not mention any learning goal. Furthermore, teachers did not mention the purpose of what students were doing in 64.8% of the instructional tasks in mathematics classes and in 56.9% of the tasks in science.

**Session 5 502**

2 September 2017 14:45 - 16:15

Paper 502:

Single Paper

Motivational, Social and Affective Processes

**Paper Presentation: Attitudes, Beliefs and Self-Efficacy**

**Keywords**: Attitudes and beliefs, Goal orientation, Learning disabilities, Motivation, Motivation and emotion, Primary education, Self-efficacy, Self-regulation, Student learning

**Interest group**: SIG 08 - Motivation and Emotion

**Chairperson**: Stephan Schwan, Leibniz Institut für Wissensmedien, Germany

Implicit Theory and Classroom Goal Structure in the Cognitive Appraisal of Self-efficacy Information

**Keywords**: Attitudes and beliefs, Goal orientation, Motivation, Self-efficacy

**Presenting Author**: Min Mi Bong, Korea University, Korea, Republic of

**Co-Author**: Sun Soo Ahn, Brain and Motivation Research Institute (IMRI), Korea University, Korea, Republic of

The main purpose of this investigation was to examine students’ implicit theory of ability and perceived classroom goal structure as the ability of the self-efficacy information and academic self-efficacy. Hierarchical multiple regression analyses were performed on the responses of Korean high school students across two studies (N = 395 in Study 1 and 259 in Study 2). Sources of efficacy beliefs were classified into four different categories with single self-efficacy and academic self-efficacy was stronger for incremental theorists and students who perceived a strong mastery goal structure, compared to entity theorists and students who perceived a weak mastery goal structure in the classroom, respectively (Study 1). Interaction effects were created by a different moderator, depending on the achievement levels of students (Study 2). For high achievers, it was the implicit theory that interacted with efficacy beliefs: the relationship between mastery experience and self-efficacy and that between vicarious experience and self-efficacy were stronger for incremental than entity theorists. For low achievers, it was the perceived classroom goal structure that interacted with efficacy sources: the relationship between mastery experience and self-efficacy was stronger for those who perceived a strong, compared to a weak, mastery goal structure in the classroom (Study 2).

Sources of Mathematics and Science Self-Efficacy Among Adolescents in Rural Appalachia

**Keywords**: Attitudes and beliefs, Self-efficacy, Student learning, Motivation and emotion

**Presenting Author**: Ellen Usher, University of Kentucky, United States

**Co-Author**: Caleb York, University of Kentucky, United States

**Co-Author**: Cal-world, University of Kentucky, United States

**Co-Author**: Aline E. Roberts, University of Kentucky, United States

According to social cognitive theory, the context in which people live can influence how they think about their abilities (Bandura, 1997). Living in a rural location may reduce students’ academic opportunities and resources and thereby lead them to develop less optimistic academic beliefs. The purpose of this study was to examine the sources of primary and secondary learners’ N = 609) mathematics and science self-efficacy in a rural, high-poverty area in the Appalachian region of the U.S. Participants were from Grades 4-12 in one school district completed survey items in their mathematics and science classes at two time points. The results assessed the sources of students’ self-efficacy in each subject (spring, Year 1) and the subject-specific self-efficacy and self-efficacy for self-regulated learning (fall, Year 2). Confirmatory factor analysis revealed that a four-factor structure represented the sources of self-efficacy data. All variables were significantly correlated with one another. Regression analyses revealed that mastery experience, social influence, and anxiety as well as the four-factor model explained self-efficacy in mathematics and science. All four sources predicted students’ self-regulatory self-efficacy in both subjects. Mastery experience and achievement were the most powerful predictors of students’ academic self-efficacy. This research extends findings related to the sources of self-efficacy to the understudied population of rural adolescents and to the less-studied context of science.

Commodity of academic difficulties and sources of self-efficacy among primary school age children

**Keywords**: Attitudes and beliefs, Learning disabilities, Primary education, Self-efficacy

**Presenting Author**: Helena Viholainen, University of Jyväskylä, Finland

**Co-Author**: Tuja Aro, University of Jyväskylä, Finland

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**Co-Author**: Päivi Pernä, University of Jyväskylä, Finland

**Co-Author**: Riikka Sorvo, University of Jyväskylä, Finland

**Co-Author**: Eija Räikkönen, University of Jyväskylä, Faculty of Education, Finland

**Co-Author**: Mikk Ano, University of Jyväskylä, Finland

It has been suggested that learning disabilities (LD) may restrict access to sources of academic self-efficacy, and therefore, be risk for development of negative self-efficacy (SE), and further, to academic performance. Therefore, previous limited knowledge about connections between sources of SE and LD focused our interest to compare whether children with LD (in reading, RD; in math, MD; or combined, RMD) have different SE and vicarious experiences (VE), verbal persuasion (VP), and affective and physiological states (PS) differently than children without LD (NL). Furthermore, effect of combined learning difficulties on sources of academic SE were studied. First, the participant’s (N=867; girls=420, boys=447), enrolled from 2–5 grades, reading (sentence reading, word chain) and math (addition, subtraction and problem solving) tasks performed in order to group the children into four groups: TD (standardized reading and math-composite scores > 0.5), RD (standardized reading composite score ≤ 0.5), RMD (standardized composite score ≤ 0.5), RMD (standardized composite score ≤ 0.5), RD (standardized reading composite score ≤ 0.5), RMD (standardized composite score ≤ 0.5). Sources of reading and math SE were assessed with a questionnaire. The repeated measures variance analyses were used to test the group differences. Our results showed that children with LD experiences lesser amount of MES, VPs, and more anxiety and stress than children without LD. Thus, LDs restrict the access to sources of self-efficacy, and therefore, might be risk for negative development of academic SE, and thereby, for academic learning, especially in the academic skill difficult for them. Furthermore, children with comorbid difficulties might be in greater risk for developing negative academic SE.
Self-regulatory efficacy beliefs and their sources of children with attention deficit symptoms

Keywords: Attitudes and beliefs, Primary education, Self-efficacy, Self-regulation

Presenting Author: Mika Paananen, University of Jyväskylä, Finland
Co-Author: Tuula Arho, University of Jyväskylä, Finland
Co-Author: Helena Viholainen, University of Jyväskylä, Finland
Co-Author: Tuula Kopenan, University of Jyväskylä, NMI, Finland
Co-Author: Jari Westerholm, Nilo Mäki Institute, Finland
Co-Author: Mikko Arho, University of Jyväskylä, Finland

The purpose of this study was to examine self-efficacy for self-regulated learning (self-regulatory self-efficacy) and its sources, and assess associations between these among elementary school children with attention deficit symptoms (n = 86) and their peers (population sample; n = 1245). We were especially interested in whether attention deficits affect relations between self-efficacy and its sources. ANCOVA revealed that control group children gave more positive estimation of their efficacy beliefs, mastery experiences and physiological/emotional states after controlling for gender and academic skills. Regression analyses showed that variability in self-efficacy on children with attention deficit symptoms varied as a function of attention deficit: the group with attention deficits indicated reduced connections between the sources and efficacy beliefs compared to the control group.

Session 5 503
2 September 2017 14:45 - 16:15
Main Building E - E221
Single Paper
Cognitive Science, Motivational, Social and Affective Processes

Paper Presentation: Neuroscience and Cognitive Development

Keywords: At-risk students, Cognitive development, Cognitive skills, Experimental studies, Learning and developmental difficulties, Learning disabilities, Mathematics, Motivation and emotion, Neuroscience, Numeracy
Interest group: SIG 22 - Neuroscience and Education
Chairperson: Clare Newton, The University of Melbourne, Australia

Developmental trajectories of children’s symbolic skills and associated cognitive competencies

Keywords: At-risk students, Learning and developmental difficulties, Mathematics, Numeracy
Presenting Author: Kian Vanbrinst, KU LEUVEN, Belgium
Co-Author: Eva Caelemans, KU Leuven - University of Leuven, Belgium
Co-Author: Lien Poters, KU Leuven - University of Leuven, Belgium
Co-Author: Pol Ghyselinck, KU Leuven - University of Leuven, Belgium
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While symbolic numerical magnitude processing skills are key for learning arithmetic, its developmental trajectories remain unknown. We therefore delineated in the first three years of primary education (ages 5-8 years) groups with distinguishable developmental trajectories of symbolic numerical magnitude processing skills, using a model-based clustering approach. Three clusters were identified and labelled as: inaccurate, accurate but slow and accurate and fast. The clusters did not differ in age, sex, socioeconomic status and IQ. We tested whether these clusters differed in domain-specific and domain-general cognitive competencies that might contribute to children’s ability to (efficiently) process the numerical meaning of Arabic numerical symbols. The clusters differed in non-symmetrical numerical magnitude processing, digit identification, visuospatial short-term memory and processing speed, but they did not differ in verbal working memory. Follow-up analyses of covariance further revealed that the cluster differences in children’s symbolic development remained when the abovementioned cognitive competences were controlled for, which suggests that other factors additionally account for these individual differences in children’s development of symbolic skills. On the other hand, the three trajectories of symbolic numerical magnitude processing showed remarkable and stable differences in arithmetic fact retrieval, which stresses the importance of symbolic numerical magnitude processing skills for learning arithmetic.

Adjusting Skill Learning Protocols to Aid Learning in Developmental Disorders.

Keywords: At-risk students, Learning and developmental difficulties, Learning disabilities, Neuroscience
Presenting Author: Esther Adi-Japha, Bar-Ilan University, Israel

Procedural memory is integral to the learning of cognitive, perceptual, motor, and linguistic skills that contribute to school achievements. Procedural learning is a basic mechanism enabling newly acquired skills to improve gradually across multiple learning experiences. Motor skill learning tasks have been consecutively used as a model for procedural learning. Atypical learning and consolidation of motor skills was reported in several developmental disorders, including attention deficit hyperactivity disorder (ADHD), specific language impairment (SLI), and developmental coordination disorder (DCD). In this presentation, I will summarise evidence that individuals with ADHD tend to perform inaccurately, and their inaccuracy is even enhanced 24 h post-learning. Individuals with SLI display an initial learning rate that is slower than that displayed by their peers without the impairment. Furthermore, they do not retain their learning well between sessions. Finally, individuals with DCD display a typical learning curve, however overall their performance is slower than that of their peers. It has been suggested that adjustments in the learning protocols can improve learning. I will claim that the type of adjustments is different for different developmental disorders. Implications for the learning environment will be discussed.

Do rewards enhance learning? The effect of a reward prospect on information processing: An EEG study

Keywords: Cognitive skills, Experimental studies, Neuroscience, Motivation and emotion
Presenting Author: Bob Ven, Utrecht University, Netherlands
Co-Author: Sven van Touw, Utrecht University, Netherlands
Co-Author: Anne van Hoogmoed, University of Groningen, Netherlands
Co-Author: Eva Janssen, KU Leuven - University of Leuven, Belgium
Co-Author: Paul Leseman, Utrecht University, Netherlands

Introduction. Promised rewards and punishments are often used to stimulate learning behaviour. This prospect may change the emotional state and thus process of learning materials. It was tested whether a monetary reward or punishment affected information processing and recall of learning.

Method. Two EEG studies were performed, with the N400 paradigm: sentences with a logical or illogical final word (e.g., the tree is full of apples/coffee). The difference in brain activity between these conditions was determined.

Study 1. 39 female participants completed the N400 task, then a recall test of the sentence-final words. Participants were told that financial compensation increased with each correct answer (reward condition; n=19), or that compensation was fixed (control condition; n=20).

Study 2. 56 female participants completed the N400 task, then a recall test of whether the sentences were logical. Participants were told that financial compensation increased with each correct answer (reward condition; n=19), decreased with each incorrect answer (punishment condition; n=19); or that compensation was fixed (control condition; n=18).

Results. Study 1. In the reward condition the N400 effect was more spread over (left) frontal areas; recall was better than in the control condition.

Study 2. No difference in brain activity was found between control and reward condition; in the punishment condition the N400 effect was more spread over (left) parietal and central areas. Recall performance was best in the control condition.

Discussion. Results of the two studies seem contradictory: a reward prospect alters semantic processing, but its effects on learning are less clear.

Beyond Arabic digits: Symbolic number processing with alphabetic characters

Keywords: Cognitive development, Cognitive skills, Mathematics, Numeracy
Presenting Author: Courtney Pollock, Vanderbilt University, United States

The ability to understand numerical symbols is important for success in mathematics. In particular, literal symbols (e.g., x) in higher-level mathematics such as algebra are often used to represent numerical magnitudes. However, compared to Arabic numerals, literal symbols may require more complex mental representations because these symbols have strong pre-existing associations in literacy that may interfere with numerical references. The present study tested this notion using the same-different distance paradigm that typically produces longer response times and higher error rates for different magnitudes that are closer together compared to farther apart (i.e., a same-different distance effect). Twenty-four high school-aged adolescents completed three same-different tasks using numbers-only, literal symbols, and both numbers and literal symbols. All three symbolic formats produced a same-difference distance effect, suggesting that both real and artificial symbols can access mental representations of magnitude. However, there was longer response time to process literal symbols compared to artificial symbols, which suggests a cognitive processing cost associated with literal symbols that may reflect interference with fluent mental representations related to literacy. Further, while there was a moderate positive correlation for reaction time between numbers-only and artificial symbol distance effects, reaction times in the literal symbols distance effect did not correlate with reaction times in the other conditions. Taken together, the results of the present study suggest that different cognitive mechanisms may support literal symbol processing in a mathematics context.

Session 5 504
2 September 2017 14:45 - 16:15
Main Building A - A07
Single Paper
Learning and Special Education, Motivational, Social and Affective Processes

Paper Presentation: Special Education

Keywords: Assessment methods and tools, At-risk students, Attitudes and beliefs, Economics of education, Emotion and affect, Learning and developmental difficulties, Learning disabilities, Mathematics, Play therapeutics, Querrai’s methods, School effectiveness, Special education
Interest group: SIG 15 - Special Educational Needs
Chairperson: Mareen Luebke, Zurich University of Applied Sciences (ZHAW), Germany

Unemployment among individuals with learning disabilities: childhood predictors and adult outcomes

Keywords: At-risk students, Economics of education, Learning disabilities, Special education
Presenting Author: Anna-Kajsa Eloranta, Nilo Mäki Institute, Finland
Co-Author: Visa Närhi, University of Jyväskylä, Finland
Co-Author: Timo Ahonen, University of Jyväskylä, Finland
Co-Author: Elisa Korhonen, Nilo Mäki Institute, Finland
Co-Author: Tuula Aro, University of Jyväskylä, Finland

Learning achievement, educational performance, learning disabilities, low education (e.g., Hakkarainen et al., 2016), and are hence a risk for unemployment and social marginalization (e.g., Myrskylä, 2012) however, research on long-term outcomes of LDs beyond early adulthood is scarce. In the present follow up study we aimed to better understand the implications of LDs on individual wellbeing and society by examining unemployment of adults with childhood LDs. Four subgroups (reading disability (RD), mathematical disability (MD), reading and mathematical disability (RD + MD), and mild LDs) were studied. We analyzed 1) differences in unemployment among 509 individuals with different LDs and their 2620 controls, and 2) childhood predictors of long unemployment among individuals with LDs. Individuals with LDs had been unemployed significantly longer (M = 358 base unemployment allowance (UA) days) than their controls (M = 275 days). The RD + MD and the MD group had received more UA than other groups (M = 397 days and 381 days, respectively). Moreover, the proportion of individuals having received UA for more than one year (258 days) was significantly higher among the LD group (28%) than among controls (18%), especially among the RD + MD (33%) and the MD groups (31%). Mathematical disability and mother’s educational level were the only significant childhood predictors of receiving UA for more than a year. Results suggest that LDs have individual and societal implications on adulthood. Individuals with LDs need more efficient, long-term educational support, especially those with mathematical difficulties.

Attitudes of students with learning disabilities to teacher assistance in learning and task solving

Keywords: Attitudes and beliefs, Learning disabilities, Quantitative methods, Special education

Presenting Author: Títoor Vídkovitch, University of Szeged, Hungary
Co-Author: Erika Kőböl, University of Szeged, Hungary

This research investigated the attitudes of students with cognitive disabilities to three types of assistance in learning and task solving, and the correlations between their attitudes and their results on a reading comprehension test. We hypothesized that the achievements of students can be influenced by the appropriate form of teacher assistance.

For the assessment of the attitude, a questionnaire was developed that contained statements representing three situations and three assistance conditions: (1) no assistance, (2) verbal instruction, and (3) verbal instruction with an illustrative example. Students’ attitudes to school learning and to social situations related to learning were also assessed.

For the assessment of reading comprehension, three equivalent tests were developed. These tests were administered with the three different conditions of teacher assistance. Data were collected in special schools, and the sample comprised altogether 208 students (C2D to B5th graders).

Analyses of correlations showed that the attitudes to the assistance conditions correlate with the attitudes to school learning and to social situations. The attitudes to the first condition of assistance do not depend on age. The second and third conditions of assistance were less popular among the 7-8th graders than among the other students. Similarly, attitudes to school learning and to social situations were also weaker in the sub-sample of 7-8th graders.

Students performed better under both conditions of active teacher assistance than without assistance. However, significant negative correlations were found between attitudes and reading comprehension achievements. Positive attitudes seem to show that students really need teacher assistance.

Validating a math anxiety scale for adolescent students: A confirmatory factor analysis approach

Keywords: Assessment methods and tools, Emotion and affect, Mathematics, Psychometrics

Presenting Author: Johan Korhonen, Abo Akademi University, Finland
Co-Author: Pasi Rääsänen, Nilo Mäki Institute, Finland
Co-Author: Karin Linnarmäki, Abo Akademi University, Finland

This paper reports a cross-sectional two cohort study on math anxiety in adolescent students. The aim of the study was to validate the math anxiety scale for adolescents (MASA) with a sample of grade seven and grade nine students. Construct validity was assessed with confirmatory factor analysis and item properties where examined with Rasch modeling. Furthermore, convergent and discriminant validity of the measure was investigated. The literature supports a multidimensional conceptualization of math anxiety but the operationalization of these dimensions vary across studies. Overall in anxiety research, two prominent dimensions are often used to conceptualize anxiety; state (emotion) and trait (worry) anxiety. Accordingly, this conceptualization was used as a starting point when developing the current scale. The preliminary confirmatory factor analyses supported the a priori two-factor structure of the MASA and correlational analyses supported the convergent and divergent validity of the measure.

Practice and effects of inclusive education – Results from a Swiss national empirical study.

Keywords: Learning and developmental difficulties, Learning disabilities, School effectiveness, Special education

Presenting Author: Reto Luther, Zurich University of Teacher Education, Switzerland
Co-Author: Andre Kurt, Zurich University of Teacher Education, Switzerland

During the last years, the school systems in Switzerland are developing from strongly separated models of special needs education (special schools and special classes) into inclusive education (inclusive support for pupils with special educational needs in mainstream schools). In this situation, a lack of knowledge is stated about the ways and methods of inclusive support in practice and their effects. The study presented in this paper is funded by the Swiss National Science Foundation and analyzed the realization of inclusive education in Switzerland on a national sample of Teachers and Professionals for special needs education (N=3669) in 208 schools. The study conducted a multi-method, longitudinal design (from 2014 to 2016) with a combination of quantitative and qualitative research methods, ranging from standardized school performance tests (languages and mathematics) to questionnaires, interviews and content based document analysis. The findings of the study show that important factors for effective realization of inclusive support and show ways for further development of practice for individual educational planning and support for children with special educational needs in inclusive schools.

Session 5 S 505

2 September 2017 14:45 - 16:15
Pinn 3B - B1100
Single Paper
Motivational, Social and Affective Processes

Paper Presentation: Motivation and Achievement - B
Keywords: Achievement, Educational Psychology, Experimental studies, Motivation, Self-efficacy, Self-regulation, Social aspects of learning and teaching, Student learning
Interest group: SIG 08 - Motivation and Emotion
Chairperson: Ulrich Ludewig, LEAD Graduate School, Germany

Longitudinal relations between school-related basic need support and academic self-efficacy

Keywords: Achievement, Educational Psychology, Motivation, Social aspects of learning and teaching

Presenting Author: Age Diseth, University of Bergen, Norway

Need support, as described within self-determination theory (SDT), and self-efficacy focus on the role of personal autonomy and control in motivation. This study investigated the longitudinal relations between self-efficacy for academic achievement and school-related basic need support from parents and teachers measured at three waves: points at an interval of two years (T1 at 6th grade, T2 at 8th grade, and T3 at 10th grade respectively). A main purpose was to investigate temporal causal relations between these variables, thus providing support for causality that has not been sustained in previous cross sectional research on these variables. A longitudinal path analysis (cross lagged design) showed that teacher support at T1 (6th grade) predicted self-efficacy at T2 (8th grade), and teacher support T2 (10th grade) predicted self-efficacy at T3 (10th grade). Hence, the results indicated that teacher support of basic needs is an independent source of subsequent self-efficacy, also when controlling for the effects of parent support and prior levels of self-efficacy. The relatively long time interval of two years provided a particularly strong test of these longitudinal relations, and support for the theoretical assumption that basic need support is an important source of motivation among students.

Individual and compositional effects of achievement goals, self-regulation and student achievement

Keywords: Achievement, Motivation, Self-regulation, Student learning

Presenting Author: Melvin Chan, National Institute of Education, Singapore

This study examines individual and class relations of academic achievement and learning-related outcomes. The primary research questions are: i) What impact do different aspects of motivational goal orientations have on students' self-regulatory dispositions and academic performance, taking into account the social and academic background of students? ii) To what extent do individual and compositional effects of social and academic background influence student motivation, self-regulatory dispositions and academic performance? Based on a large-scale study of grade 10 students in Singapore, findings reveal that substantial compositional effects on both performance goals and academic achievement. Prominent goals (mastery and performance) produced positive effects on self-regulation and achievement, while performance avoidant goals negatively predicted achievement. Implications of findings will be discussed, particularly, the importance of mastery learning.

Promoting Long-term Interest with a Utility-Value Intervention

Keywords: Achievement, Educational Psychology, Experimental studies, Motivation

Presenting Author: Judith Harackiewicz, University of Wisconsin-Madison, United States
Co-Author: Cameron Necki, University of Wisconsin-Madison, United States
Co-Author: Stacy prinsinki, University of Wisconsin-Madison, United States

We tested the long-term effects of a utility-value intervention that had proven effective in promoting academic performance for underrepresented students in a college biology course (Harackiewicz et al., 2016). We followed 1046 biology students over a three-year period and found that baseline interest, course grades, and perceived values were all important predictors of whether students continued into the second course of the Biology sequence, and whether they majored in STEM disciplines three years later, offering strong support for the multiplicative effects of expectancies and values in predicting academic choices.
Interventions that promote perceived values and course performance in the short term can have long-term effects on important academic outcomes.

Correlates of students’ self-evaluation bias of competence according to their level of achievement

Keywords: Achievement, Educational Psychology, Motivation, Self-efficacy
Presenting Author: Ludvine JAMAIN, Université Grenoble Alpes, France
Co-Author: Thérese Bouffard, Université du Québec à Montréal, Canada
Co-Author: Pascal Fani, Université Grenoble Alpes, France

Whatever their competence, students may erroneously estimate it and present either a positive or a negative bias of self-evaluation. The aim of this study was to examine if students’ self-evaluation bias correlates differently to their motivation and their perception of parental feedback toward their school achievement. Participants were fourth graders and were examined with regard to two school subjects: Language arts (n=165) and Mathematics (n=168). Results showed that whatever their high or low level of achievement, students with a positive bias were generally at advantage over those with a negative bias which regard to their learning motivation in both Language arts and Mathematics and their perception of parental feedback. Cognitive advantage of students with higher competence seems to be annihilated when they underestimate their competence. Conversely, an overestimation of competence seems to protect students with a low level of achievement. Findings of this study thus confirmed the conclusions of previous research regarding to the deleterious correlates of the underestimation of competence and adaptive correlates of overestimation of competence.

Session S 506
2 September 2017 14:45 - 16:15
Vita - 113
Single Paper
Lifelong Learning

Paper Presentation: Lifelong Learning

Keywords: Citizenship education, Informal learning, Lifelong learning, Motivation, Professions and applied sciences, Qualitative methods, Science education, Vocational education, Workplace learning
Interest group: SIS 14 - Learning and Professional Development
Chairperson: Beatriz Vargas Dorneles, Brazil

Seeing the invisible: editing wikipedia for the public good

Keywords: Citizenship education, Informal learning, Professions and applied sciences, Lifelong learning
Presenting Author: Allison Littlejohn, Open University, United Kingdom
Co-Author: Nina Hood, University of Auckland, Faculty of Education, New Zealand
Co-Author: Martin Rehm, University of Duisburg-Essen, Germany
Co-Author: Bart Rienties, Open University UK, United Kingdom

This presentation illustrates the unseen work of online editors as they develop strategies to create and share knowledge in Wikipedia's tools. Open opportunities for social engagement with the ways knowledge is developed and circulated. New forms of knowledge production and distribution enable people to take on new responsibilities for knowledge, raising questions about knowledge strategies, the ways knowledge is generated and who contributes. Trace data from Wikipedia was analysed through Social Network Analysis and qualitative, interview data was investigated through thematic analysis. The findings indicate that work and learning is not only shaped by technical and content knowledge, but is influenced by the emerging roles and responsibilities associated with knowledge creation. These findings have important implications for the way society views the impact of learning activities in digital settings on the public good.

Entrepreneurial Competencies of Established Women Entrepreneurs in Germany and Ireland

Keywords: Professions and applied sciences, Vocational education, Workplace learning, Lifelong learning
Presenting Author: Kaethe Schneider, Friedrich Schiller University Jena, Germany

While there is a growing body of literature on the entrepreneurial competencies of male entrepreneurs, it seems that there is still considerable uncertainty concerning competencies as underlying set of characteristics of female entrepreneurs that result in effective performance. The current study extends previous research to examine the entrepreneurial competencies of established women entrepreneurs. The results reveal that the entrepreneurial competency predicted by a set of managerial skills, entrepreneurial orientations, entrepreneurial self-efficacy and the founder and innovator identity has strong impact on entrepreneurial success. Besides of business-related factors and financial performance the individual fulfillment and the social contribution predict the entrepreneurial success.

Determinants of a corporate culture for lifelong learning development

Keywords: Informal learning, Qualitative methods, Workplace learning, Lifelong learning
Presenting Author: Birgit Gößling, University of Osnabrück, Germany

Even though it is generally accepted that learning and development is necessary during the whole course of working life, human resource development and corporate training efforts are usually still targeted at younger employees. This neglects the added value of a workforce with a broad demographic structure and the learning potential of experienced and aging employees.

In our study this is seen as a call for a more individualized approach to lifelong competence development. By interviewing 28 older employees, 3 HR representatives and 8 managers, we explored (a) which personal and corporate factors influence learning participation and readiness to run through a competence assessment process from the three perspectives, (b) which strategic and cultural changes are necessary and (c) to which degree are the internal stakeholders willing to change corporate culture and strategies.

The results indicate that corporate views and stereotypes of aging employees are at least partially internalized even if employees themselves recognize a mismatch between the stereotype and their own experience. Readiness to actively participate in learning activities also depends on professional identification and job satisfaction, which in turn depends on personal (e.g. family situation) and corporate factors (e.g. shown appreciation). When competence development is managed, learning opportunities are promoted and competence assessment is accompanied by guidance, readiness of older employees to participate is higher. The willingness of internal stakeholders for change also depends on the wider institutional background (e.g. legal conditions of acquiring qualifications) and financial flexibility (e.g. for personal guidelines).

Workplace learning motivation: pointing out the conceptual and measurement issues

Keywords: Motivation, Science education, Workplace learning, Lifelong learning
Presenting Author: Nanke Kochan, Université catholique de Louvain (UCL), Belgium
Co-Author: Isabela Raemdonck, Université Catholique de Louvain (UCL), Belgium
Co-Author: Mariane Freray, Université catholique de Louvain (UCL), Belgium

Workplace learning motivation becomes an increasingly important topic given the necessity for workers to involve in continuous learning. The present literature review focuses on the way workplace learning motivation is conceptualized and measured. Inclusion criteria captured empirical studies on training and learning motivation in the context of work. A total of 34 articles were included and examined through different aspects. First, the conceptualization of workplace learning motivation was analyzed. We also focused on the operationalization of the concept and its differentiation from other related terms. Results revealed that concepts of motivation and workplace learning were poorly developed in the conceptualization and operationalization of training and learning motivation. Moreover, there was no evidence for a clear distinction between pre-training, training and learning motivation. The article discusses results and brings suggestions that might reduce the revealed issues.

Session S 507
2 September 2017 14:45 - 16:15
Prix B - BS1/07
Single Paper
Assessment and Evaluation, Developmental Aspects of Instruction, Learning and Instructional Technology

Paper Presentation: Educational Effectiveness and Teaching

Keywords: Instructional design, Learning and developmental difficulties, Literacy, Mathematics, Misconceptions, Primary education, Reading comprehension, Secondary data analysis, Student learning, Teacher Effectiveness, Teacher Professional Development, Teaching / instruction, Writing / Literacy
Interest group: SIS 18 - Educational Effectiveness
Chairperson: Floris van Blankenstein, ICLOD-Leiden University Graduate School of Teaching, Netherlands

Effects of Meaning-Focused Instruction on Reading Comprehension in Grade 1 in Estonia and Finland

Keywords: Literacy, Primary education, Reading comprehension, Teaching / instruction
Presenting Author: Jonni Ruotsalainen, University of Jyväskylä, Finland
Co-Author: Priit Soodla, Tallinn University, Estonia
Children differ in their pre-skills in literacy reading which sets a challenge for reading instruction at school entry. Practices in early primary years’ literacy instruction can be divided into code-focused and meaning-focused activities (e.g. Connor et al., 2009) which need to be balanced to match children’s reading skill development. In the present study audiotapes from grade 1 literacy lessons in Estonia and Finland were coded with respect to amount of meaning-focused (MF) instruction during the lessons. The aim was to examine the effects of the amount of MF instruction on children’s reading comprehension when children’s concurrent reading fluency (RF) was taken into account. In Estonia children differed in their reading comprehension based on their reading fluency. In Finland the least fluent readers had the lowest reading comprehension scores whereas the average readers had similar reading comprehension results as the most fluent readers. Reading comprehension scores were especially poor among Finnish children in the low-RF group who attended high-MF lessons, and they benefitted most if they attended average-MF lessons. Increases in MF instruction had a positive effect on children’s reading comprehension among Finnish children who belonged to the average- or high-RF group. No similar effects were found for the Estonian children. The findings suggest that average rather than high amount of meaning-focused instruction contributes to better reading comprehension skills among children in Grade 1.

Utilizing Three Different Lenses to Study Teaching Quality: Do They Lead to Similar Conclusions?

Keywords: Mathematics, Primary education, Teacher Effectiveness, Teacher Professional Development

Presenting Author: Eva Ottoson-Kasapi, University of Cyprus, Cyprus

Co-Author: Charalampos Charalambous, University of Cyprus, Cyprus

A plethora of research findings during the last four decades attests to the critical role that teachers have for student learning. Not coincidentally then, recent years have seen a rapidly growing number of observation frameworks and instruments, aiming to capture teaching quality and connect it to what students gain from instruction. Despite the systematic scholarly work in this area, it seems that scholars have often worked in silos, focusing on certain instructional aspects and leaving others out—thus, often producing partial delineations of teaching quality. To address this gap, in this study we simultaneously use three different frameworks and observation instruments: one tapping into generic teaching aspects, a second capturing content-specific teaching aspects in Mathematics—the subject matter of interest—and a third one focusing on cognitive demands and exploring the unfolding of tasks in teachers’ lessons. Utilizing these three frameworks and instruments as lenses, we analyzed 15 videotaped lessons, given by a convenience sample of five elementary school teachers (each giving three lessons). Each lesson was analyzed by two independent coders leading to three classifications of the teachers, one for each lens under consideration. By comparing and contrasting these classifications, we noted both notable convergences and divergences of the teaching quality in each teacher’s lessons. This, in turn, suggested that the use of only one instrument could lead to a fragmented picture of teaching quality. In discussing our findings, we consider their implications for teacher summative and formative evaluation purposes.

Dealing with mistakes in class – (Interactive) effects on students’ achievement and motivation

Keywords: Misconceptions, Secondary data analysis, Student learning, Teaching / Instruction

Presenting Author: Julia Kätter, German Institute for International Educational Research, Germany

Co-Author: Susanne Küger, The German Institute for International Educational Research (DIPF), Germany

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Making mistakes is a regular phenomenon in every classroom setting. Still, there is only little research about how teachers and students deal with mistakes and the consequences for students’ cognitive and motivational development. According to social-constructivist learning theories, a supportive way of dealing with students’ mistakes enhances learning processes by providing information about misconceptions and giving students the opportunity to learn from (their) mistakes (Heiselt, 1997; Vosniadou & Brewer, 1987). This study analyses how teachers’ and students’ attitudes and reactions towards mistakes affect two most relevant outcomes of education: student learning and motivation. A second aim is to explore whether the heterogeneity of the student body in the classroom a) influences the teachers and students dealing with mistakes and b) moderates the effects of dealing with mistakes on students’ achievement and motivation. The study uses data from the representative German DESI study (DESI-Konsortium, 2008) that assessed student development in English as a foreign language as well as reading, whereby results show no interaction effects between the heterogeneity of students and different aspects of dealing with mistakes. These results are particularly important in light of the instructional effectiveness research and provide further empirical evidence on the topic of heterogeneity in classrooms.

Effectiveness of Feedback in a Repeated Spelling Training

Keywords: Instructional design, Learning and developmental difficulties, Primary education, Writing / Literacy

Presenting Author: Sophie Gruhn, Radboud University Nijmegen, Behavioural Science Institute, Netherlands

Co-Author: Elanie Siegers, Radboud University/ University of Twente, Netherlands

Co-Author: Ludo Verhoeven, Radboud Universiteit Nijmegen, Netherlands

Effectiveness of feedback on strengthening lexical representations was investigated in a computerized spelling training by contrasting two different feedback conditions with no a feedback condition. Ninety-one Dutch fifth and sixth graders practiced spelling of 40 multisyllabic words with irregular grapheme-phoneme correspondence in five training sessions within maximally two weeks. In the two feedback conditions, participants were asked to write the word again, after they have received the correct word form. In the first condition visual dictation (N = 29), their next spelling attempt was required from memory, whereas participants in the second condition typing over (N = 30) were asked to copy the word. A control group (N = 31) did only receive information about the correctness of their writing attempt. With repeated measures ANOVA’s, higher gains in spelling accuracy over time were observed for participants in both feedback conditions compared to participants in the no feedback condition. Already after one training session, feedback in form of visual dictation led to higher gains in spelling accuracy than feedback in form of typing over. Participants in the typing over condition caught up with the visual dictation condition only at the fourth training session. The repeated spelling training generally improved spelling speed of trained words. Transfer to spelling speed and accuracy of untrained words and transfer to reading speed of words trained and not trained in spelling was observed. Repeated spelling can be a relevant method to improve decoding skills and feedback seems to increase the efficiency of spelling instruction.