Conference Program

Wednesday 18/9/2024

WEDNESDAY 9:00-10:30, ROOM 1.403

Registration, Meet & Greet

WEDNESDAY 10:45-12:15, REUTERSAAL

SIG 20 Keynote

The Role of Adaptive Prompts and Hints in Guiding Simulation-Based Scientific Inquiry Learning
John Nesbit (Simon Fraser University, Canada)

Although there is strong evidence that learners with low prior knowledge need substantial guidance during the inquiry process, more research is required to determine the characteristics of the guidance that should be provided during scientific inquiry. Is it best to guide learners with a limited suite of fundamental scientific inquiry prompts that are given as needed? Or should we provide more fulsome guidance that, in addition to the prompts, follows the learner at every step to also provide hints and confirmatory feedback? As part of an experiment that had learners manipulate a DC electricity simulation to develop their qualitative understanding of Ohm's and Kirchhoff's laws, my research group developed 38 scripted prompts along with the specific conditions under which each prompt would be given by a human tutor. The participants were randomly assigned to receive either minimal guidance with no adaptive prompts (Control group), scripted adaptive prompts (Prompt group), or the same scripted adaptive prompts with the addition of hints and confirmatory feedback (PromptPlus group). Learning outcomes were assessed by a posttest and the behaviors of tutors and learners were coded from videos made of each session. The purpose of the research is to develop tutoring principles and heuristics to inform the development of AI-based tutoring systems for

simulation-based inquiry learning. Beyond the effects of the experimental interventions, the timing, frequency, and qualities of the individual prompts and hints – and the learners' responses to them – can tell us much about how to design within-task guidance for inquiry activities.

WEDNESDAY 13:15 - 14:45

Parallel Slot A

Paper Session A1: Inquiry learning as a response to societal challenges - SIG 20 (Room 1.401)

Dimensions of socially shared learning spaces

Isabel Wullschleger (Humboldt Universität zu Berlin, Germany)

As part of a study (dissertation), the learning and experiential spaces of children in a music education school setting are analysed. It is an empirical, phenomenologically orientated study based on material – observation text (Breidenstein, 2012) and videography (Brinkmann & Rödel, 2018; cf. Knoblauch, 2004, p. 131) – from an ethnographic school study (Breidenstein et al., 2020). The work takes its course through eventful moments between child and learning object, through intensive and sometimes unpleasant phases of confrontation to the discovery of new play and creative spaces and finally finds its way to a learning theory order that takes into account, among other things, social situatedness and aspects of social learning. In the lecture, the socially framed facets of the shared learning space among children will be presented on an empirical basis.Detailed analyses show the extent to which the shared experiential space and what is socially negotiated and experienced are relevant forindividual learning processes. The ways of dealing with discomfort and negative experiences (Benner 2005) are just as much a part of the empirically based results as the (jointly shared) attention, self-perception and social negotiation of challenges in the learning object, which are important for learning processes.

Nanoparticles in food packaging: Exploring the impact of an RRI module in the chemistry classroom

Yiannis Georgiou & Eleni Kyza (Cyprus University of Technology, Cyprus)

Science education is an important dimension of the European Commission's Responsible Research and Innovation (RRI) objectives; however, RRI is not an explicit focus of chemistry teaching and few chemistry teachers have experience in integrating RRI in classroom practice. This study investigated the impact of an RRI module about nanotechnology in food packaging, co-designed by a group of chemistry teachers, leveraging the affordances of the Socio-Scientific Inquiry-Based Learning (SSIBL) pedagogical approach. The module was implemented by the chemistry teachers to their secondary education students (n=109). A pre-post research design revealed an increase of students' conceptual understanding and social accountability (feelings of responsibility and willingness to act), as well as a notable change of students' attitudes towards nanotechnology. Students' conceptual learning gains were also positively related to perceived nanotechnology risks and students' feelings of responsibility. Overall, the findings of this study provide empirical substantiation to the multi-dimensional learning outcomes that pedagogically-oriented RRI modules may have, especially in support of students' responsible citizenship.

Investigating intergenerational learning experiences within a Hungarian higher education context

Emese Schiller, Helga Dorner & Klára Antesberger (Eötvös Loránd University, Hungary)

Intergenerational (IG) collaboration initiatives aim to foster acceptance among diverse age groups (Kaplan et al., 2017) and promote active aging (Aláez et al., 2022). Higher education institutions play a pivotal role in facilitating these initiatives (Corrigan et al., 2013) also to support IG dialogue and inquiry. This study investigates IG learning experiences within a higher education context. Conducted in December 2022 at a Hungarian tertiary institution, this research was undertaken in an international consortium aimed at enhancing integrated aging. This exploratory study aims to explore (1) how participants define their learning experience in the IG programme; (2) different types of interactions between partakers; (3) potential differences found in reflections based on age. Participants comprised undergraduate student (n=6) and older volunteers (n=8) engaged in the IG learning project. Focus group interviews were conducted for both age groups, and discourse analysis (Krzyzanowksi, 2015) was employed to synthesize the data, with a keen focus on interaction dynamics. The analysis reveals distinct differences between the two age groups, as well as commonalities and divergences within each group. Notably, both age cohorts demonstrated improvements in cooperativeness and willingness to compromise, with potential applications beyond the project context, especially highlighted by younger participants. Representatives from both groups acknowledged challenges related to communication difficulties. Some participants attributed these challenges to their attitudes toward IG learning, while others emphasized age differences. Instructor facilitation emerged as a crucial supportive factor throughout the study.

Open schooling projects and inquiry-based learning: Monitoring and evaluating stakeholder engagement

Tasos Hovardas, Yvoni Pavlou, Marilena Savva, Georgia Kouti, Marios Papaevripidou & Zacharias Zacharia (University of Cyprus, Cyprus)

The engagement of schools in open schooling projects has been increasing over the last decade and has been widely supported by policy makers. We believe that inquiry-based learning (IBL) can be expanded building on open schooling because both approaches share core perspectives. In this paper, we will present a participatory monitoring and evaluation approach through the utilization of an adapted Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis that replies on stakeholder input to monitor aspects, which can facilitate or hinder the implementation of an open schooling project. Specifically, we will concentrate on major findings from the Schools as Living Labs (SALL) project, based on coding analysis of semi-structured interviews with teachers, school principals and other stakeholders engaged in projects with 15 different schools across 8 European countries. Teachers and stakeholders in the first round shared more of less analogous frequencies across several codes. Principals were distinguished in the first round by their concerns related to the COVID-19 pandemic and to further concerns they had for whether stakeholder collaboration would work or not. In the second round of interviews, other stakeholder groups participatingin open schooling projects acknowledged the strengths of these projects for promoting content knowledge. Teachers in the second round saw merit in stakeholder networks established through open schooling projects but they were also quite concerned about the methodology of open schooling, with which their peers remained quite unfamiliar, especially in the iterations between brainstorming, co-creation and delivering prototypes. The latter finding has quite a few implications for delving deeper with teachers in training

sessions and professional development programmes to consolidate inquiry-based learning aspects and the flow within and across inquiry cycles.

Paper Session A2: Professional dialog and discourse - SIG 26 (Room 1.406)

Tensions in research-practice partnerships: How can they inform future research?

Ingvill Rasmussen & Anja Amundrud (University of Oslo, Norway)

This empirical study emphasizes the significance of understanding the dynamics of professional development (PD) initiatives, with a particular focus on the collaboration between teachers and researchers within the framework of design-based research (DBR). Highlighting the importance of evidence from diverse teacher training programs, this research investigates a collaborative effort aimed at professional development of dialogic teaching through a teacher-researcher partnership. The utilization of Activity Theory (AT) is emphasized to identify and analyze potential tensions within teacher-researcher collaborations.The research methodology comprises semi-structured interviews with teachers from Norway and the UK, exploring their experiences in a yearlong research project adopting a DBR approach to teacher-researcher partnerships. This study offers insights into the teachers' accounts of adopting new pedagogical tools and strategies, particularly the "Thinking Together" approach and the digital tool Talkwall, aimed at enhancing dialogic teaching.Findings from the study illustrate tensions between established practices and the integration of educational resources fostering a dialogic pedagogy, including digital technology. Teachers' reflections also indicate tensions regarding their roles as partners within the PD initiative.The discussion highlights the methodological challenges and the complex interplay of different perspectives in PD initiatives and concludes by emphasizing the importance of recognizing and addressing the subtle yet impactful tensions that arise in teacher-researcher partnership initiatives.

Paradoxes of professional change: re-framing professional dialogues to break away from stabilisation

Riikka Hofmann (University of Cambridge, United Kingdom)

Conversations with colleagues are considered to afford a significant opportunity for practitioners to learn and change their professional practice. At the same time, research has shown that many professional conversations in institutional settings, such as schools and healthcare settings, tend towards identifying quick solutions to problems and stabilisation of existing practices. Even when practitioners experience challenges in their current work and are motivated to learn, institutional practices are known to be highly stable and change often remains elusive. This paper focuses on investigating how professional dialogues in institutional settings in school and healthcare could be re-framed to support practitioners to effect change towardsthings that matter to them. To develop further theoretical insights into this puzzle, this study focuses on analysing and conceptualising the nature of the barriers to effective professional dialogues and sustained professional change, and the mechanisms through which they work to hinder the development of new forms of practice. Going beyond investigating the linguistic features of workplace conversations, it considers who should participate in professional dialogues and what should be dialogically examined in those. Using a novel analytical approach, the Difference-within-Similarity approach, this study re-analyses findings from five studies on professional learning in educational and healthcare settings through a

systematic comparative approach, framed by sociocultural and activity-theoretical models of change. It finds that three paradoxes of professional learning regularly stop professionals from enacting change in their practice even after successful professional learning interventions, and terms these the Paradox of Agency; the Paradox of Other People and the Paradox of Risk. The nature of these paradoxes and their implications to effective professional dialogues and professional learning theory are discussed.

Preparing for Professional Discourse Around Video Cases: In-Service vs. Pre-Service Teachers

Roni Jutkowitz, Avraham Merzel & Christa Asterhan (The Hebrew University of Jerusalem, Israel)

Collaborative analysis of classroom videos can support meaningful and productive dialogue around practice and pedagogy. Not every discussion type, even around rich representations of practice such as video recordings, is considered equally effective.Scholars of discussion-based pedagogical development and video-based pedagogical development have described what is considered productive pedagogical discourse among teachers. This study explores teachers' focus while watching a colleague's video and preparing for the conversation with him\her. We investigated two groups of teachers - pre-service and in-service - using a questionnaire based on video excerpts of classroom teaching. The participants included 44 in-service and 50 pre-service mathand physics teachers who watched a classroom video excerpt and then were asked to comment about it. We sorted the answers by three aspects: the focus of interest (teacher, student, interaction, content), the knowledge they demonstrated (Pedagogical Content Knowledge, Pedagogical Knowledge, Content Knowledge), and whether the statement was evaluative or inquiry-oriented. Preliminary findings show distinctions in focus between in-service and pre-service teachers, with the in-service demonstratinga broader range of pedagogical content knowledge and content knowledge references. Both in-service and pre-service focus mainly on the teacher, less on the student, and rarely mention disciplinary content. This study provides insight into the pre-conversation stages that can help to promote productive dialogue. In addition, it helps in comprehension of teacher noticing while watching a video from the class among varying levels of experience, and so, in better supporting teachers peer learning.

Symposium A: Dialogic Communities of Professional Inquiry: Increasing Opportunities for Equitable Participation - SIG 26
(Room 1.301)

Chair: Alison Twiner Hughes Hall, (University of Cambridge, United Kingdom)
Discussant: Mary Catherine O'Connor (Boston University, USA)

Re-Mediating Teacher Learning for Justice-Centered Dialogic Pedagogy

Sherice Clarke & Sushil S (University of California San Diego, USA)

Conceptualizing dialogic pedagogy as potentially powerful anti-racist praxis (Freire, 2005), our work focuses on supporting teacher learning about the ways in which equity and inequity are structured at the micro-level through talk and dialogue in the classroom. We report on the first iteration of a design-based Research-Practice Partnership focused on a PD intervention to foster the development of teachers' facilitation of dialogic pedagogy in the service of equity and anti-racist instructionalpractices. Our work is guided by the premise that antiracism, as a commitment and a habit of mind, is a

developmental (and non-linear) process. Through teacher professional development comprised of one-on-one coaching and year-long collaborative professional learning communities, we engaged teachers to notice, reflect and reframe instructional decisions to honor and leverage the brilliance of minoritized children and youth (who have been historically and contemporarily underserved in US publicschools). Using interviews, PLCs and coaching sessions, we examined the development of teachers' racial meanings across their life course and its relation to perceptions of the manifestations of race and racism through macro, meso, and micro educational processes, and noticing these processes in their dialogic pedagogy lessons. The findings point to the ways in which early life experiences shaped their racial meanings, particularly the way others positioned them within the racial hierarchy, andthe way others were positioned. The teachers, however differed in their analysis of the manifestations of these meanings in schooling processes more generally, and with respect to critical analyses of their own instructional practice. The findings point to design implications for PD that can better visualize equity in the dialogic pedagogy to scaffold teachers' ways of seeing equity in their facilitation of discussions. In addition, there is a need to better scaffold teacher agency to enable teachers to recognize their power to engage, micro-interactionally, in justice work.

Developing Dialogic Peer Review to Diversify Voices in the Education-Practice Knowledge Base

Alison Twiner, Sara Hennessy, Patrick Carmichael, & Pete Dudley (University of Cambridge, United Kingdom)

Practitioner research is an established field, for instance through case study, action research and lesson study. Many educators also undertake professional development, often conducting practice-based inquiries. Whilst there are exceptions (see Posch, 2003), insights and changes to practice from this work frequently remain localised, and the research conducted may not meet criteria for publication in academic journals. This gap between educators inquiring into their practice - which many do - and having a legitimate voice in the wider education-practice knowledge base - which is rare - is where our work seeks to impact. There is a wider but connected problem: of peer review and quality assuring published research. Peer review is a common practice in academic journals, largely considered a requirement for academic researcher status. Despite this there exists little training supporting reviewers in consistently implementing quality criteria, nor for authors to use review feedback as a supportive mechanism toward publication (McLaughlin et al., 2015). For many, therefore, invisible peer review criteria and rejection without reason present a barrier to engagement, and to having a voice about what works in education. For practitionerswishing to conduct and share findings of their practice-based inquiries, there needs to be transparent and constructive exchange around visible and achievable criteria; and reviewers can benefit from training to offer dialogic, respectful and effective feedback that facilitates publication.In this presentation we share findings from developing an online teacher research-exchange, as a mechanism to support the conduct and publishing of ethically-sound and methodologically-rigorous practitioner researquality practitioner research and diversifying the voices and contexts represented in the education knowledge base.

Equitable Access to MOOCs for Teacher Professional Development in Educational Dialogue: A Case Study

Meaghan Brugha (University of Cambridge, United Kingdom)

This case study explores the equity of enrolment and participation in online teacher professional development (TPD) designed for educators developing their dialogic practices. This builds on data from a doctoral study, which sought to better understand

the intersection of technology and dialogic pedagogy to enhance TPD and assist in the development of communities of practice in which practitioners reflect together, support one another, and share dialogic practice. As part of this research, threeMassive Open Online Courses (MOOCs) on educational dialogue were developed for educators globally and trialled. Design principles were formed, tested and reiterated. Within these design principles, equitable access continued to emerge as a criticalconsideration regarding both the course content and structure; i.e. who is able to access and meaningfully engage in the materials and who is not. Using case study methodology (Hamilton, 2011), this paper asks what affordances MOOCs can provide to teachers globally in accessing an online forum of educators and what the barriers are to participation. Data from the full number of participants who submitted pre- (n=275) and post-course (n=78) questionnaires across the three course trials were analysed. Following this analysis, questionnaires and interviews were conducted with five case study participants from Iran and Sierra Leone who were willing to share detailed reflections regarding their participation. Five core themes were identified through inductive thematic analysis of all data, each of which can be leveraged to improve equitable access and participation in similar online TPD environments: (i) inclusion of learner voices in platform design, facilitation and evaluation; (ii) infrastrucdes with recommendations for future research.

Parallel Slot B

Paper Session B1: Students navigating controversial topics - SIG 26 (Room 1.401)

Students' understanding of disagreement in science and history-related controversies

Stephan Venmans, Saskia Arbons, Geerte Savenije, Tessa van Schijndel, Jaap Schuitema, & Carla Van Boxtel (University of Amsterdam, Netherlands)

Teaching about controversial issues is an important but challenging task. One such challenge is how to promote students to explore and critically examine different perspectives and arguments that people put forward in discussions. To do this, it is important that students understand what people with different perspectives actually disagree upon. People can, for example, disagree about different types of knowledge claims (e.g. eating meat is unhealthy; the VOC exploited the Bandanese rather thantraded with them) and about (the priority of) values (e.g. national security outweighs personal privacy). This study examined 15-year-old students' understanding of disagreement in concrete discussions about controversial issues related to science and history. First, a measurement instrument to assess students' understanding of disagreement was iteratively developed using theory on teaching about controversies, think-aloud sessions with students (N=21) and interviews with controversy-oriented educational specialists (N=15). Second, the finalized instrument was administered at several different secondary schools in the Netherlands, measuring students' understanding of disagreements (N=685). The instrument features vignetted discussions comprising different perspectives on current history and science-based controversies, such as the reconsiderations on statues of national heroes, the Dutch government's response to the UN Srebrenica mission, vegetarian-only school canteens, and the inclusion of transwomen in competitive sports. The instrument and the analysis focused on students' ability to a) discern knowledge-based and value-based claims; b) identify the values in value-based claims; c) identify knowledge-based and value-based claims they do experience difficulty in pinpointing and describing the values in question. We will

discuss the quality of the instrument and implications for teaching about controversial issues in science and history.

Students' use of generative AI in classroom discussions of social issues

Thomas Nygren & Evgeniia Efimova (Uppsala University, Sweden)

This study explores students' use of generative artificial intelligence (AI) as a source in classroom discussions of controversial issues. Two lessons were designed based on discussions with teachers and researchers and performed by three social studies teachers in three classes in one upper secondary school in Sweden. We identify "social corroboration" as a complementary approach to individual fact-checking when the students evaluate AI-generated information. We also identify two views of AI among the students: optimistic and cautious. Optimistic students viewed AI as a 'better than human' tool, allowing them to get the right answer without bias quickly. Cautious students were more aware of its limitations. Our analysis reveals that students' argumentation can be influenced by their interactions with AI, leading towards viewpoints that are US-centric and conventional. This shift in argumentation aligns with the inherent biases in AI training data, suggesting that the content and perspective provided by AI tools can shape the direction and nature of students' discussions and learning. Our findings demonstrate how students may use AI in dynamic ways to support their understanding, but also how it may be used to just solve problemsquickly - without learning much.

Synthesizing evidence on how undergraduates detect cherry-picked evidence in texts

Toshio Mochizuki (Waseda University, Japan), Clark Chinn (clarkchinn@gmail.com), Rutgers University, USA), Etsuji Yamaguchi (Kobe University, Japan) & Hiroki Oura (Tokyo University of Science, Japan)

Authors of digital documents often intentionally or inadvertently mislead readers by presenting cherry-picked evidence—e.g., a single study supporting a claim while most studies support a different claim. Citizens in this digital society need to be able to recognize when cherry-picking occurs and adjust their interpretations accordingly. One promising strategy to navigate this challenge is to critically scrutinize the evidence presented to support claims. Readers need to be attentive to trying to find out the consensus within larger bodies of evidence, rather than relying solely on isolated studies. Understandably, laypeople may lack the time or expertise to meticulously review and evaluate a multitude of evidential data from numerous scientific studies. However, there may be indicators within digital texts that may suggest evidence has been cherry-picked. The authors have conducted a thorough examination of laypeople's abilities to discern nuances related to cherry-picking evidence across various topics. This paper seeks to consolidate the comprehensive evidence gathered from five studies that the authors have endeavored, thereby offering valuable insights for future endeavors aimed at addressing this issue. The five studies weredesigned to examine laypeople's epistemic vigilance in identifying nuances of cherry-picked evidence under various conditions regarding the number and quality of evidence, and cues of cherry-picking described in the documents.The synthesized findingencapsulates crucial insights from the studies. It underscores the importance of explicitly highlighting possible cherry-picking in science communication to ensure readers can critically evaluate the information presented across various sources. Additionancourages students to seek diverse perspectives and avoid relying solely on information that aligns with their prior beliefs.

Conceptualizing Students' Dispositions toward Uncertainty Navigation in Scientific Argumentation

Ying-Chih Chen, Jongchan Park, Carlos Meza-Torres, Emily Starrett, & Michelle Jordan (Arizona State University, USA)

Scientific argumentation, as an essential practice of science learning, is a dialogic practice permeated with scientific uncertainty. However, how scientific uncertainty is conceptualized remains fuzzy and undefined. This study aims to conceptualizemultiple dimensions of student dispositions of uncertainty navigation in science learning, validate the conceptualized disposition of uncertainty navigation scale, and examine its relationship with epistemic curiosity and academic achievement. The study developed a multi-dimensional scale for uncertainty navigation in science learning, taking into account four constructs of student disposition toward uncertainty navigation: epistemic orientation toward uncertainty, positive and negative affective reactions, self-efficacy, and strategies for uncertainty navigation. Survey data collected from 876 middle school students were used for analyses to investigate the validity evidence of the scale. Exploratory and confirmatory factor analyses supported a five-factor model of uncertainty Navigation. Notably, positive and negative affective reactions to uncertainty are distinct constructs, warranting separate attention rather than a unidimensional approach. Structural equation modeling (SEM) wasemployed to examine the relationship between disposition of uncertainty navigation, curiosity, and learning achievement. The SEM findings highlight that curiosity (e.g., joyful exploration, deprivation sensitivity) is a critical mediator in the positive relationships between three dimensions of uncertainty navigation (e.g., epistemic orientation toward uncertainty, positive affective reactions, negative affective emotions) and learning achievement. Without epistemic curiosity as a mediator, positive and negatively affective reactions toward uncertainty negatively predict student learning achievement. The results demonstrate that students exhibit complex emotions when engaging in an uncertainty-driven learning environment to learn science.

Paper Session B2: Student participation in dialogue and argumentation - SIG 26 (Room 1.406)

Educational regime. Students' perspectives on the (digital) transformation of the university

Isabel Wullschleger (Humboldt Universität zu Berlin, Germany) & Steffen Wittig (Pädagogische Hochschule Freiburg, Germany)

The SARS-Cov2 pandemic posed an extraordinary challenge for students at universities by fundamentally changing traditional ways of learning and interacting. The shift to digital learning environments and the loss of traditional social interaction ledto a re-evaluation of studying, educational experiences, and university teaching itself. In this context, our qualitative-empirical research project investigated how students perceive the change in university learning and educational processes, particularly concerning spatial, temporal, content-related, and communicative aspects. Our research project aimed to gain insights into the subjective experiences and assessments of students through semi-structured interviews. It focused on how studentsposition themselves in the new learning environments that the pandemic has transformed and what impact these changes have on their learning processes.The findings we wish to present show a shift from an externalization of problems to an internalization, with issues such as social isolation and the loss of supportive structures prominent. In particular, digital teaching left a gap in the quality of learning spaces, with students missing essential social and material structures deemed necessary for successful study. The results indicate that the digital

transformation of the higher education system led to students being "thrown back on themselves [Zurückgeworfensein]" on the one hand. On the other hand, a "blurring of boundaries [Verwischungvon Grenzen]" between private and university spaces was identified, which significantly changed the university as a learning and educational space. Despite the challenges, the advantages of digitalization, such as making learning more flexible, were also-CoV-2 pandemic.

Motivational, experiences and prior achievement level in classroom discussion participation

Dina Yosef, Yael Malin, Tony Gutentag & Christa Asterhan (The Hebrew University of Jerusalem, Israel)

Equitable participation is one of the defining features and goals of academically productive dialogue in classrooms (e.g., Alexander, 2018; Kim & Wilkinson, 2019; Michaels et al., 2007). Yet, student participation in teacher-led, whole classroom discussion activities is often times unevenly distributed, as some students may be very active vocally, whereas others remain mostly silent. Existing studies on student discussion participation are predominantly based on classroom observations, capturingaspects of overtly observable, vocal student participation. However, these are limited in the extent to which they can provide information about the student's experiences and perceptions, their motivations for participation, and aspects of non-vocalparticipation (i.e., active and attentive listening). In the current study, we therefore utilize the affordances of self-report questionnaires to capture these underexplored aspects of student participation in a quantitative study. Our sample included 409 upper elementary students (low-achieving and their classmates) from 18 classrooms. Their teachers had participated in an intensive intervention program to promote dialogic teaching in language arts lessons and had implemented designated discussion activities around text in their lessons. We developed a self-report survey that captures four distinct aspects of a student's own perceptions and experiences during these classroom dialogue activities: Attentive listening, vocal participation inreasoned dialogue, sense of impact and agency during discussions, and teacher support for one's own participation. Results revealed that, compared to their classmates, low-achieving students reported on less vocal participation, active listening, and percsupport, and mastery goals. Attentive listening was predicted by mastery goals, gender, sense of impact and agency, perceived teacher support, and sense of belonging, but not by achievement level.

Breaking the Silence: Enhancing Student Participation through Equitable Classroom Dialogue

Klara Sedova, Roman Švaříček & Zuzana Salamounova (Masaryk University, Czech Republic)

This study explores the educational effects of classroom discourse with a focus on the participation patterns of silent students, who often face significant challenges due to limited verbal engagement. Through an intervention involving six Czech language and language arts teachers and their 6th-grade students, we aimed to enhance equitable dialogic participation. Teachers engaged in a professional development program, and a series of nine lessons per class were video-recorded to measure studentsverbal participation and examine the distribution of talk time. Special attention was given to 15 focal students, who were typically silent but showed increased verbal activity in specific lessons, using a linguistic ethnography approach for detailed analysis.Key findings reveal the importance of teacher talk moves, such as open-ended questioning, personalized

prompts, and explicit encouragement, in motivating silent students to participate. Teachers' sensitivity to the spontaneous contributions of silent students and their ability to adjust classroom dynamics were crucial in creating a supportive environment that encouraged all students to share their thoughts. Additionally, the study examined how students' motivations and attitudes towards success and failure influenced their participation, highlighting the need for tailored pedagogical strategies to foster inclusive and equitable classroom dialogue. The results underscore the transformative impact of focused teacher interventions on creating an engaging classroom environment where silent students can actively participate. This contributes to the discourse on educational equity and the significance of teacher professional development, offering insights for educators to develop more democratic and participatory learning environments.

The link between dialogic teaching and student discursive engagement and second language learning

Pengjin Wang & Gaowei Chen (The University of Hong Kong, Hong Kong)

Contemporary second language (L2) pedagogy highlights task-based interaction in class to develop learners' communicative competence. However, learners may not be willing to communicate in L2 and previous studies have identified individual factors such as their motivation and confidence contributing to their willingness to communicate (WTC). While teachers play a crucial role in classroom discourse, the links between their instructional strategies and students' WTC and interaction with classmatesin class remain underexplored. This study seeks to understand the connection between teachers' academically productive talk (APT) with student discursive engagement and L2 learning from the students' perspective. Using a sample of 490 students fromseven primary and secondary schools in Hong Kong, we examined the relationship between students' perceptions of their teachers' APT, student WTC, L2 learning motivation, L2 communication confidence and their discursive engagement with others in the L2 English classroom. Results from structural equation modelling revealed that student-perceived teacher APT was positively associated with students' L2 learning motivation, L2 communication confidence, and discursive engagement with classmates. In addition, teacher APT was connected to their students' WTC both directly and indirectly through motivation and communication confidence. Furthermore, WTC mediated the relationship between teacher APT and students' discursive engagement. These findingssuggest the pivotal role of teachers in fostering productive classroom talk and student engagement. This study also provides evidence on how students' WTC may relate to their discussion behavior, and WTC's mediating role between teacher APT and discursive engagement with classmates.

Symposium B: Potential and challenges of creating dialogic space in multimodal and asynchronous learning contexts - SIG 26
(Room 1.301)

Chair: Sara Hennessy (University of Cambridge, United Kingdom)
Discussant: Yifat Kolikant (Hebrew University of Jerusalem, Israel)

Operationalizing the Expansion of Dialogic Space in Online Undergraduate Research Training

Shengpeng Shi & Rupert Wegerif (University of Cambridge, United Kingdom)

The idea that educational interventions should expand dialogic space has been put forward in the literature but is a concept that is seen by many as both hard to operationalize in practice and difficult to measure. We report on a Design-based Research (DBR) study that successfully operationalized the idea of expanding dialogic space in the context of an online course and also successfully measured that expansion. We describe designing, implementing and evaluating a series of dialogic interventions aimed at expanding dialogic space in order to promote higher order thinking within a Chinese University course on research methods in the Social Sciences. This study includes the development of a contextually sensitive analytical framework to measure changes in the online dialogic space, thereby evaluating the effectiveness of the interventions. We adapted the Cam-UNAM SEDA educational dialogue coding scheme (Hennessy et al., 2016) to reflect more closely the specific moves involved in opening, widening and deepening dialogic space. We used this as the basis for systematic coding which we then analyzed using Epistemic Network Analysis (Shaffer, 2016) to statistically measure and visually present the expansion of the online dialogic space. The patterns used to describe dialogic moves within the new framework have the potential to benefit practitioners and learners by providing insights into the complex cognitive processes that underpin online discussions, thereby guiding practice. The findings of the study shed light on how dialogic relationships are established, and how the degree of diversity and reflection can be enhanced in online asynchronous dialogue through a combination of pedagogical and technological design.

Teacher-Student Dialogue in Videoconferencing Environments: A Design-Based Research Study

Dongkeun Han (University of Cambridge, United Kingdom)

Since the Covid-19 pandemic, videoconferencing (VC) has emerged as a crucial tool in remote education, overcoming geographical barriers between teachers and students. However, the full potential of VC, particularly in facilitating interactive and collaborative learning, remains underexplored. This research aimed to examine the use of VC to enhance learning through educational dialogue. It specifically addressed the following research questions: 1) How can a teacher professional development (TPD)program develop teachers' awareness and exploitation of the technical affordances of VC for dialogue? 2) What key influences can be reinforced to increase their positive impact and mitigated to reduce their negative impact on multimodal interaction?3) To what extent and in what ways does dialogue in VC lessons change over the course of a TPD program? This Design-Based Research study involved collaboration with two secondary science teachers from the UK and Mexico as co-inquiers, who have contributed actively to the research within a participatory framework. 10 video-recorded VC lessons were collected and coded for multimodal dialogue. The project also conducted two surveys, along with a series of interviews, including stimulated recall sessions, with teachers and students. These were thematically analysed to gain deeper insights into the effectiveness of the TPD program. Multimodal interactions, such as chat and annotations, were comprehensively analysed using ELAN software to discover methods that can foster new rich forms of dialogue. The study's findings highlight the complex, multimodal nature of VC-mediated dialogue, wherein various communication modes enriched interactions. This opened up multimodal dialogic space that transcenThese distinctive features of VC-mediated dialogue underscore the need for an emphasis on them in TPD programs.

Dialogic Space: Relations with, and participation in, dialogue with difference

Maureen Boyd & Raana Jilani (University at Buffalo, USA)

Dialogic space is that elusive "shared space of possibilities" (Author, 2015) that is opened, sustained, and bounded by our relations with, and participation in, dialogue across difference (Author, 2024). Dialogic space requires from participants a willingness to take risks, to admit and respectfully interrogate difference, and be open to change. How ideas and perspectives are presented, received, and folded into a classroom's way of experiencing teaching and learning matters. This paper arguesthat classroom conditions where students experience repertoires of differences (connected and inter-related classroom practices that illuminate difference -such as materials, activities, ways of engaging, grouping, locations, types of talk: Alexander, 2020) make it more likely that students will participate in dialogic space. What teachers count as important is manifest in and through classroom practices. Students respond to what they have experienced. Classroom communities with robust and different repertoires of differences not only signal that difference is valued, but they provide varied opportunities to engage with difference, multiplicity, and uncertainty (Cook et al, 2019). Further, tools can mediate learning and participation and teachers might use pivots (a physical object, space/spatial arrangement, word/phrase, physical movement/posture: Sherry, 2021; Vygotsky, 1978) to signal a (re)framing, possibly inviting different rules, roles, relationships, responsibilities, and possible responses (Goffman, 1974). This paper examines ways a second-grade classroom community made visible, drew attention to, and explicitly valued relations with difference through repertoires of differences and use of physical pivots. Data derive from a mce is experienced and valued; different types of pivots with different ways of, and purposes for, interacting and responding; and examples of student participation in dialogic space.

Exploring Multimodal Classroom Dialogue: A Study of Two Case Analyses

Yi Zhao, Usama Javed Mirza, Shengpeng Shi & Sara Hennessy (University of Cambridge, United Kingdom)

This research explores the transformative role of multimodal dialogue (MMD), a paradigm extending boundaries of dialogic space (Wegerif, 2010) beyond traditional verbal interactions to include a rich fusion of communication modes, facilitated by collaborative digital tools. The primary focus lies in elucidating whether and how MMD within classroom environments (1) enriches and diversifies teaching and learning processes to engage students and support knowledge building, and (2) informs and challenges methodologies for research and analysis. Two illustrative case studies encompass a history lesson mediated by Mentimeter technology in a Chinese junior high school setting and classroom discussions on decolonising the history of science in an all-girls Muslim secondary school in England, mediated by VoiceThread. (Voicethread is an interactive collaboration tool for building online presentations by adding images, documents, videos and other media to which other users can add comments for discussion). Subsequently, we consider the application of research methodologies to integrate theory and practice in analyzing multimodal interactions. We detail the application of a pioneering scheme for educational dialogue analysis in technology-mediated contexts for coding the dialogues. This exercise necessitated addressing methodological challenges including data collection for tracking the evolution of shared artifacts, segmentation of data, and capturing and coding overlapping actions to understand multimodal dialogue. Furthermore, the paper grapples with and proposes strategies for addressing potential challenges associated with the integration of MMD pedagogies into diverse educational landscapes. While discussions on contentious issuesusing anonymous collaborative tools or moderating socio-political tensions arising. Consequently, this paper offers a comprehensive exploration of the potentials and limitations of MMD, culminating in guidelines for fellow researchers and educators.

Wednesday 17:30-19:00

Opening Reception w/ Prof. Niels Pinkwart
Foyer Ground Floor

Poster collection 1: Analysing social learning processes 1 - SIG 26

Researching Online Dialogues: A Design-Based Research Approach Integrating ENA

Shengpeng Shi & Rupert Wegerif (University of Cambridge, United Kingdom)

In education, we often know what we want to achieve, but we do not always know the best way to achieve it. Educational Design-Based Research (EDBR) provides us with a pathway forward. EDBR seeks to address complex educational problems through iterative cycles of design, implementation, evaluation, and revision, aiming to produce solutions that can enhance learning and teaching practices (Bakker, 2018). However, EDBR has often been criticized for a perceived lack of rigor in testing and developing theoretical knowledge. To address this issue, we combined EDBR with a new quantitative ethnographic method - Epistemic Network Analysis (ENA) - for measuring, visualizing, and interpreting the structure of connections in corpus data (Shaffer, 2017). This report elucidates the integration of ENA into an EDBR study focused on expanding the dialogic space in online undergraduate research training. In this illustrative case, dialogic interventions are designed to advance higher-order thinking skills among learners. In the evaluation process, a contextually modified version of the Cam-UNAM SEDA educational dialogue coding scheme (Hennessy et al., 2016) is used to capture learners' cognitive processes behind online discussion transcripts. ENA is then further utilized to identify connections among codes, measure the strengths of their connections, and visualize them in networks, aiming to determine the extent of effectiveness in achieving the intended goal. The integration of ENA into the EDBR enhances the rigour of EDBR while maintaining its original advantages in developing interventions to enhance practices and aligning with participants' experiences. This report contributes to methodological insights for EDBR researchers to conduct rigorous and impactful investigations, not only improving focal practices but also advancing knowledge.

Exploring a Method to Examine In-game and In-person Transactive Discourses

Daeun Hong, Xizi Wang, Cindy Hmelo-Silver, David Crandall (Indiana University, USA), Krista Glazewski & Jamer Lester (North Carolina State University, USA)

In collaborative problem-solving settings, students' active and even participation, which is a vehicle for social interaction and problem solving, can represent one aspect of productive collaborative problem solving. In computer-supported collaborative learning (CSCL) environments, where students engage in both online and in-person activities, there is a call for a method to measure and analyze participation across both modalities. This study introduces an exploratory approach for examining transactive discourses that occur during collaborative problem-solving activities, encompassing both online and in-person interactions. Using a case of group collaboration within a collaborative inquiry-based game learning environment, we analyzed averages and standard deviations (SD) utilizing the chat count and scores extracted from the speaking detection model during a three-minute interval. As a result, the study uncovered several potential advantages of this representation in depicting the level of active and equitable participation within a group. However, this representation also encounters areas to be improved in future research. Future research will delve deeper into refining a representation that offers more comprehensive and intuitive insights into the active and equitable participation of a group.

Transactional Distance and Interaction in Hybrid Education; a Case-Study

Veerle Ottenheim, Ralph Meulenbroeks (Freudental Institute, Utrecht University, Netherlands) & Paul Drijvers (Utrecht University, Netherlands)

In recent years, hybrid education received increasing attention from researchers, focusing on the aspects of teaching and interacting with two separate groups at the same time. Teachers and students both struggle with interaction with online students. We hypothesize that transactional distance might play a role in this. This study, therefore, aims to identify and describe the characteristics of hybrid education in terms of interaction and transactional distance. In this case study, we observed four hybrid lectures of a university history of physics course. Following each lecture, the students (N=6) received a survey assessing transactional distance; after all the lectures students and teachers participated in individual semi-structured interviews. Our findings indicate that online students experienced limited engagement in group discussions, mainly asking for clarification when teachers asked questions. Moreover, online students also experienced a greater transactional distance compared to their onsite counterparts. This disparity in engagement and perceived distance may stem from the online students' inability to partake in the informal interactions occurring before, during, and after the lectures. Both students and teachers stressed the importance of this small talk when talking about the differences between online and onsite students. In conclusion, our research underscores the essential role of informal interactions in hybrid education, emphasizing the need for deliberateefforts to facilitate such exchanges for building a cohesive classroom community and enhancing student engagement and learning outcomes.

Assessment of Economic Critical Online Reasoning Skills in First-semester Bachelor Economic Students

Dominik Braunheim, Marie-Theres Nagel, Olga Zlatkin-Troitschanskaia (Johannes Gutenberg-Universitaet, Germany), Lisa Martin de los Santos (RPTU Kaiserslautern-Landau, Germany), Philine Drake & Johannes Hartig (Deutsches Institut für Internationale Pädagogische Forschung, Germany)

University students increasingly rely on the Internet for learning. Especially the economics discipline considers the skills to search and evaluate online resources crucial for academic success (Infante-Moro et al., 2019). These skills can be subsumed as Critical Online Reasoning (COR): The skills to search, evaluate, and use online information to solve a generic or domain-specific problem (Molerov et al., 2020). Although previous studies indicate that economics students' COR skills are deficient (Nagel et al., 2020, 2022), so far there have been only a few attempts at fostering these skills in higher education (for an overview, Zlatkin-Troitschanskaia et al., 2021). Therefore, the presented study examines the level of students' domain-specific (DOM-COR) skills in economics as a basis for developing targeted support measures in higher education. For this purpose, we use newly developed digital scenario-based performance tasks, which students solve using unrestricted Internet research and writing response texts. We present results from the first DOM-COR assessment with N=151 first-semester economics and sociology students, providing insights into their baseline DOM-COR skills and influencing factors (e.g., prior education, media use in higher education etc.) and drawing preliminary conclusions for further research and fostering COR skills in economics in higher education.

Poster collection 2: Analysing social learning processes 2 - SIG 26

Analysing argumentative abilities in 8–9-year-old children in mathematical tasks

Maria Elena Favilla (Università di Modena e Reggio Emilia, Italy), Paola Borghi (Istituto Comprensivo 5, Modena, Italy), & Michela Maschietto (Università di Modena e Reggio Emilia, Italy)

The presentation we are proposing here is focused on one sub-part of a wider research on argumentation and is specifically devoted to investigate argumentation skills in kindergarten and primary school children, with the objective of developing teaching activities, strategies and methods adequate for the earliest years of schooling according to the National Italian Education guidelines. Our approach is transdisciplinary and considers the mathematics and language education domains as a whole.Ourpaper specifically analyzes some mathematical activities proposed to 8-9 year old children of a primary school to elicit argumentations, in order to discuss: - examples of possible activities;- possible progress achieved;- problems of method in the analysis of children's arguments.Our analysis is based on Toulmin's and Lo Cascio's models and also considers the perspective of "socio-mathematical norms".On the whole, the children were in general able to formulate utterances possessing the basic-grammatical structure of argumentation. Nevertheless this analysis has shown that applying the models is not always easy and uncontroversial. In order to learn how to argue, we find it important to adopt a kind of "why and how" teaching method startingas early as kindergarten, getting children used to justifying their choices, giving reasons, and asking how they came to their conclusions. Managing argumentation is long-term goal which requires to develop a wide net of related skills, i.e. linguistic, mathematics, and logical.

Measuring different types of Cognitive Load during a peer-to-peer Dialogue.

Anne Jonker, Jeroen Spandaw & Marc de Vries (TU Delft, Netherlands)

A widely used theory in education about the functioning of memory is Sweller's cognitive load theory (CLT). According to CLT working memory has a limited capacity and there are different types of workloads (Sweller, 2011).Using peer-to-peer argumentation in the classroom is a way to motivate students to use their working memory actively and to make an effort, which is required for learning. Some claim that explaining to others may exceed the available cognitive capacity, and the explanation could be unclear (Chi, 2013). Others argue that using argumentation in the classroom is successful for a better understanding of the learned material (Asterhan, 2009; Schwartz, 1995). Therefore, we would like to have more insight into the cognitive loadduring a peer-to-peer dialogue to optimise the teacher's guidance further.We developed an instrument to measure intrinsic, extraneous and germane cognitive load during a peer-to-peer dialogue in mathematics education. We conducted a pilot study withthis newly developed and validated instrument. A discussion was provoked using diagnostic questions. Diagnostic questions are multiple-choice questions. Their answers are designed so that they reveal preconceptions. Students with different answer choices were linked together. They had to explain to each other how they arrived at their answer and think together about the correct answer. Immediately after discussing the diagnostic question, the students completed the questionnaire to measure the different types of cognitive loads.The conversations were recorded, coded, and analyzed to assess the quality of the debate. The results help us link the perceived cognitive load with the quality of the discussion. If a relationship is found here, it can help us to gain more insight into the processes that play a role in the meaningful use of peer-to-peer dialogues in mathematics education.

Academically Productive Dialogue in language arts classrooms: Case study on low-achieving students

Dina Yosef & Christa Asterhan (The Hebrew University of Jerusalem, Israel)

Ensuring equitable participation is a fundamental aspect of Academically Productive Dialogue (e.g., Alexander, 2018; Kim & Wilkinson, 2019; Michaels et al., 2007). Student participation is frequently uneven during teacher-led, whole-classroom discussions, since certain individuals are being highly vocal while others tend to remain silent. However, despite the vast amount of research and theory on the topic of dialogic teaching and learning, there has been less focus on individual student differences in dialogic classrooms, and in particular, students with learning difficulties. This study was embedded in a larger researcher-practitioners partnership-based intervention program that aimed to develop and implement dialogic classroom activitiesaround texts in language arts lessons. In the current study, we zoom in on one highly motivated and involved upper elementary teacher and her classroom. We observed all the designated teacher-led, whole classroom discussion activities in language arts lessons for a period of 1.5 years, and conducted a semi-structured interview with the teacher. We examined and compared the teacher's verbal behavior in dialogue spells with low-achieving and high-achieving students, as well as characteristics ofthese students' vocal participation patterns. Additionally, we analyzed the teacher's perceptions regarding the factors influencing low-achieving students' participation in APD lessons, her reflections about her own actions to encourage participation, and differences in the ways she facilitated discussion participation of low-achieving vs. high-achieving students. The results of classroom dialogue are based on both coding and quantified analysis, as well as qualitative micro-analysis. The results revin students' discourse patterns and in teacher's responses toward them. These differences expose the challenges and difficulties of creating equal participation in terms of quality and not only quantity.

Conversations in the Kindergarten Classroom: Analyzing the Discourse of Vivian Paley

Ian A.G. Wilkinson & Joowon Lee (Ohio State University, USA)

The purpose of the study was to examine discourse in an early childhood classroom in an attempt to understand the characteristics and nature of dialogic talk with young children. Employing sociocultural discourse analysis, we analyzed 80 transcriptsfrom two of Vivian Paley's books documenting conversations with five-year olds in her kindergarten classroom. Findings show that much of the discourse could be characterized as dialogic, particularly in discussions of texts and teacher-posed questions. Paley appears to have tried to steer the conversation more in discussion of behavioral-moral issues and, to a lesser extent, problem-solving topics—challenging, disagreeing, or rejecting students' ideas more than she did with other topics. Nonetheless, even with these topics, she provided space for students' ideas and contributions (e.g., posing "what if …" questions). Paley's frequent use of authentic questions, uptake, and low modality words, in concert with a dialogic stance, afforded students considerable control over the flow of talk and substantial agency in the construction of knowledge and understanding. The study contributes to our understanding of early childhood classrooms as a promising setting for dialogic pedagogy and an ideal context to investigate children's thinking and reasoning through talk. It reveals the richness of young children's talk and, perhaps, the limitations in their reasoning.

Poster collection 3: Conflict and controversies I - SIG 26

Combating social polarisation with educational games

Nataliia Sokolovska (Alexander von Humboldt Institute for Internet and Society, Germany) & Agata Komendant-Brodowska (University of Warsaw, Poland)

During the recent Covid-19 pandemic or climate debate we can observe what a destructive effect polarisation processes may have on society and how they affect decision-making even in democratic countries. How does this happen? Why do radical, one-sided movements occur and grow and get more and more supporters?This year a multi- and transdisciplinary educational project ACTiPLEX started, which aims to combat social polarisation among young people by educating them about the dangers and shedding light on the underlying dynamics of polarisation. For this, a set of interactive learning experiences will be created throughout the next three years, combining digital and analogue tools. We work on an online course for university platforms and a game-based workshop on polarisation and dialogue, including educational social simulations that can be integrated in students' curricula. Throughout the project we aim to test our educational resources with students, teachers and experts in the field ofdigital and innovative education. During the conference we would like to present our first study plan and a prototype of the interactive game-based workshop on polarisation and dialogue. We'd like to collect feedback, reactions and ideas in order toimprove our ideas on further stages of the work.

Teaching Sensitive and Controversial Issues in secondary education: an interview study

Leonie Vanhove, Virginie Lemmens, Machteld Vandecandelaere & Jan Sermeus (KU LEUVEN, Belgium)

Research on the teaching of sensitive topics is more important than ever. Factors such as an increasing classroom diversity and the Woke movement are contributing to an intensification of classroom tension, especially when teaching about sensitive issues. There have been several studies focusing on the importance of sensitive topics and how teachers can deal with them. However, this has been limited to domains and little attention has been paid to the determinants that contribute to tension in teaching sensitive issues. In this research, we identify teachers' perceived determinants of tension around sensitive topics and their relationship to system dynamics, identity theory and the nature of the topic. We do this by using concept map-mediated interviews with teachers from different school subjects, situated either in the natural sciences or in the social sciences and humanities. A comparative analysis will then reveal the commonalities and differences between the different domains. Ourhypothesis is that classroom tensions, as reported by teachers, are due more to contextual factors than to the topic or subject itself, legitimating and facilitating the construction of a cross-disciplinary framework with subject-general and subject-specific determinants of induced tensions.

Designing bridging objects to connect civic education with local sustainable development

Ole Smørdal & Anja Amundrud (University of Oslo, Norway)

This study investigates how youth may be engaged in local climate change actions and their perceived and actual influence on political decisions impacting sustainable transitions. Despite a strong understanding and interest in politics, many young Norwegians report feelings of "participation fatigue" and a lack of transparency in how their contributions are processed, leading to lower confidence in their ability to effect

change. Central to this poster is the exploration of civic education's potential to facilitate a shift towards sustainability, highlighting the significance of inclusive participation and collaborative practices between schools and municipalities. It examines educational strategies designed to foster dialogue, reasoning, and argumentation, thereby training and preparing students for contributing to decisionmaking in local sustainability issues. Insights are drawn from the S4U project, a collaborative initiative between schools, municipalities, and the authors, among others. Employing participatory methodologies, S4U aims to connect civic education with municipal planning, engaging students in co-creating local plans. Design experiments are used to discover new learning opportunities and foster a collaborative environment for addressing complex problems. Rooted in sociocultural theory, the research underscores the importance of dialogue and language in developing a collective understanding and fostering shared knowledge building. S4U's approach involves developing and testing boundary objects in co-creation processes to facilitate cross-sectoral dialogue and building shared understanding thereby supporting students' learning and engagement in democratic processes. The anticipated outcomes include the development of workshops and educational plans aimed at facilitating the co-creation of interventions. These interventions are designed not only to foster equitable discussions but also to stimulate the re-imagination of future possibilities. This effort will particularly focus on strategic municipal planning, emphasising how such planning can integrate and advance climate actions. By actively involving youth in these processes, we aim to contribute to more inclusive and sustainable solutions.

Democracy, citizenship and Sustainable Development through Digital Dialogues

Ole Smørdal, Anja Amundrud & Ingvill Rasmussen (University of Oslo, Norway)

This study investigates how to engage students in Norway in authentic democratic experiences, enhancing dialogue, critical thinking, and community involvement. It proposes that education in democracy involves learning about, for, and through democratic activities. It emphasizes that, while theoretical knowledge is fundamental, practical engagement in democratic processes is paramount.Rooted in sociocultural theory, the project values dialogue and language as crucial to thinking and understandingcollectively, seen as essential for a thriving democracy. This research aims to explore dialogic practices, particularly in digital spaces, leveraging Norway's high youth engagement with digital technologies. It also examines the role of game-basedlearning, which has shown promise in teaching democratic and sustainable practices.The research employs a design-based case study involving various stakeholders, including students, teachers, policymakers, and NGOs. The process includes co-design activities, testing of digital tools such as games, VR, and AR, and aims to enhance cross-sector collaboration. Data collection includes video recordings and interviews, focusing on the spring semester of 2024.Anticipated results include innovative educational designs and tools for democratic and sustainable education, insights into dialogic teaching, and the use of digital tools to facilitate participation. The study also hopes to demonstrate how game-based learning can involve students in democratic processes and how collaboration between local stakeholders can foster youth participation in the societal transition to sustainability.

Poster collection 4: Conflict and controversies II - SIG 26

The Disconfirmation Bias, Refutational Argumentation, and Polarization

Michael Nussbaum (University of Nevada, USA)

This paper reviews research on the disconfirmation bias, where more cognitive effort is expended on finding evidence and arguments that disconfirm an opposing belief than to

scrutinizing one's own beliefs. It is different from—and has garnered lessattention than—the confirmation bias, in which disconfirming evidence is simply ignored. The disconfirmation bias has been shown experimentally to be more likely to be activated on emotionally charged issues, and among politically sophisticated individuals who have more knowledge about an issue from which to construct refutational argument. These findings are applied to the controversy over the legitimacy of the 2020 U.S. presidential election. Recent research by Vail et al. (2023) suggests thatthe existence of a disconfirmation bias is a major factor contributing to the political polarization over this issue. Based on surveys administered to 770 college students before, during, and after the election, the researchers found that concern about the integrity of mail-in ballots changed during the election depending on whether one's favored candidate was winning or losing, and that this pattern can be explained by a disconfirmation bias, for example, Trump supporters actively searching for reasons to refute arguments that Biden won. Allowing people to discuss controversial issues with others with opposing views can often enhance polarization (Tajfel & Turner,1979); people are pressed to dwell on their refutations and in reiterating/defending their own positions, rather than scrutinizing those positions. Teachers should therefore be careful in how they facilitate discussion on controversial issues. Although more research is needed, practices that might mitigate the disconfirmation bias include use of balanced, dual-positional texts, fostering nonpolitical identities, and cultivating classroom norms and practices regarding active listening, perspective taking, empathy, and detachment from prior beliefs.

Understanding a debate space: The relationship of attitudes, behavior, and learning on eating habits

Paulo José Medeiros dos Santos, Albulene Grajcevci & Armin Weinberger (Saarland University, Germany)

Controversies pervade different social spheres, igniting debates that mold attitudes, behaviours, and impact learning. This study delves into the contentious omnivore-vegetarian debate, examining the relationship between attitude change, learning, and antecedents of attitudes, specifically, environmental beliefs, anti-speciesism values, and behavior-change intentions. Through Structural Equation Modeling (SEM), our findings reveal the predictive power of both anti-speciesism and health beliefs on dietary choices. Moreover, they underscore the substantial impact of behavior-change intentions, ethical considerations (anti-speciesism value), and health-related beliefs on attitude shifts. Attitude change was shown to be related to perceived learning, hinting at a potential role of attitudes as gatekeepers to learning, influencing individuals' receptiveness to new information. By elucidating these dynamics, we aim to provide insights into fostering constructive discourse and promoting meaningful learning outcomes in contentious topics like the omnivore-vegetarian debate. The results emphasize the importance of understanding domain-specific aspects of scientific reasoning and argumentation in navigating such debates.

How Students Leverage Gestures for Intuitive Knowledge during Argumentation about Heat Transfer

Rajashri Priyadarshini (Indian Institute of Technology Bombay, India), Chandan Dasgupta (University of Twente, Netherlands) & Sahana Murthy (Indian Institute of Technology Bombay, India)

Scientific argumentation has been in focus for quite some time, rendering them useful processes for building appropriate scientific practices and for collaborative knowledge construction. During these processes, students use both verbal (speech) andnon-verbal

(drawings, gestures) modes. While verbal arguments have traditionally been emphasized, non-verbal modes such as gestures are often overlooked despite their potential to enrich scientific discourse. These gestures hold essential intuitive knowledge that is tacit in nature, exerting influential power in students' reasoning about the phenomenon. Understanding students' scientific arguments requires examining both verbal and non-verbal discourses. This study explores how students' gestures support their intuitive knowledge during argumentation in a macroscopic level activity. We examined three Grade 11 groups (N=10) to investigate how students leverage their gestures to integrate their intuitive knowledge with their spoken argumentsregarding heat transfer in a cup. Adapting the 'Claims, Evidence, Reasoning' framework for gesture analysis, we investigated the ways in which students' gestures carrying intuitive knowledge about heat transfer, helped strengthen their arguments. We observed 1) Students relied on gestures containing intuitive ideas as non-verbal evidence to add emphasis to their arguments during episodes of conceptual debating; 2) Gestures facilitated students' exploration of competing scientific claims while illustrating their intuitive idea for other members to perceive; 3) Students' gestures served as a collaborative reasoning tool, enabling them to externalize intuitive knowledge, co-construct evidence, and refine their claims. Our findings inform interventions and inquiries in scientific argumentation, where both verbal and non-verbal modes are given equal weight.

Teacher assessment of scientific reasoning and argumentation: role of knowledge, skills and beliefs

Marleen Evers, Jan Elen & Machteld Vandecandelaere (KU LEUVEN, Belgium)

Scientific Reasoning and Argumentation (SRA) are recognized to be important 21st century skills and their acquisition is among the intended goals of secondary education around the world. Current research on SRA is mainly restricted to hard sciences and history, and falls short in guiding teachers on how to assess SRA. As an extension of current research, this study investigates the interplay among psychology teachers' practical epistemological beliefs, SRA skills, and epistemic knowledge in influencing teachers' assessments of SRA. Participants are upper secondary psychology teachers. The central SRA task throughout the study is a written task focusing on the SRA-activity Drawing Conclusions. Teachers first complete an online 10 multiple-choice test about the psychological theories used in the SRA task. Next, teachers are asked to solve an SRA task, followed by a semi-structured interview in which teachers are asked to elaborate on their answer. Teachers are then presented with a scoring rubric and asked to score different student SRA-answers, followed by a semi-structured interview in which teachers can explain their scores. Data on teachers' practical epistemologies (i.e., implemented epistemological beliefs) will be induced from the first SRA task teachers are engaged in and the following interview. Data from the multiple-choice test and teachers' ratings of students' SRA skills will be analyzed quantitatively. Data from the interviews and the SRA task completed by the teachers will be analyzed qualitatively, using thematic analysis. A within-case analysis is used to create a profile for each respondent, describing their practical epistemologies, SRA skills, and assessment practice and their relationships. A cross-case anaimpact teachers' assessment of SRA, and the challenges associated with it.

Poster collection 5: Critical thinking - SIG 26

Dialogic case teaching for fostering pre-service teachers' critical thinking: An action research

Jeremy C.C. Chang (National Sun Yat-sen University, Taiwan)

This poster presentation outlines an ongoing research project funded by the Taiwan Ministry of Education, investigating the impact of dialogic case teaching on the critical thinking abilities of pre-service teachers and the enhancement of classroom dialogue quality. This study is conducted among 15 pre-service teachers participating in a Philosophy of Education course during the second semester of 2024, from February to June. The research employs a 16-week intervention using an innovative pedagogical approach termed "dialogic case teaching." This approach merges dialogic education principles with case teaching methods. Each week, a case related to educational issues reflective of the weekly topic—such as pragmatism, existentialism, and post-modernism—is studied. These cases are designed to prompt extensive pre-class preparation and in-class group discussions, fostering enhanced dialogue opportunities. To evaluate the development of critical thinking skills among pre-service teachers, the Critical Thinking Test (CTT-II, Yeh, 2003) is administered before and after the dialogic case teaching intervention. Classroom interactions, including whole-class and small-group discussions, are meticulously documented through video recordings and audio devices. Additionally, qualitative data from interviews with the pre-service teachers, alongside teaching reflective journals, are gathered to enrich the study through data triangulation. The anticipated outcomes of this research aim to offervaluable insights into the theoretical and practical benefits of integrating dialogic case teaching within teacher education programs, promising to inform and advance pedagogical strategies in this domain.

Promoting Conceptual Change in Science Through Oral Expression: A Quasi-Experimental Study

Bénédicte Boissard, Nancy Granger & Patrice Potvin (Université du Québec à Montréal, Canada)

Numerous conceptual change models have already been proposed to explain how to assist students in transitioning from intuitive to scientific ideas. However, even when they are aligned with the sociocultural dimension of learning, these models usuallylack clear guidelines on how to facilitate productive dialogue. Fortunately, analysis of classroom discourse has shown that different forms of dialogue, such as justifying or challenging a peer's idea, can improve student performance (Howe et al., 2019). However, studies have not always yielded consistent results. This study aims to verify if students' oral justification and reformulation can promote conceptual change as well as achievement in middle school science. A quasi-experimental designwas used, in which students are in turn part of the controlled condition (customary teaching) and the experimental condition (innovative treatment) (Taber, 2019). Using multiple-choice items, student's prior knowledge and misconceptions regarding mass, volume and photosynthesis were tested, and other potential confounding variables such as student self-concept and individual interest toward sciences were also included in the model. N=400 students (6 teachers, 5 schools) participated during the 2023-2024 school year. Preliminary results (with N = 40) show that when comparing average gains between pre- and posttests, our innovative treatment generated higher gains both for regular assessment items and mis-conceptual items. These rather encouraging results should however be considered with caution since only a subset of data was available for preliminary analysis at the time of writing. A complete analysis of the entire dataset will however be available at the conference and an analysis and interpretation will then be provided. These results present opportunities for reconsidering pedagogical strategies in science, emphasizing the significance of oral expression and social interaction in the development of conceptual understanding.

Integrating argumentation and the development of epistemic cognition

Christian Sebastián, María Rosa Lissi, Macarena Sanhueza Céspedes & Jazmín Coli (Pontificia Universidad Católica de Chile, Chile)

Epistemic cognition includes the different acts of thinking about knowledge, the process of knowing, and learning, that each person maintains in a more or less implicit manner. Teachers that operate with a more developed thinking will promote betterlearning in their students. However, research shows that initial formation has little effect in the development of student teachers' epistemic cognition, partly because the researchers have no clarity about what the key processes and dynamics in epistemic development are. We argue that a Vygotskian reconceptualization of epistemic cognition and its development would allow us to approach this problem. This allows us to characterize epistemic cognition as a higher psychological process developed through the internalization of qualitatively different ways of conceiving knowledge and the knowing process. These forms or levels of epistemic cognition (objectivist, multiplicist and evaluativist) would be characterized by qualitatively different argumentative sequences. In previous works we have shown examples of patterns these argumentative sequences might take. However, a distance remains between the used code system (which to a certain extent only distinguishes the form of the argumentativeelements) and the statements about knowledge and the knowing process. In this presentation we will present a development of this previous work in two senses. On one hand, we will describe an integration attempt between this "argumentative form" andepistemic "content", taken as dimensions in which epistemic cognition can be characterized, in an analogous way to the three-dimensional model proposed by Albornoz and Sebastián (2022) for historical thinking. On the other hand, and as a result of an ongoing theoretical research, we will formulate a hypotheses of the forms these profiles or argumentative patterns could take in their internalized forms in the interpsychic plane.

Fostering critical thinking: Informed decision making based on mathematical argumentation

Michael Besser, Dominik Schlüter (Leuphana Universität Lüneburg, Germany) & Maike Hagena (Leibniz University of Hannover, Germany)

Fostering the ability to think critically as part of "21st century skills" is an important educational mission of schools and subject teaching. In this context, mathematics education plays a crucial role since decisions quite often must be justifiedreflectively using mathematical argumention when dealing with everyday problems. However, it is largely unclear which mathematical argumentation students actually use for decision making when working on everyday problems (status quo) and how exactlythe development of those skills can be successfully fostered in mathematics education (development). Based on this, the present study investigates (1) the extent to which students (successfully) use mathematical argumentation for decision making whendealing with everyday problems and (2) the extent to which students increasingly (successfully) use mathematical argumention in those situations by participating in an interdisciplinary learning programme. As part of the research project FASAF, a total of N=420 year 7 students took part in a 16-week intervention study. The results of the study show that students only (successfully) consider mathematical argumentation to a limited extent when making decisions on everyday problems. But integratedlinguistic and mathematical support can help students building up the competence of using mathematical argumentation. Further results and implications will be discussed in the presentation.

Poster collection 6: Generative AI and chatbots - SIG 26

Enhancing Students' Self-Assessment Skills through Human Versus AI-Powered Formative Feedback

Oldřiška Buchanan (Masaryk University, Brno, Czech Republic)

Self-assessment is a critical metacognitive skill that enables students to evaluate their own learning progress, thus enabling them to direct their growth and reach their learning goals. Formative assessment practices, where teachers provide ongoingfeedback to support learning, can cultivate these reflective abilities. However, many students lack sufficient opportunities to develop proficient self-assessment within traditional classrooms. Advances in artificial intelligence (AI) present new possibilities for individualized assessment and facilitation of self-assessment conversations at scale. This quasi-experimental study will examine the comparative impact of formative assessment feedback from a human teacher versus an AI chatbot on improving secondary students' self-assessment skills over time. Mixed methods data collection will include quantitative pre-post assessments of self-evaluation, goal-setting, and reflection strategies, alongside qualitative analysis of student-teacher/chatbot dialogues and perceptions. Students in English, Spanish, and History classes will be randomly assigned to receive formative feedback from either their human teacher or an AI chatbot using a customized prompt to guide self-reflection. Quantitative analysis will determine differences in self-assessment competency gains between the two feedback conditions. Qualitative examination of the interactive dynamics and student experiences will provide insights into how learners engage with human versus AI formative assessment. Findings will inform the design of effective formative assessment strategies that leverage AI to develop independent, self-regulated learners. This study addresses a critical gap in empirical research comparing the efficacy of human expert versus AI-powered approaches for advancing essential metacognitive skills within lower secondary education contexts.

Does AI-Generated Feedback Enhance Diagnostic Reasoning in Pre-service Teachers?

Annette Kinder, Fiona Briese (Freie Universität Berlin, Germany), Marius Jacobs (Ludwig-Maximilians-Universität München, Germany), Niclas Dern (Technische Universitaet München, Germany), Niels Glodny (Ludwig-Maximilians-Universität München, Germany), Simon Jacobs (Technische Universität Berlin, Germany) & Samuel Leßmann (Ludwig-Maximilians-Universität München, Germany)

Feedback is crucial for learning, and Artificial Intelligence (AI) models such as ChatGPT can offer adaptive, task-specific feedback. This study examines the impact of AI-generated feedback on the diagnostic reasoning abilities of pre-service teachers. We provided participants (n=270) with two case scenarios involving students with learning difficulties, and asked them to compose short texts agreeing or disagreeing with the interventions suggested by a hypothetical teacher, while justifying their decision. A pre-post design with experimental and control groups was employed, with the experimental group receiving AI feedback (from ChatGPT) and the control group receiving static feedback in the form of expert solutions. An interactive tool incorporating a task-specific prompting system was used to facilitate interaction between participants and ChatGPT and to deliver the feedback. The feedback was evaluated by assessing participants' reception of the feedback, their decision accuracy, andthe quality of their justification. Preliminary results indicated a positive response to AI-generated feedback. This research could highlight the potential of AI in providing effective educational feedback.

Assessment performance in Critical Online Reasoning in economics with and without AI chatbot use

Dimitri Molerov (Humboldt-University Berlin, Germany), Denis Federiakin, Lucas Trierweiler (Johannes Gutenberg University of Mainz, Germany) & Samuel Greiff (Goethe University, Germany) & Olga Zlatkin-Troitschanskaia (Johannes Gutenberg-Universität Mainz, Germany)

Critical Online Reasoning (COR) has been introduced as a construct for the necessary skillset of acquiring, evaluating, and reasoning with information on the Internet (Molerov et al., 2020), given conditions of varying information quality and abundance. To assess it, corresponding open web search tasks have been developed and validated for higher education in Germany (Nagel et al., 2020, 2022): In the assessment, students are allowed to use the Internet to answer general-topic, everyday information problems, or more specialized information problems related to their study domain, while their responses and web behavior are tracked (Zlatkin-Troitschanskaia et al., 2021a). AI chatbots have offered advanced support in numerous educational tasks,including COR-related facets such as synthesis, reasoning, perspective-taking (Herbold et al., 2023; OpenAI et al., 2023, SWK, 2024). However, they may disrupt open web search assessment. While general criteria of information quality have remained similar, AI chatbot affordances have changed the requirements of tasks to be performed and information to be critically evaluated to produce a well-substantiated response. This paper is based on the data from the first measurement of a longitudinal study conducted in the winter term 2023/24. Out of N=151 economics COR task completions by participating first-year students, N=24 task responses showed use not only of Internet search and websites but also of AI chatbots. We compare the COR scores ofstudents with and without AI chatbot use and analyze components of tracked student-copied AI responses (baseline) and students' (re)phrasing of prompts and responses (own performance). We find that, with the freely available AI chatbot model at the time (ChatGPT 3.5), students' performance improved significantly with ceiling effects in certain sub-facets (e.g., synthesis), while in others, it did not (e.g., information evaluation). We discuss implications for future open web search task design in view of recent AI chatbot improvements.

Dialogic stances: generative AI in Norwegian classrooms

Henrik Tjønn, Sten Runar Ludvigsen & Anders Mørch (University of Oslo, Norway)

In the project Learning in the Age of Algorithms (LAA), we used generative artificial intelligence (GAI) in Norwegian elementary and secondary schools. Teachers designed prompts to be used by all pupils through chatbots in different subjects and formore generic skills. The chatbots contained age-specific features for content generation. These chatbots were designed to integrate various subjects with GAI.The LAA project could be classified as Design-Based Research and theoretically grounded in sociocultural approaches to learning. Given the need for comprehensive empirical knowledge about the use of Generative Artificial Intelligence (GAI) in K-12 education, the research design is of an exploratory nature in its initial phase. The pupils'use of the designed chatbots took place in several classrooms in Asker municipality in Norway. In early 2024, project researchers visited five schools, involving six teachers and close to 200 pupils in seven different classes. The schools were variedin size and socioeconomic representation within the municipality.Based on the Stance Triangle (Du Bois, 2007), we observed that pupils encountered difficulties in comprehending the modified design of the chatbots and particularly in performing epistemic stances.Based on our observations, we argue for the

importance of sequencing and modelling in the use of a school chatbot. This approach presupposes clear instruction and modelling of possible uses. The different chatbots need continued fine-tuning to properly scaffold the learning processes of most pupils in the municipality. To enhance pupils' engagement and dialogic interaction with the GAI, the teacher must facilitate pupils working together in pairs when interacting with the chatbots. Takinoming iterations of the design process.

Poster collection 7: Inquiry Learning I - SIG 20

The Impact of Inquiry-Based Learning Interventions on Enjoyment and Effort in Adolescence

Lia Grahl, Sabine Schweder & Diana Raufelder (University Greifswald, Germany)

In alignment with the principles of control-value theory, this study set out to monitor the progression and variance in enjoyment and effort throughout a school year. The subject group consisted of 754 adolescents, with an average age of 13.56 (SD =1.2) and a female representation of 49.7%. These students participated in two separate one-week intervals of inquiry-based learning. The application of a bivariate latent neighbor change model revealed a surprising positive trend in both enjoyment and effort over the course of the academic year, with notable increases observed during the inquiry-based learning sessions. The study also found that enjoyment and effort influenced each other reciprocally over time, although this interdependence became prominent after the initial experience of inquiry-based learning. Incorporating intervals of inquiry-based learning into the curriculum appears to effectively counter the commonly observed decline in both enjoyment and effort among students, a trend that typically intensifies with the onset of adolescence and the transition to secondary education. Furthermore, the study highlights that increased effort can amplify enjoyment, and vice versa, paving the way for a transition from initial excitement ('thrill') to a more sustained, committed approach to learning ('will').

Investigating the role of gamification in learning with virtual reality

Markos Souropetsis & Eleni Kyza (Cyprus University of Technology, Cyprus)

This study analyzed an inquiry-based VR activity in the context of a virtual visit to a cultural heritage site to understand how learning is affected by gamification elements in a virtual reality learning environment. An experimental research designwas adopted to analyze the experience of 47 undergraduate students, of whom 24 used the gamified version of the inquiry-based VR learning environment while the remaining 23 used the same inquiry-based VR learning environment without the gamified elements. In our quantitative analyses we found that students in the gamified condition had statistically significant greater learning gains, higher perceived competence, and higher experienced immersion as compared to students in the non-gamified condition. In this report we present the results from the qualitative analysis of a case study consisting of two students, one from each condition seeking to understand how the gamification elements used in the VR environment may have contributed to theseresults. Data were collected using post-activity interviews. Our findings contribute empirical evidence on the effect of gamification in virtual reality settings and its positive relation to the learning process, perceived competence, and experienced immersion.

Examining the Impact of Inquiry-Based Learning on Student Motivation in Secondary Education

Sabine Schweder, Lia Grahl & Diana Raufelder (University Greifswald, Germany)

Grounded in Self-Determination Theory, this longitudinal, four-wave study investigated the development of basic psychological needs and motivational states among secondary school students. The research examined the interplay within a pedagogical framework that alternates between inquiry-based learning and teacher-guided instruction. The study's design, encompassing a sample of 754 students (mean age = 13.56, SD = 1.22; 49.7% female). Utilizing latent change score models, the study analyzed bothquestionnaire responses and performance metrics. Contrary to trends identified in prior research, the findings revealed a significant, positive trend in student motivation and competence experiences across the academic year. This positive developmentwas primarily attributed to periods of inquiry-based learning, highlighting this approach's effectiveness in enhancing student motivation and suggesting that inquiry-based learning promotes growth in basic needs and motivation. These findings have profound implications for educational practice and policy, advocating for the strategic inclusion of inquiry-based learning intervals in the secondary school curriculum. Such integration could effectively counteract the commonly observed decline in motivation at the beginning of secondary education and early adolescence, offering compelling evidence for rethinking and restructuring conventional instructional strategies to better align with the developmental needs of contemporary youth.

A review of empirical evidence on learning in Makerspaces

Kyriaki Vakkou, Tasos Hovardas & Zacharias Zacharia (University of Cyprus, Cyprus)

The potential benefits of makerspaces for inquiry-based learning (IBL) have been highlighted by recent research showing promising potential. We report key findings of a literature review we have conducted in a shortlist of 31 articles with empiricaldata, and we summarize our key findings outlining the multiple benefits that can be derived from a cross-fertilization of IBL with the maker education. We found that research tends to engage more secondary school students, focus more on integrated STEM/STEAM, and explore learner skills and attitudes through non-experimental designs. Delving deeper in the results of the shortlisted articles, we observed a focus of the authors to document benefits for self-efficacy, and STEM attitudes. In terms ofskills, makerspaces were quite beneficial for developing learner creativity, computational thinking, and equity-oriented goals. Despite these well pronounced benefits, a major concern shared by several authors was the considerable learning support which would be needed by the instructor in makerspaces. This is especially demanding if we also take into account the remarkable variation in the duration of educational interventions reported in the shortlisted manuscripts, which ranged from some days to two years. Based on the results of our review, we would like to recommend a tighter connection of maker education with IBL, especially versions of IBL which are meant to accommodate open-ended learning environments. Such a synergy would allow for pedagogical designs building on subsequent inquiry cycles, which may be supported by platforms offering online tools.

Poster collection 8: Inquiry Learning II - SIG 20

Fifth graders' learning outcomes and studying strategies in illustrated texts and videos

Mikko Haavisto (University of Turku, Finland) & Tomi Jaakkola (Tampere University, Finland)

Despite the prevalence of videos and illustrated texts in primary education, there is a limited understanding of how children study and review these materials, and how this impacts their learning performance. This presentation aims to further this understanding based on a series of studies in progress. The first study demonstrated that video outperforms illustrated text in an authentic classroom environment in terms of learning outcomes and cognitive load. The focus of this presentation is on two follow-up studies (studies 2 and 3). The second study explored reasons for this outperformance by examining tablet screen recordings. The recordings captured the learning behaviors of fifth graders as they freely explored illustrated texts and videos with extensive learner controls. The analysis focused on the children's navigation activities, studying rates, and review strategies. The preliminary results show that videos were studied faster than content-equivalent illustrated texts. Furthermore, this faster studying was associated with the better performance observed in the first study. As the children scarcely used the navigation options in the videos, the videos were mostly studied and reviewed linearly at their designed rate, which was especially beneficial for slower readers. In comparison, both the studying rate and the review strategies were more varied in the illustrated texts. In the third study, further data collection of screen recordings is currently in progress that investigates how having access to the materials during the post-test changes children's exploration of illustrated texts and videos.

Blended Learning Models and Self-Regulated Learning: Preliminary results from a school experiment

Heike Schaumburg, Anne-Madeleine Kraft, Björn Kröske & Thomas Koinzer (Humboldt-Universität zu Berlin, Germany)

The present study analyzes the development and implementation of blended learning models in 18 schools within a three-year school experiment in Berlin, Germany. Different models were identified and then examined based on their effects on students' self-regulated learning. The study utilizes qualitative interviews with teachers, principals, and students to identify the blended learning models. Their effects on self-regulated learning are investigated within a quasi-experimental design using a student questionnaire. The results indicate that the blended learning models differ from a control group that was not taught using a blended learning approach only with regard to the cognitive dimensions of self-regulated learning. However, significantdifferences in all investigated dimensions of self-regulated learning were found between the clusters. The results suggest that the instructional design of blended learning plays a crucial role in promoting self-regulated learning. Project-based learning arrangements appear to be particularly effective.

Enhancing Scientific Literacy through Inquiry-Based Learning within Hybrid Learning Environments

Martina Graichen & Silke Mikelskis-Seifert (University of Education Freiburg, Germany)

Scientific literacy is vital for effective participation in science education, and inquiry-based learning environments present a promising approach for its development. However, ensuring these environments are accessible to all students, regardless of their diverse

characteristics, is paramount. Digital learning environments are one way of supporting all students with their diverse characteristics. This study investigates the effects of a digital, inquiry-based learning environment on magnetismfor grades 5 to 6, emphasizing accessibility and stereotype-free design. A pre-post design study involving 303 students was conducted, with measurements taken before and after learning in this digital environment. In order to measure learning successand the assessment of the accessibility of the learning environment, appropriate test instruments had to be designed. Results reveal high reliability of scales assessing accessibility and self-concept. Furthermore, these results are promising. So, significantly improved perceived accessibility for Experiment 2 compared to Experiment 1 suggests potential familiarity or training effects. Moreover, post-intervention, two out of three domain-specific self-concepts related to experimental instructions displayed an increase, indicating a positive influence of the learning environment on self-concept development. These findings underscore the importance of well-structured, stereotype-free inquiry learning environments in enhancing scientific literacy and domain-specific self-concept. Further analysis is needed to fully grasp the impact of such interventions on student learning outcomes.

Building BRiDGES through Digital Dialogues: Educational Learning Communities on Internationalisation

Martina Graichen & Claudia Ingrisch-Rupp (University of Education Freiburg, Germany)

The EU-funded BRiDGE-project seeks to establish a collaborative pan-European professional learning community, engaging researchers, civil society organizations representatives, and policymakers to support both, intra- and interprofessional learning processes. Thus, it endeavours to support the European Union's objective of bridging the gap between research and policy in education. It uses digital dialogic formats to achieve this aim: it offers seminars and professional peer-learning activities for representatives from research, policymaking, and civil society organisations. These interactive, synchronous dialogic formats are completed by various documentation formats to allow for asynchronous communication. As internationalization in education has become a focal point of policy and research attention in the past two decade but still suffers from a disparity between policy and research evidence, the topic of "Hybrid International Mobility for all Learners" is at the centre of the firstproject phase. Communication on internationalization in higher education, as articulated by Teichler (2017), is complex due to varying interpretations and evolving phenomena, such as digital exchanges. In our poster, we focus on the evaluation of thedigital dialogue formats which we applied. Despite challenges such as funding and differing interpretations of key concepts, participants emphasized the need for authentic feedback and regional considerations. The discussion underscored the importance of establishing a common understanding and involving policymakers more actively in the community to advance international mobility initiatives effectively.

Poster collection 9: Professional development 1 - SIG 26

Diagnosing diverse learning abilities – A case-based learning approach for pre-service teachers

Jacqueline Wissmann & Annette Kinder (Freie Universität Berlin, Germany)

For children with diverse learning abilities, accurately identifying their educational needs is critical for initiating suitable support measures. This necessitates that teachers have

comprehensive skills, ideally developed during their teacher education. For proficient diagnostic actions, it is essential for pre-service teachers to not only acquire fundamental diagnostic knowledge applicable across various contexts but also to engage in learning opportunities that enhance situation-specific skills. We present a case-based learning approach designed to assist pre-service teachers in making informed decisions regarding diagnoses and appropriate support measures. The efficacy of this learning approach in fostering situation-specific skills iscompared with a traditional task-based exercise focused on teaching the essential foundations for competent diagnosis in diverse situations. A study involving students enrolled in a teacher education, employing an intervention-control group design,demonstrated that case-based learning was more effective in promoting the development of situation-specific skills. Conversely, the task-based exercise proved more advantageous in promoting fundamental conceptual knowledge. Both exercises received positive feedback from the students, with the case-based approach receiving a higher appraisal. Students' self-assessment of their diagnostic skills was notably higher when both exercises were implemented consecutively. The findings indicate that a combination of both approaches could effectively prepare students with the necessary competencies for making diagnostic decisions.

'The Studio': A School-Based Model for Pedagogical Improvement Based on Dialogue Data

Benzi Slakmon (Tel Aviv University, Israel), Inna Smirnov Oknin (Tel Aviv University; Kaye Academic College, Israel) & Asher Albo (The Hebrew University of Jerusalem, Israel)

At Legacy Bridge High, a Research-Practice Partnership (RPP) has been established, focusing on implementing dialogic pedagogy. The "Studio" is a school-based model for teacher learning and pedagogical improvement centered around dialogue data. It isan integrative approach aimed at enhancing the quality of pedagogy within the school through lesson planning, instruction, and reflective research of practice. Over a month-long cycle, teacher teams collaboratively plan lessons grounded in dialogic education theory, observe and record one team member teaching the lesson, and then analyze the dialogue data to discuss implementation challenges and formulate lessons learned.The model incorporates recognized principles for effective teacher professional development, such as teacher collaboration, anchoring in strong learning theory (dialogue and cognitive engagement), focus on teaching and learning through meticulous planning and reflective practice, long-term accompaniment, balancing internaland external expertise, and integrating the model into school routines for sustainability and scalability.Several research programs are being pursued within the Studio project, including investigating the use of video for teacher learning, the impacton teaching quality and student achievement, challenges in designing with the ICAP model, the relationship between ICAP and SEDA theoretical frameworks, developing a theory of action for efficient implementation, and exploring how the documentation-based approach influences teachers' willingness to embrace new paradigms.The Studio model represents a shift towards sustained, iterative, school-embedded, documentation-driven professional development processes, aiming to transform educational settings and catalyze professional growth and learning. The poster presents the model, its mission and design, and the research directions it holds.

Improving Teachers' Different Aspects of TPACK and Technology Integration Skills

Hasan Ozgur Kapıcı (Bogazici University, Turkey)

Educational technology has been developing rapidly in parallel to the improvements in technology. The use of instructional technologies has been increasing in classes. To use

them efficiently, teachers have primary roles. This study aims to investigate the effects of designing an inquiry-based learning environment on the virtual platform on teachers' TPACK self-efficacy and practical skills. Another aim of the study is to reveal teachers' views about technology integration in learning environments. In this study, a case study-mixed methods design (Guetterman & Fetters, 2018) was used. The study was done with 12 in-service science teachers. A program of 3 weekends (5 days in total) was designed for teachers. Furthermore, each teacher implemented inquiry learning spaces developed on the virtual platform in their classes. Data was gathered from two different TPACK scales and pre- and post-interviews. The preliminary results showed that science teachers' TPACK self-efficacy and TPACK-practical, and technology integration skills improved throughout the project.

Facilitating teachers' collaborative diagnostic reasoning in simulation-based learning

Sebastian Tews & Freydis Vogel (University of Hamburg, Germany)

Teachers' diagnostic reasoning competences play an important role for student achievement, classroom management and instructional quality. The situation-specific skills needed for diagnosis in the context of learning and teaching are often conceptualized as the eight diagnostic reasoning activities problem identification, questioning, hypothesis generation, construction of artefacts, evidence generation, evidence evaluation, drawing conclusion and communicating. Engaging in collaborative diagnostic reasoning (CDR) requires, in addition, the application of the collaborative problem-solving activities sharing, elicitation, negotiating, and coordination. Previous studies in the medical field have emphasized the importance of collaborative diagnostic activities for the accuracy of collaborative diagnosis. However, there is limited evidence on how exactly teachers engage in CDR. Simulation-based learning provides the opportunity to investigate and promote CDR among teachers, as simulationscan reduce the complexity of real-life teaching situations. Our research aims to better understand the conditions under which teachers effectively engage in CDR while diagnosing classroom situations in a simulation-based learning environment. Furthermore, this study seeks to examine the effect of different expertise levels and interdisciplinarity on the collaboration process and outcome. This study employs a quasi-experimental design, assigning novice teachers (pre-service) and expert teachers (in-service) to interdisciplinary or non-interdisciplinary dyads to observe and assess the digital competences of simulated teachers in video cases. Analyzing the recorded discourse data with regard to the CDR activities will shed light on which activities lead to successful collaboration and the need for collaboration support can be derived.

Poster collection 10: Professional development II - SIG 26

How to convince faculty to support research-based learning? The cascade model for justifying RBL

Harald A. Mieg (Humboldt-Universität zu Berlin, Germany). Jan Zottmann (Ludwig-Maximilians University Munich, Germany) & Anna Horrer (LMU University Hospital, LMU Munich, Germany)

What arguments can be used to convince university teachers to implement research-based learning (RBL)? We conducted interviews with 40 university teachers to find out. The obvious argument that students learn useful skills in this way does not seem to work as expected. Our paper presents the Cascade Model for justifying RBL that we obtained as a synthesis of a research network reflecting on higher education reforms in

Germany. It became obvious that it is clearly not enough to set up suitable teaching formats in order to implement RBL. Rather, research must make sense for those involved - students and teachers alike. The model distinguishes "epistemic authorities" university teachers refer to when they justify RBL within higher education –it suggests a cascade of university, professional, individual, and societal references, which is associated with decreasing internal controllability of the effect by the university. If we intend to convince university teachers to implement RBL, societal reference would therefore be the ultima ratio, as it can be completely challenged politically. Our paper first presents the research on which the Cascade Model is based, second shows method and results of the interview study, and third discussesthe model in terms of epistemological beliefs.

How is the idea of dialogue for learning mobilised in practising teachers? A case study

Maribel Calderon (Universidad Católica Silva Henríquez, Chile), Marisol Gómez & Maximiliano Silva Barrueto (Universidad Alberto Hurtado, Chile)

Results of a teacher professional development experience implemented in a Chilean school to promote dialogic teaching through a training design that was organized following the principles of dialogic teaching and its repertoires. The proposal is articulated, considering the notion of pedagogical thinking - understood as a dialogical practice for the resolution of emerging problems in teaching and learning situations - and productive pedagogical conversations to visualize the negotiation processes regarding dialogue, its link with learning and classroom practices.We worked under a qualitative approach, through a case study in a private subsidized elementary school in the Metropolitan Region. Nine teachers participated. The workshop was implemented through 5 group workshop sessions plus an individual feedback session. The video material of workshops and individual meetings was transcribed and analyzed using different techniques, and three classes of each teacher were recorded to visualize changes. Among the results, the notions regarding dialogue and linkage with learning, dimensions of pedagogical thinking mobilized during the process and DT principles implemented in the teaching practices and which are partly transferred to the practices are pointed out. Implications of the study are discussed.

"We Don't Meet, And We Don't Typically Collaborate:" Supporting Cross-Disciplinary Research

Alina Reznitskaya (Montclair State University, USA), Emily Dux Speltz & Evgeny Chukharev (Iowa State University, USA)

The purpose of this poster is to share our efforts to conduct an online two-day workshop to support collaboration among scholars in the fields of argumentation and technology. We also present the results of an open-ended online survey designed to address barriers and opportunities for cross-disciplinary collaboration. The workshop brought together 24 scholars with expertise in argumentation, education, and computer science. Prior to the workshop, we asked participants to submit a two-page proposal. On Day 1 of the workshop, participants presented and discussed their proposals in argumentation and/or technology. On Day 2 participants explored opportunities for collaboration through group discussions.Following the workshop, 18 participants completed an anonymous, online survey. They rated their overall experience and answered open-ended questions about workshop activities. They also discussed general barriers and strategies for productive cross-disciplinary collaboration. We used Nvivo software to conduct thematic analysis of participants' open-ended responses. The results show that participants had very positive reactions to the workshop. Written feedback from participants also indicates that the

workshop was a valuable experience.On the other hand, the workshop revealed the complexity of facilitating cross-disciplinary research. It highlighted issues with recruitment, difficulties with understanding the other discipline, and challenges with identifying overlapping interests.Participants made multiple recommendations for future workshop organizers.We were encouraged to see a lot of creativity, excitement, and curiosity about cross-disciplinary work in argumentation and technology from both fields of study. At the same time, idressing these challenges will require sustained and ongoing efforts.

Thursday 19/9/2024

Parallel Slot C

Paper Session C1: Teacher practices and inquiry learning - SIG 20 & SIG 26 (Room 1.401)

Beyond teaching practices: dialogue as a tool for conceptual change for future teachers

Michele Flammia (Italy) & Franco Passalacqua (University of Milan-Bicocca, Italy)

Advocating for dialogic teaching often faces challenges due to limited resources allocated for teacher training (Author, 2021). Developing the necessary proficiency requires substantial time and access to skilled professionals, which may not always be readily available within the educational framework. Consequently, this situation leads to two significant outcomes: the limited integration of dialogic approaches in educational settings despite evidence of their efficacy (Sedova, Salamounova & Svaricek, 2014), and the risk of trivializing or misinterpreting their underlying principles and strategies (Reznitskaya & Gregory, 2013). In addition, several studies reveal how epistemic cognition, defined as thinking about the construction and justification of knowledge, plays an important role in the in shaping teachers' practices (Brownlee, Schraw, & Berthelsen, 2011), but the acquisition of dialogue facilitation techniques does not automatically lead to a change in epistemic cognition (Reznitskaya & Wilkinson, 2019)In response to these challenges, we developed a training and research protocol for students in the Primary Education course at the University of Milano-Bicocca. The protocol aimed to immerse future teachers in dialogic practices, allowing them to experience the transformative potential of this approach firsthand. Rather than providing a comprehensive program, the goal was to instigate conceptual change and intrinsic motivation among future teachers to fully grasp the potential of dialogic teaching and continue their training in the field. The dialogic practices tested were Socratic Challenge (Author, 2023) and Inquiry Dialogue with the use of the Argumentation Rating Tool (Reznitskaya & Wilkinson, 2021). Active participation in dialogic sessions and metacognitive reflection allowed future teachers to critically reflect on their professional identity and practices. Conceptual changes emerged regarding the potential of dialogue, highlighting the fundamental role of critical analysis and error recognition in dialogic teaching.

Effects of a teacher-led educational robotics intervention on pupils' learning and teachers' beliefs

Jo van Schaik (Radboud University Nijmegen, Netherlands), Amy Hughes & Sarah Gerson (Cardiff University, United Kingdom)

Recent advances in educational robotics have enabled the introduction of programming concepts to ever younger children. Concurrently, programming is being introduced in primary school curriculums worldwide. However, the efficacy of educational robotics for learning programming and the role and readiness of teachers to implement robotics in early primary school remain open questions. In a 6-week pretest-posttest control group

intervention, we investigated the impact of teacher-administered robotics lessons on children's programming skills, related skills, and beliefs, and on teachers' beliefs and practices. In total, 430 4-7-year-olds and 17 teachers across seven Welsh primary schools participated. Schools were assigned to one of three conditions: Control (received robots and lesson plans after posttest), Intervention (robots and lesson plans provided after pretest), or Intervention+ (same as Intervention, plus a teacher education workshop after pretest). Multilevel models indicate significantly better improvements in Intervention+ compared to Control on debugging and prediction tasks, while no transfer effects were found for an unfamiliar programming task nor for visual perspective taking and sequencing. Pupil attitude and self-efficacy scores were high across conditions and timepoints. Significantly higher teacher improvements in the Intervention+ versus Control were found for enjoyment, perceived relevance, and self-efficacy, with anxiety showing non-significant but promising improvements. Both intervention conditions showed improved robotics teaching practices compared to Control. What is more, several significant interactions between teacher and pupil measures were found, with higher teacher self-efficacy and perceived rest that further support is needed to foster transfer. Moreover, the Intervention+ and teacher-pupil results point to the necessity of teacher education on this unfamiliar and (to most) daunting topic that has been added onto primary teachers' overflowing workloads.

The Shaping of Epistemic Climate in High School Science Inquiry: Identifying Teachers' Practices

Noora Fatima Noushad, Susan Yoon (University of Pennsylvania, USA), Clark Chinn (Rutgers University, USA), Zhitong Yang (University of Pennsylvania, USA) & Huma Hussain-Abidi (Rutgers University, USA)

To address sciences' trustworthiness in times of denial and misinformation, some researchers advocate for teaching epistemic practices (EPs) in schools—namely, the disciplinary processes scientists use to establish trustworthy explanations. However,teaching EPs requires a fundamental change in instructional approach to inquiry; specifically, it necessitates shaping a learning climate where students engage in constructing and validating scientific explanations rather than simply completing tasksmodeled by the teacher. There are few models of enactment that adequately capture this instructional approach. In this study, we examine how two teachers implemented the epidemic unit, a curriculum designed to teach EPs, wherein students constructedscientific explanations using the data they collected from a simulation and negotiated the trustworthiness of their explanations. Findings indicate that the teachers used two strategies to shape the epistemic climate: (1) normalized revising predictions to communicate the iterative nature of scientific explanations, (2) encouraged students to exercise choice in constructing scientific explanations while maintaining an invisible authority over their quality to communicate the social construction of scientific explanations.

Elementary teachers' classroom experimentation with self-designed historical inquiry lessons

Yolande Potjer, Carla Van Boxtel (University of Amsterdam, Netherlands), & Marjolein Dobber (Vrije Universiteit Amsterdam, Netherlands)

This study reports on how seven elementary school teachers participating in a professional development program, designed historical inquiry lessons and put these to practice. The two-year program taught elementary school teachers to reason historically and develop skills to design inquiry-based lessons for historical reasoning. To evaluate

how the participating teachers realised inquiries and promoted historical reasoning in their classrooms, we: 1. videotaped two lessons per teacher; 2. Collected teachers' inquiry-based history lesson plans designed during the program; 3. conducted post interviews. For the analysis of the lessons, lesson plans and the interviews, we developed coding schemes. For the lessons and lessons plans these focused on: modelling of historical reasoning, the use of historical sources, teaching of different perspectives, the use of exercises that promote historical reasoning, promoting historical reasoning in classroom discussions and teacher guidance. For the interviews we coded for goals and experience with inquiry-based history teaching activities and for professional development and sense of agency. A substantial intercoder agreement (Cohen's kappa 0,76 for lessons and 0,75 for interviews) was reached for all coding.During the program, participants examined their ideas about inquiry. At the start of the program, most participants saw inquiry-based learning as open, students-led inquiry. During the program some realized that guided inquiry, where the teacher provides materials and is more guiding in the inquiry, is more fitting for historical inquiries. This rethinking of inquiry is visible in the lessons they designed and taught. Preliminary findings indicate that all participating teachers designed lesllenging part turned out to be how to read and analyze source materials.

Paper Session C2: Argumentation, debate and criticism - SIG 26 (Room 1.406)

How are different communicative objectives expressed in oral argumentation in learning debates?

Ingrid Gonzalez & Antonia Larrain (Universidad Alberto Hurtado, Chile)

Debate is an active methodology with a long tradition in universities. Although it is believed that this promotes learning, the evidence on its effectiveness is not conclusive (Cariñanos-Ayala et al., 2021). There are good reasons to believe that debate could promote learning, because it involves an argumentative practice, which, from a psychological point of view, promotes and deploys cognitive processes of high epistemic value. Now, there are different types of debate, and although debates canbe implemented with a competitive objective (classical view), there are adaptations of the debate to promote mutual understanding (deliberative). The question of the study is: Are different communicative objectives in the debate expressed in different forms of argumentation? Specifically, we seek to characterize how the deliberative and persuasive objective is expressed in the argumentation of university students in the context of university debate, extending the literature developed by Felton and collaborators. We believe that this is key, because it is still necessary to detect key indicators of argumentative dialogue by objectives to control this variable in future experimental studies. We carried out a study of teaching–learning sequence (Psillos, 2015), we elaborated two designs of debate, debate with a persuasive and deliberative objective. We conducted an implementation with 39 university students. Each student participated in 4 debates (each with a preparation and execution phase). From these data, we qualitatively analyze the argument adapting Felton's coding procedure (2022) and Leitão (2000). We also performed a thematic analysis. The main findings show that there was greater partial agreement, anticipation, reflexivity andive and persuasive argumentation and their potential for learning, as well as the theoretical challenges regarding both types of argumentation when making them dialogue with empirical differences.

Thinking critically about critical thinking in teacher education

Jarmila Bubikova-Moan (Oslo Metropolitan University, Norway), Leila Ferguson & Anette Andresen (Kristiania University College, Norway)

Critical thinking (CT) has attracted much scholastic attention in recent years, including in teacher education (TED). Current research has addressed various questions, including pre-service teachers' training in CT, instructional effectiveness but also ways of improving CT instruction in TED. Despite these advances, CT remains a blurred concept with many different conceptualizations in circulation. The primary aim of this systematic review was to zoom in on the existing conceptual conundrum andsynthesize how CT has been conceptualized in international scientific literature on CT in TED. Our secondary aim was to offer an aerial view of this literature by exploring its selected publication-related features. To address these two questions, weconducted a systematic review, following the meta-synthesis design. This led to the identification of 208 studies that satisfied our inclusion criteria and that were subjected to further analysis. Our findings show that while research on CT in TED draws on numerous theoretical frameworks, conceptualizations nested in argumentation theory predominate. However, researchers are often not explicit while defining CT and draw on a broad range of related terminology which blurs the concept. Although both domain-specific and domain-general conceptualizations are present in the sample, researchers also often do not offer explicit clarifications on the role of disciplinary knowledge in CT. Our findings suggest further that research on CT in TED is heterogeneous across several dimensions, including educational levels and school subjects pre-service teachers (PSTs) were training to teach, as well as adopted methodologies. We also evidence a sharp increase in publication rates in the last decade. We will discuss the implications of our findings and argue in particular for the need for greater conceptual clarity in research on CT in TED for educating critical thinkers in dynamic, fast-changing learning spaces.

Argumentation as a transdisciplinary issue: a program to enhance basic skills in teacher students

Laura Landi, Maria Elena Favilla, MIchela Maschietto & Beatrice Battilani (Università di Modena e Reggio Emilia, Italy)

The Italian school system emphasizes argumentative skills development from preschool to secondary education, but many university students struggle with these skills. This is particularly crucial for students studying to become primary school teachers. At the Department of Education and Human Sciences (University of Modena and Reggio Emilia) we address this by integrating argumentation into the curriculum for Primary Education Sciences students. We use a transdisciplinary approach, combining linguistics and mathematics, to teach argumentation alongside reading comprehension and logical reasoning.A study conducted in 2023-24 focused on first-year students with further additional requirements (OFAs), identified based on test results covering linguistic competence, logical reasoning, literary knowledge, and science/mathematics. Those with OFAs underwent targeted interventions.Data collection involved initial assessments, a 10-week course, and follow-up assessments. The course emphasized general and mathematical argumentation using Toulmin's model (1958), facilitating structured argumentation and logical reasoning. Assessments aimed to determine the impact of the course on students' argumentative skills.The paper's objectives include analyzing the relationships between different sub-tests, examining how difficulties in mathematical argumentation correlate with text comprehension and math abilities, and assessing the course's effectiveness. Results will be compared across various assessments to determine the impact of the intervention.Overall, the study evaluates the effectiveness of integrating argumentation skills into the curriculum and aims to provide insights into improving argumentative abilities among primary education students. By addressing

these challenges early on, the university seeks to better prepare future teachers to foster critical thinking and effective communication in their students.

Discussion vs. debate in civic education: a quasi-experimental video study

Lukas Conrad Brandt (Technische Universität Dortmund, Germany)

Argumentation is of particular importance for political learning processes (Gronostay, 2019). It serves, among other things, the development of communicative political capacity and democratic conflict skills. Argumentation also plays an important role in everyday teaching practice. In political didactic research, however, there is little known as to whether and under what conditions discussion-oriented methods promote the students' ability to make political judgements. The video study aims to find out to what extent political judgement competence (Detjen, 2012) can be promoted by cooperative and competitive discussion formats (Johnson, 2015) in politics lessons and how the use of a structuring aid in the form of an Argumentation Vee Diagram(Nussbaum, 2008) affects this process. In order to investigate this question, the same lesson was conducted and video-recorded in several classes using different discussion methods. In addition to the video data, further data was collected through questionnaires and student workbooks. The oral arguments will also be coded regarding their quality. The analysis of the collected data will be quantitative. The first analyses of the students' written arguments can be presented at the conference.

Symposium C
Handling the Dangers of Bona fide Argumentation in Democracies - SIG 26 (Room 1.301)

Chair: Baruch Schwarz (Hebrew University of Jerusalem, Israel)
Discussant: Michael Baker (CNRS - Telecom Paris, France)

The co-elaboration of moral reasoning in relation to action in dialogue

Baruch Schwarz (Hebrew University of Jerusalem, Israel), Francoise Detienne& Michael Baker (CNRS, France)

Literature on moral education and dialogue is abundant, but there is no research on the emergence of moral (or ethical) thinking in social interactions. We describe the implementation of an international program aimed at instilling "European values"through the enactment of a dialogic pedagogy, inspired by Buber's (1958) ethics of dialogue. Wordless texts that alluded to values such as empathy, tolerance or inclusion, were chosen as resources to encourage children to have fruitful discussions onsuch values. The paper discusses the coordination between ethical thinking and ethical conduct on the basis of qualitative analyses of two dialogues between students: in one, ethical thinking and conduct were closely associated; in the second, meticulous teacher guidance led to a discourse in which ethical thinking and ethical conduct were dissociated. Whilst teacher guidance is crucial in enabling students to grasp moral questions emerging from narratives (Baker et al. 2023), it is also essential to preserve a zone of autonomous discussion between students.

The Covid-19 Vaccine as a Socio-Cognitivo-Emotional Controversy for Fruitful Health Education

Claire Polo (ECP Laboratory, France) & Kristine Lund (CNRS, Ecole Normale Supérieure de Lyon, ICAR, France)

The Covid-19 pandemic challenged us to build sustainable societies able to overcome sanitary crises 'leaving no one behind' (LNOB). The French government invested in vaccination policy in authoritative top-down ways, but a great wave of vaccine hesitancy disrupted the society and led to strong caricatured pro/anti-vax opposition in the mass media. Instead of people being convinced by genuine argumentation, the mandatory health pass was the reason 79% of the French population became fully vaccinated. In this paper, we argue that unpacking the three-part socio-cognitivo-emotional nature of reasoning about such socio-scientific issues, and developing health education programs based on such analyses, may help citizens develop critical and constructive argumentation. In particular, making the affective background of diverging claims explicit could help mutual understanding and avoid stigmatization of others. To illustrate our argument, we draw on the deep analysis of 3 widespread messages in the French media about vaccine hesitancy. We show that, even if they might sound only cognitive, only social or only emotional at first glance, they in fact all rely on these three dimensions. We conclude by discussing how such a perspective can inform health education in an inclusive, sustainable society.

From dialogue to metadialogue: students' metadialogic contributions in civic education discussions

Chrysi Rapanta (Universidade Nova de Lisboa, Portugal) & Fabrizio Macagno (Universidade de Lisboa, Portugal)

A distinction commonly drawn in education, linguistics, and argumentation is between "object-level" and "meta-level" discourse moves (Sfard, 2015). It is generally admitted that it is at "meta-level" where ideas are negotiated, misunderstandings are solved, and higher thinking outcomes are fulfilled. The problem this paper addresses starts with the specification of what counts as a "meta-level" in students' dialogic discourse. In the literature, different concepts have been developed: metalanguage (Jakobson, 1981; Tang, 2021), metadiscourse (Hyland, 2017), metatalk (Myhill & Newman, 2016), metadialogue (Bereiter & Scardamalia, 2016; Krabbe, 2003) and meta-communication (Hübler, 2011). All these meta-levels represent different perspectives on how discourse can be used for talking, discussing, or negotiating the verbal activity itself, and not a distinct cognitive object. For education, this meta-level of discourse has several crucial implications. First, it corresponds to the level at which the core of the common ground between the participants is developed (Kecskes & Zhang, 2009; Labov & Fanshel, 1977), overcoming cultural differences. Second, at this level, misunderstandings are prevented, by clarifying language uses and the intended interpretation of an utterance. Third, it affects meta-cognition, namely the awareness of how knowledge is developed (Fleming & Lau, 2014; Kuhn, 2000). However, very few works have addressed this topic, let alone attempted to capture how it is manifested in interactions and affects them. The purpose of this paper is to propose a typology of students' metadialogical moves in classroom dialogues and outline how they are used for contributing to civic education discussions. In particular, metadialond 3) providing meta-arguments.

SIG 20 & 26 Keynote

Reclaiming Autonomy Online: Critical Ignoring and Other Tools for Navigating Digital Challenges
Anastasia Kozyreva (Max Planck Institute Berlin, Germany)

The widespread dissemination of attention-grabbing and manipulative content, including false and misleading information, has become a global problem requiring urgent solutions. This issue is not only a policy challenge—given the risks social media poses to public health, mental well-being, and the integrity of democracies—but also a significant challenge for education. Traditional approaches to critical thinking, developed in an era far less saturated with information, are now being tested in unprecedented ways. Social media, in particular, creates conditions that demand the development of new resistance practices and competencies. In this talk, I will explore the essential tools and skills needed to empower citizens to combat online misinformation and manipulation, and to reclaim their autonomy in attention-driven information environments. I will specifically focus on the competence of critical ignoring and a toolbox of individual-level interventions against misinformation.

THURSDAY **12:15-13:45**, ROOM **1.401**

JURE Members Social Lunch Hour

THURSDAY **13:15-14:45**

Parallel Slot D

Paper Session D1: Assessing discourse and dialogue - SIG 26
(Room 1.401)

Developing and Assessing Students Capability with Argumentation

Jonathan Osborne, Stanford University, USA), Mark Wilson (University of California Berkeley, USA), Kristin Gunckel (University of Arizona, USA) & Linda Morell (University of California Berkeley, USA)

In this paper, we outline the work undertaken by multiple groups to develop assessments for middle school science based on a learning progression for argumentation (Osborne et al., 2016). The approach taken is based on the Berkeley Evaluation & Assessment Research Assessment (BEAR) system, grounded in four building blocks (e.g., construct map, item design, outcome space, and Wright Map) which guide assessment development. This research requires administering a set of items to a group of students, typically 500-1000 students, coding any constructed responses and then producing a representation of the results called a Wright map. The learning progression in argumentation and the subject-specific topic serves as a testable hypothesis and the Wright map is the representation of the data that provides validation evidence for the construct. Revisions to the construct, the items, or the scoring design are then made enabling the production of an improved construct map and better items. The work, now in its tenth year, has developed multiple progressions looking at students' capability to argue in the domains of structure of matter, ecosystems, natural resources, and the more

general theme of patterns. In addition, the work has led to thedevelopment of a software system – the BEAR Assessment System (BAS) Software for administering the items. This system enables the coding of selected items and the production of reports for teachers and other interested parties. This presentation willoffer an overview of what has been achieved and its value for the field.

Microgenetic Analysis to explore Dialogicity in Face-to-face and Online Classrooms

Jose Luna & Merce Garcia-Mila (University of Barcelona, Spain

Dialogical teaching is a useful pedagogy to improve dialogicity in the classroom, and foster learning. It has been applied in a variety of contexts, but most researchers assume that interaction between students is face-to-face. The present study aimsto explore the differences in the development of dialogicity between face-to-face and online environments. We conducted a microgenetic design to analyze the change in the level of dialogicity over ten sessions in two classrooms of high school students, one face-to-face and one online. The results showed that students in the face-to-face classroom improved their level of dialogicity over the sessions. In the online classroom no significant changes were observed. The findings point out that students in the online classroom had difficulties in directing the discussion towards the content of the sessions. The development of metadialogical skills may provide a solution for students to effectively lead discussions in online environments.

ArgCoach: Discourse Analysis to Support Automated Coding of Teacher Facilitation of Argumentation

MacKenzie Novotny, Iowa State University, USA), Alina Reznitskaya (Montclair State University , USA) Droste Hennings (Iowa State University), Samantha Semelroth (Iowa State University), Evgeny Chukharev (Iowa State University, USA) & Ian A.G. Wilkinson (Ohio State University, USA)

Advances in generative AI and natural language processing may offer valuable alternatives to traditional teacher professional development by providing individualized, cost-effective, and practical solutions. This presentation reports on the initial work to design an expert-informed AI tutoring system called ArgCoach. The purpose of ArgCoach is to support elementary science teachers in learning to facilitate argumentation during simulated discussions among student avatars. ArgCoach will use generative AI to create brief dialogues among student avatars to offer teachers practice with facilitation of student argumentation. ArgCoach will also take the role of a human coach by analyzing the teachers' facilitation and providing adaptive feedback.Despite the capability of modern technology, AI tools still function as generalists and need specialized training to draw on relevant expertise. To become a specialist, AI needs examples of teacher utterances to learn how to classify them based on normative frameworks of argumentation and facilitation. In this project, we created a procedure to code teacher utterances based on the Argumentation Rating Tool (ART), an instructional and assessment instrument that presents argument evaluation criteria along with related facilitation practices (Reznitskaya & Wilkinson, 2021). Drawing on methods of discourse and rhetorical analysis, we developed rules to classify utterances according to facilitation practices in the ART. After developing the rules, three raters independently coded teacher utterances in 10 discussions. The raters achieved acceptable levels of agreement on half of the facilitation practices and identified methods to improve reliability of the coding process. When the practices caning up effective PD aimed to support teacher learning of facilitation.

Authentic Assessment as a Means of Supporting Deliberative Dialogue Competencies

Paula Waatainen (Vancouver Island University, Canada) & Jessica Selzer (Rockridge Secondary School, Canada)

Supporting our students to engage in productive dialogue about issues of importance may not ever have been as essential as it is today, or as potentially challenging for teachers to design for. In this study, a Canadian teacher and Model United Nations sponsor (Author B) was preparing to teach a Political Studies course for the first time to a class of 16- and 17-year-old students. Knowing many of the students were Model UN club members and quite adept at debate and argumentation, she chose toshift focus to help them develop competencies associated with deliberative dialogue (eg. Parker, 2006; McAvoy & Lowery, 2021), by having them begin with the question "what should we do?" then consider multiple perspectives and policy options and seekcommon ground. The teacher and a researcher (Author A) formed a clinical partnership to design a five-week unit that had students engage in deliberative dialogue weekly with formative feedback, culminating in a Model United Nations simulation, whereunmoderated and moderated caucuses would require students to apply competencies associated with deliberation. This study was the second design phase in an ongoing design-based research study that the researcher began in their Learning Sciences doctoral dissertation. The design team applied theories associated with authentic assessment (eg. Wiggins, 1989; Koh & Luke, 2009), and competence (eg. Tardif, 2003; Jonnaert et al., 2006; Hipkins, 2013) to design a plan to assess the development of associated competencies so the teacher could provide formative feedback, engage students in quality self-assessment, and determine a grade to report. Findings, based on observation and interviews with the teacher and students, suggest that the use of authentic assessment practices supported the development of competencies, as we had operationalized them, student confidence, and teacher interest in making deliberative dialogue central to her program.

Paper Session D2: Professional development and dialogue - SIG 20 & 26 (Room 1.406)

Teaching social scientific reasoning. Promoting teachers' growth with educative curriculum materials

Gerhard Stoel, Radboud University, Nijmegen, Netherlands), Thomas Klijnstra, Geerte Savenije, Gerard Ruijs & Carla Van Boxtel (University of Amsterdam, Netherlands)

In social science education, students need to reason about social problems. However, reasoning is considered difficult and social problems are often complex (e.g., they have multiple causes, consequences, and solutions). Consequently, fostering students' ability to reason about political and social problems is a highly complex task. Teachers need explicit knowledge of what social scientific reasoning entails, which naïve conceptions students might hold and about pedagogical strategies to supportthis reasoning. In this study, we explore how the use of domain-specific Educative Curriculum Materials (ECM's) – namely a rubric, a list of reasoning flaws, design principles, and sample lessons based on these principles – in a yearlong professional development program contributed to teachers' professional growth in teaching social scientific reasoning (SSR) in social science lessons. Ten social science teachers participated in this study. To examine their professional growth, we collected data using questionnaires and interviews both before and directly after the professionalization program. Furthermore, we conducted an interview one year after the program.The results showed that teachers indicated a greater understanding of SSR skills,and the steps students need to take to reach higher levels. The increased knowledge was considered valuable, because it

helped teachers formulate learning objectives, grade assignments, and provide feedback on student responses. All teachers reportedthat SSR was given increased attention in their lessons. The ECM's were considered important sources that contributed to teachers' professional growth in knowledge, beliefs and instructional practice. The teachers actively used these materials in their owpecific ECM's in a professional development program contributes to teachers' professional growth in teaching reasoning skills in social science lessons.

Negotiating Dialogicity in Literacy Coaching: The Role of Epistemic Authority and Knowledge Objects

Livat Eshchar – Netz & Aliza Segal (Technion, Israel)

Literacy coaching, a form of school-embedded teacher professional development, is marked by tensions between directive and responsive approaches. While responsive, dialogic coaching is often viewed as more effective, directive coaching methods may beprioritized in underperforming schools focused on rapid improvement. This study examines the role of epistemic authority and knowledge objects in shaping dialogicity within literacy coaching interactions. This in-depth case study features an analysis of two parallel literacy coaching events in an underperforming elementary school serving marginalized students. First, coaching mentor Smadar undertakes a coaching activity with coach Lily; the second event features Lily replicating this activity with teachers. Using linguistic ethnographic methods, the study investigates how participants negotiate dialogicity and its limits, and the factors that afford or constrain dialogue in these two disparate discourse events.The findings reveal that theuse of epistemic artifacts, or knowledge objects, played a key role in distributing or consolidating the coaches' epistemic authority. In the first event, the shared access to instructional materials fostered a more dialogic interaction. In contrast,the provision of a different knowledge object in the second event led teachers to believe they shared epistemic authority, even as the coach exerted control to guide them to a predetermined outcome. This study contributes to understandings of the cultural and relational complexities inherent in promoting dialogic approaches through literacy coaching and other teacher professional development initiatives. We suggest that recognizing the potential of knowledge objects to shape epistemic authority dynamics may offer insights for enhancing dialogicity in coaching and classroom settings.

Enhancing Mathematics Teachers' Noticing with Bakhtin: a Professional Development Intervention Study

Rotem Abdu (David Yellin Academic Education College, Israel) & Benzi Slakmon (Tel Aviv University, Israel)

Acknowledging the pivotal role of noticing in teachers' professional work, it is noteworthy that its application in dialogic activities remains an area that has yet to be studied. In this study, we examine mathematics teachers' noticing of dialogue among peers working together on problem-solving tasks and investigate the impact of a professional development intervention focused on dialogue on teachers' noticing practices. Through think-aloud interviews, fourteen teachers provided insights into their noticing practices by attending to and responding to video excerpts of dyads engaged in collaborative problem-solving in computer-supported learning environments. Their noticing practices were analyzed using a Bakhtinian-informed dialogic framework. Subsequently, the teachers participated in a professional development intervention centered around dialogue and were interviewed again using the same video excerpts. The second round of interviews was also analyzed using the same dialogic framework. The findings shed

light on the initial state of teachers' noticing and indicate a discernible improvement in their ability to notice specific dialogic attributes. These findings offer valuable insights into how collaboration and dialogue betweenstudents can be effectively supported. Additionally, the study discusses how teachers envision dialogue and considers the capacity and limitations of incorporating a dialogic vision into the noticing paradigm.

S(t)imulating dialogic teaching as a core practice in teacher education

Susi Klaß, Elisa Calcagni & Alexander Groeschner (Friedrich Schiller University Jena, Germany)

The relation between theory and practice in teacher education poses long-standing challenges in the design of teacher education programs (TEPs) worldwide. A central task is preparing teachers for challenging learning opportunities amidst the inherentuncertainty of classroom interactions (Forzani, 2014). The practice-based teacher education movement, and the U.S.-based Core Practice Consortium in particular, have developed a theoretical and practical approach (Core Practice Consortium, n.d.; Grossman et al., 2009). This approach posits that preparing teachers requires identifying evidence-based "core practices" that preservice teachers (PSTs) can learn and begin to routinize during their studies (Forzani, 2014). A growing body of empiricalstudies has addressed core practices of teachers during field experiences and/or university courses, in many cases leading to the partial or complete restructuring of teacher education programs (Matsumoto-Royo & Ramirez-Montoya, 2021). As great variation exists within and across countries in how TEPs are designed, it is important to situate related research in context and reflect upon how findings can contribute to the exchange and development of teacher preparation worldwide (Grossman & Fraefel, 2024).In this presentation, we report on our ongoing work with core practices in our TEP for secondary teachers at a university in XXX (anonymized for review). We provide insights into our work with PSTs to bring theory and practice closer during afive-month field experience. In the context of an accompanying course, we empirically investigated differences between a new dialogue-focused teaching simulation followed by video analysis and the usual practice of analyzing classroom videos of teachers unknown to the students. For this, we investigated PSTs' perceptions of learning in a quasi-experimental pre-post-test design.

Symposium D: Fact-Checking in the Wild - SIG 26 (Room 1.301)

Chair: Michael Baker (CNRS - Telecom Paris, France)
Discussant: Eli Gottlieb (George Washington University, USA)

Conspiracy, Controversy, and the classroom: Expanding Discourse in Educational Spaces

Glenn Bezalel (University of Cambridge, United Kingdom)

This critical ethnographic study explores the prevalence and functions of conspiracy theories among youth cultures in London. By conducting research on two school sites with very different socioeconomic and ethnic mixes in this global city, I aimed for a deeper treatment of young people and their beliefs, notions of selfhood, and relations to the other, in what might be seen as the highly diminished liberal democratic state, particularly as it relates to the rise of populism. I employed a rangeof ethnographic research methods including semi-structured and unstructured interviews, student workshops, shadowing participants on site, lesson observations and curriculum analyses, visual voice projects,

and online discussion groups. My findings point to the need for an expanded analysis of conspiracy theorising beyond the epistemic as the 'democratic deficit' wrought by a muscular liberalism compels us to consider the existential and social dimensions for conspiracy theorising as a counter to 'political rationality' that dominates the political, social, and educational discourse. The research suggests that the liberal state's unrelenting push into all aspects of our lives, not least in education, impacts significantly how young people conceptualise their own 'narrative identity' and 'social imaginaries'. In turn, this thesis looks to Arendtian 'agonistic pluralism' for an expanded discourse in educational spaces, advocating for a 'plurality of ideals' to help consider fully the teaching and learning about conspiracy theories in the spirit of what Paul Ricœur has called a 'genuine discourse'.

Religious Thought as an Aid to Critical Thinking in the Face of Generative AI

Harris Bor (Twenty Essex, London School of Jewish Studies, United Kingdom)

The growth in use of generative AI, specifically LLMs, is particularly evident in the field of education. While some consider that the technology will improve education and reduce pressure on teachers, others see it as a step towards normalizing cheating and a threat to learning. Familiarizing teachers and users with critical thinking skills is thought to be an important means to counter some of the perceievd negative effects of generative AI, including a willingness to put too much trust in theoutputs of generative AI and outsourcing thinking to a machine. Applying a philosophical-theoretical approach, and using Judaism as a case study, the presentation will argue that religion might play a role in thinking critically about generative AIwhile also offering a response to generative AI more generally which might address some of the ethical and social concerns surrounding this technology. In making the case, the presentation will draw on Judaism's traditional texts, as well as philosophical and theological ideas.In a secularist age, religion is oftentimes associated with trust in authority and blind faith, but religion also espouses personal autonomy as a value and promotes a cynical attitude towards any authority other than God.Such notions might provide a protection against a belief in AI's superiority over human intelligence or temptation to cede one's decision-making or critical thinking to an AI.Ideas that will be explored include the notion of truth, the concepts of divine authority and idolatry, and the place of individual responsibility.

When Argumentation Goes Sour: Participation in Highly Contentious Discussions in Times of War

Yael Malin, Yaeli Gardyn & Christa Asterhan (Hebrew University of Jerusalem, Israel)

Deliberative argumentation can enhance learning, however, discussion on contentious topic involving disagreement may have a negative effect, particularly during heated socio-political conflicts. Engagement in such discussion may lead to polarization,where participants become entrenched in their own perspectives, and can even affect mental health. Moreover, research indicates that certain uses of social media, such as interacting with distant acquaintances and strangers, are linked to decreased mental well-being and increased loneliness. Finally, while social media have become a primary source of news consumption, often facilitating the spread of misinformation and disinformation, many users fail to discern fake news.In this study, our objective is to assess individuals' awareness of the content they encounter on social media and their tendency to verify its accuracy. Additionally, we aim to explore whether the frequency of social media use and engagement in polarized, contentious discussions are linked to psychological well-being, within the context of the ongoing conflict between Israel and Hamas.A total of 442 Hebrew-speaking undergraduate students completed questionnaires concerning their psychological well-being and various aspects of social media usage, including frequency

of use, engagement in contentious discussions, awareness of fake news, fact-checking habits, and news consumption. Our findings indicate that the majority of undergraduates rely on social media for news consumption, and that awareness of fake news significantly predicts their fact-checking behaviors. However, fact-checking habits were generally found to be low. Furthermore, increased social media usage and participation in polarized discussions were aare at a heightened risk of consuming fake news.

Wild Things in the Classroom: How Teachers Integrate Authentic Online Sources in the Curriculum

Sarit Barzilai, Linor Hadar, Shai Goldfarb Cohen, Thuraia Copti-Mshael (Haifa University, Israel), & Liron Primor Greenfield (Hemdat Academic College, Israel)

Teachers can play an important role in preparing students for future encounters with online (mis)information. However, instruction at school rarely provides opportunities for grappling with unreliable online information sources. Thus, a key challenge is finding ways to support teachers so that they can infuse critical evaluation of authentic Internet sources in their teaching. In this study, we examined how middle school teachers, participating in a year-long course designed to support learning and instruction of critical evaluation competencies, integrated evaluation of authentic online information sources in their instruction. The participants included thirteen experienced middle school teachers who taught diverse scientific and humanistic subjects. The main data sources were recordings of all of the course meetings and semi-structured interviews with teachers. We identified two main approaches that teachers used to integrate authentic information sources in their instruction. One approach was addressing online information sources on current events and topics that interest students. The main challenge with this approach was obtaining legitimacy from administrators and students to make space for such activities. The second approach was embedding authentic information sources in the teaching of regular school subjects. The main challenges with this approach were identifying relevant information sources that can afford critical evaluation and maintaining accountability to students' knowledge. We discuss how teachers coped with these challenges and the implications of these findings for promoting integration of digital information literacy competencies at school.

THURSDAY 15:15-16:45

Parallel Slot E

Paper Session E1: Conflict and controversy in argumentation - SIG 26 (Room 1.401)

Dealing with reactance when arguing about climate change

Benjamin Brummernhenrich, Regina Jucks & Laura Bilfinger (University of Münster, Germany)

The climate crisis is a pressing problem, yet political and societal action in tackling the issue has been slow. Although most Europeans perceive climate change as a serious problem, few talk about it in their day-to-day interactions. We have focused on reactance as a problematic aspect of climate messaging: Especially strongly worded recommendations targeted at individuals ("Everyone must use public transportation instead of cars!") can provoke the opposite to the intended reaction by triggering

reactance. People also prefer solutions to be suggested at a political rather than an individual level.Personal stances toward potential action on climate change are expressed and developed in personal conversation. This entails dealing with arguments around solutions, both political and individual. Consequently, how individuals argue about these solutions is a central question.We investigated this question in a number of studies. The talk will focus on an experiment in which 605 participants were presented with a fictitious citizen's opinion on the transport sector's impact on climate change. In a 2x2 between-subjects design, mitigation strategies were proposed at an individual or a political level, and the messages expressed high or low levels of threat to health and the environment. Compared to political-level solutions, individual-level solutions elicited more reactance but did not influence reported fear. High-threat messages elicited more fear but threat did not impact reactance. Participants' willingness to discuss climate change was not influenced by either factor, but did correlate with topic-specific interest.Additionally we will report findings from other experiments, that varied the message source message and controllingrries, and to engender constructive discussion and argumentation about climate change mitigation.

Open to change: Impact of group membership perception on attitude change and evaluation bias

Paulo José Medeiros dos Santos (Saarland University, Germany), Dimitra Tsovaltz (German Institute for Artificial Intelligence), Nóra Éva Spengler, Albulene Grajcevci, Armin Weinberger, (Saarland University, Germany)

This study explores the influence of perceived group membership on attitude change and evaluation bias within argumentation-based settings, focusing on gun control debates. It examines how the perception of the arguer as either sharing or opposing one's own stance affects attitude shifts and the evaluation of arguments.Participants (N=24) from diverse Brazilian institutions engaged in one-on-one debates, with experimental conditions designed to make the arguer appear as an ingroup (aligned with the participant's stance) or outgroup (opposed to the participant's stance) member. The findings reveal a significant change in attitudes in the condition where the arguer was perceived as an ingroup member, highlighting the role of perceived group affiliation in attitude adjustment. However, the study found no significant impact on evaluation bias, pointing to the complexities of bias in argumentative contexts. These findings underline the potential of educational strategies that leverage groupmembership perceptions, combined with argumentation processes, to foster productive and reflective debates. Future research should further investigate the mechanisms underlying attitude change and the role of automatic evaluations in such settings.

Disagreement as a key to understanding the productivity of (non-convergent) discussions

Yifat Kolikant & Asaf Salman (Hebrew University of Jerusalem, Israel)

Much effort has been devoted to studying the dynamics of discussions, in order to develop computerized tools to support teachers and students in collaborative learning settings. Nonetheless, most work is tailored to convergent collaborative learning,namely, activities in which discussants are expected to converge to a consensual answer throughout a constructive and critical discussion of all ideas. Critical discussions in non-convergent, successful collaborative learning, although common (e.g.,in the Humanities) received less attention. These discussions are often replete with disagreements and disputes since the diverging ideas discussed do not merge or converge. Their productivity lies in the dialogical agency set in the participants. Therefore,

they have the potential to celebrate multi-perceptiveness and hence may be utilized to reduce social polarization. We aim to develop an AI agent to assist in identifying and predicting the course of such discussions in real-time. We claim that disagreement is key to understanding the course of discussions. Disagreement can enhance or diminish discussions' productivity. It is the engine underlying the critical exploration of diverging views and further elaboration, but it can also escalate social tensions and cause conversational failure. We argue that Disagreement Strategies — how we choose to express disagreement —matter to how one responds when being disagreed, thereby to discussion productivity. We rely on the extensive literature in the fields of communication and education. Nonetheless, in both fields, there is no clear framework addressing this theoretical correspondence. In the EARLI-SIG 26 meeting, we will present a taxonomy of disagreement strategies, we have developed.

Self, Co, and Shared Regulation of Epistemic Thinking During Document-Based Scientific Inquiry

Ina Talmon Haifa University, Sarit Barzilai (Haifa Univeristy, Israel) & Clark Chinn (Rutgers University, USA)

The challenge of making sense of multiple scientific documents evokes students' epistemic thinking as they collaboratively pursue their epistemic aims. However, little is known about how learners engage in metacognitive regulation of their epistemic aims, ideals, and processes during collaborative inquiry. Informed by the AIR model of epistemic thinking, this study aimed to identify and characterize how self, co, and shared metacognitive regulation of epistemic aims, ideals, and reliable processes are enacted during collaborative inquiry with multiple scientific documents. The participants included two dyads of ninth-grade students who participated in a microgenetic study in which they met over twelve sessions to engage in collaborative inquiry. Students worked together on four biology inquiry units using multiple documents that systematically varied in their conclusions and credibility. Detailed coding schemes were developed that exhaustively captured students' epistemic aims, ideals, and reliable processes as well as whether and how students regulated these components. Students were found to frequently engage in regulation of their epistemic thinking: Epistemic aims were most frequently regulated, followed by ideals and reliable processes. Students engaged in self, co, and shared regulation in each of the AIR categories. Students engaged in shared regulation most frequently, especially shared regulation of epistemic aims, followed by self-regulation. Co-regulation was the least frequently used mode. Monitoring emerged as the most prominent regulation skill in all regulation modes and in intersection with each of the AIR categories. The skill of planning was mainly mentioned during shared regulation of aims. Controlling andtruction by suggesting new ways of supporting learners' regulation of epistemic performance.

Paper Session E2: Fostering scientific reasoning - SIG 20
(Room 1.406)

Teacher change in differentiated instruction within Science and Technology education

Rebecca Kahmann, Ard Lazonder, Mienke Droop, & Rob Holland (Radboud University Nijmegen, Netherlands)

Differentiated instruction enables teachers to respond to the varying needs of children in their classrooms. As differentiated instruction can be difficult to implement in Science and Technology lessons, teachers are expected to require and benefit from professional development programs (PDPs). In this longitudinal case study, we set up a PDP to foster elementary school teachers' differentiation practices within inquiry- and design-based Science and Technology lessons. We assumed that a sustainable change in teachers' behavior is related to changes in their knowledge, beliefs and attitudes and to the effect that teachers see in the children's learning behavior and outcomes. These predictions were tested by triangulating data from teachers and the children in their class throughout the PDP. Results of a focus group at the end of the PDP suggest that the PDP boosted some teachers' self-efficacy and beliefs and enhanced their differentiation practices. Difficulties in implementing the aspect of formative assessment remained, however, and few teachers noticed marked changes in their children's learning outcomes and behavior. We will provide further perspectives on whether and how the participating teachers changed in their knowledge,beliefs and attitudes and differentiation practices within Science and Technology education at the conference. Those outcomes will also offer implications for future PDPs.

Inquiry learning in science education with real, virtual, combined real & virtual, or VR experiments

Salome Flegr (Technical University of Dresden, Germany) & Jochen Kuhn (Ludwig-Maximilians-Universität, Germany)

One fundamental aim of science education is fostering students' conceptual understanding. The instructional approach of inquiry learning has proven to be one possibility to effectively foster this understanding of concepts. Inquiry learning can be implemented using real (hands-on) experiments, 2D-virtual experiments (e.g., on iPads), or 3D-Virtual Reality (VR) experiments. Recent research suggests that sequenced combinations of real and virtual experiments are more effective for improving students' conceptual understanding than single experimentation formats alone. Whether this holds true for parallelly used combinations has not been investigated intensively so far. Moreover, VR experiments might minimize the split attention effect that occurs in combined real and virtual experiments; however, this has not been investigated systematically yet. In the present study, 172 middle school students were involved in inquiry learning in a physics lesson. They worked either with a (a) real experiment alone, (b) virtual experiment alone, (c) parallelly combined real and virtual experiment, or (d) VR experiment. In line with our hypotheses, inquiry learning fostered students' conceptual understanding in physics (H1), real and virtual experiments lead to similar conceptual understanding (H2), and students in the combination condition learned more than students in the single experiment conditions (H3). However, the VR experiment did not lead to higher conceptual understanding than the combination of a real and a virtual experiment (contrarily to H4). In conclusion, this study suggests that combinations of real and virtual experiments can be recommended for inquiry learning in science education, also when used parallelly.

How is the Nature of Science Represented in Exemplary Inquiry Teaching Cases?

Shani Zur & Tali Tal (Technion - Israel Institute of Technology, Israel)

Inquiry teaching is a well-known teaching approach. It is anticipated that inquiry learning processes would give students opportunities to reflect on the epistemic aspects of science as well as cultivate their procedural understanding of scientific investigations, thereby fostering an appreciation of the Nature of Science (NOS). Nevertheless, evidence indicates a gap between the idea of productive inquiry-based learning articulated in the

literature and its practical implementation. Often, inquiry-based learning is depicted as a procedural and experimental activity, inadvertently neglecting the intricate facets of the scientific endeavor, its social and cultural aspects, and its epistemological nuances. To expand our knowledge about how teachers successfully design and instruct productive inquiry, we aimed to learn from best practices of inquiry teaching by examining Exemplary Inquiry Teaching (EIT) cases. We employed a qualitative-interpretive approach and used the family resemblance approach (FRA) as an analytic lens to assess how teachers discussed and reflected the NOS in 12 cases we identified as EIT. Additionally, we conducted a thematic analysis to elucidate teachers' perspectives on and discussions about the NOS, discerning whether their references to NOS were intentional. Findings indicate that nine teachers presented considerable emphasis on the NOS in the EIT. Nevertheless, they focused mainly on cognitive-epistemic aspects of the NOS while less consideration was given to the social-institutional aspect of the scientific work as a collective endeavor of the scientific community. Furthermore, teachers were intentional about reflecting the NOS as they described their initial goals and how the inquiry was planned. Evidently, they used two main ways to reflect the NOS in EIT: (1) modeling scientific discourse and behavior and (2) encouraging students to participate in scientific practices and reflect on the NOS. Implications and conclusions are discussed.

Effects of Video Modeling and Reflection Instruction on Scientific Reasoning and Reflection Quality

Yoana Omarchevska & Katharina Scheiter (University of Potsdam)

Guided inquiry learning is an effective approach for gaining scientific reasoning and conceptual knowledge in science. However, students often struggle with different scientific reasoning processes and successful self-regulation of scientific reasoning processes was shown to be associated with a higher hypothesis and argumentation quality in prior research. Therefore, guidance can be targeted at supporting both scientific reasoning and self-regulated learning. This study investigated the effects of two types of guidance used in prior research – video modeling examples and reflection instruction – on hypothesis quality, argumentation quality, and reflection quality. University students (N = 173) solved a training and a transfer inquiry task using two computer simulations and received one of four types of instruction between the two tasks – video modeling, reflection, video modeling and reflection, and no instruction (control). Contrast analyses showed that hypothesis quality in the transfer task was higher for all experimental conditions than the control (C3), $t(163) = 2.207$, $p = .029$, but the three experimental conditions did not differ. Reflection quality, in particular the process, was significantly higher in the VM conditions than reflection condition (C2), $t(160) = 2.240$, $p = .026$. Our findings demonstrated that instruction that integrates scientific reasoning and self-regulation was effective for improving hypothesis quality. The way this integration was delivered, either by watching video modeling examples or reflecting on the inquiry process, was equally effective and no added benefit of combining instruction was observed. Implications for research and practice are discussed.

Symposium E: Dialogic teaching from the teacher's perspectives: sense-making, knowledge and perceptions - SIG 26
(Room 1.301)

Chair: Christa Asterhan (Hebrew University of Jerusalem, Israel)
Discussant: Sarah Michaels (Clark University, USA)

A case study of a teacher's learning experience with curriculum materials for civic deliberation

Antonia Larrain, Valentina Guzmán, Gabriel Fortes & Ingrid Gonzalez (Universidad Alberto Hurtado, Chile)

It has been empirically demonstrated that pedagogical practices associated with dialogue and deliberation in the classroom have positive impacts on students' disciplinary and social learning. However, these types of dialogic/deliberative practices have been very difficult to implement in classroom spaces. A promising option are curriculum materials (CMs), teaching resources which focus on teachers' practice to support complex pedagogical innovation. Taking historical-cultural theory as our theoretical basis, we assume that teacher learning (of deliberative teaching) occurs from practice (not from theory or knowledge behind practice) because, in this case, teachers appropriate new forms of deliberative language through its performance in social practice. This appropriation process implies taking a new position in relation to various voices historically situated and politically positioned, thus involving both a subjective and practical sphere. In this study, we aim to explore in detail -through a case study - to what extent the transformation of language practice (new ways of talk) involves the transformation of teacher's points of view as well. We followed a teacher throughout a unit (seven lessons), taught employing CM especially developed to foster civic deliberation. Through the analysis of classroom videos and teacher interviews, our results show that CM, the proposed scaffold, had effects enriching and making pedagogical practices more complex. Likewise, this curriculum scaffolding played a crucial role in the teachers' subjective sphere. These new positions were rearticulated and transformed in different ways in and through the processes of teaching change. Furthermore, this study explores and supports the idea that teacher learning can occur from practice scaffolded by CM by discussing strongly rooted theoretical perspectives focused on individual cognition.

More than a buzzword: Teachers' conceptions of classroom dialogue

Elisa Calcagni (Pontificia Universidad Católica de Chile, Chile), Alexander Groeschner (Friedrich Schiller University Jena, Germany), Sara Hennessy & Ruth Kershner (University of Cambridge, United Kingdom)

Efforts seeking to promote classroom dialogue through professional development (PD) have mainly focused on teaching practices, with teachers' conceptions receiving little attention thus far. This paper reports on a mixed methods study of practitioners' conceptions of classroom dialogue, based on written responses of 146 educational practitioners across educational levels from 11 countries completed before commencing an inquiry into classroom dialogue. We examine teachers' conceptions and reported dialogue practice, mapping them onto the Three Domains for Dialogue Framework (Calcagni & Lago, 2018), with 12 components capturing central elements of dialogic teaching. Our research questions are: What are teachers' conceptions of dialogue and how do they map onto the domains and components of the Three Domains Framework? Do teachers' conceptions relate to their previous PD experience in the area of classroom dialogue? We analysed responses employing content and thematic analysis. Our findings show that in the responses on teachers' understanding of dialogue, only one or two components were identified for each teacher, mainly highlighting aspects of practice such as open questions, more symmetrical interactions or collective knowledge building. More components were present in teachers' examples of practice, reflecting the consideration of teaching instruments such as specific dialogic tools. Meanwhile, the theoretical assumptions underlying dialogic teaching rarely came up. When comparing responses of teachers with short previous PD experiences (n=46) with those with lengthier PD

experience (n=31), significant differences were found in the number of components in teachers' examples, favouring the Lengthier-PD group. We discuss the implications of teachers' previous concepts for PD design, considering how different perspectives should be brought together and how the underlying assumptions of dialogic education need to be linked to the practical aspects of classroom interaction.

Teacher learning of dialogic teaching: A transcontextual analysis of the revoicing concept

Merav Sara Levin, Adam Lefstein & Christa Asterhan (The Hebrew University of Jerusalem, Israel)

Existing research on initiatives to encourage academically productive classroom talk (APCT) rarely documents how newly introduced pedagogical concepts are understood, translated, adapted, and taken up as they travel from the original research and theory through different professional learning contexts (such as collegial discussions, workshops and training materials). In this study, we address this under-examined gap between theory and practice by zooming in on one central APCT concept: revoicing. We examine how this concept is expressed and interpreted in different contexts as it transfers from context to context.The research is part of an initiative to promote APCT in upper elementary language arts lessons. We adopt a linguistic-ethnographic approach using transcontextual analysis methods for this investigation (Maybin, 2017). Our data include records from all the contexts in which revoicing surfaced in the initiative: academic papers, teachers' training materials, workshops and professional learning community meetings. We map the differences between the expressions of revoicing and identify the factors that may have shaped these differences. The findings show that the ways in which revoicing was interpreted and presented changed significantly across the different contexts of the professional development initiative. We identified a general pattern of increased simplification, which removed essential aspects of revoicing's unique and complex functions and meanings, as these are described in the academic literature. The findings of our study contribute to ongoing scholarly efforts to understand the existing gap between theory and practice.

Voices of Change: Exploring Teacher Perspectives through Pedagogically Productive Conversations

Roman Švaříček, Klara Sedova, Maria Vrikki, & Zuzana Salamounova (Masaryk University, Czech Republic)

The aim of this paper is to understand teachers' perspectives on how interactions with researchers influence their pedagogical reasoning, professional growth, and instructional methods. Specifically, it investigates how these dialogues, incorporating rich practice representations and multivoicedness, contribute to teachers' adaptive expertise and professional judgment. The study examines teachers' perceptions of the impact of these dialogues on their embrace of dialogic teaching methods and their ability to navigate the complexities of teaching. Drawing on Vygotsky's (1987) work and Guzmán & Larrain's (2021), this research aims to understand the content and focus of dialogues between teachers and researchers during an interventional TPD program, specifically targeting the teachers' perspective. We utilize the concept of pedagogically productive talk (Lefstein et al., 2020) to outline the nature of conversations that foster teachers' adaptive expertise and professional judgment, which is crucial for navigating the complexities of teaching. This perspective offers a comprehensive view of the dialogic processes that underpin effective teaching, serving as a bridge to our empirical exploration of teacher and researcher dialogues in the context of dialogic teaching practices. We ask the following

research questions: (1) How do dialogues integrating rich practice representations between teachers and researchers align with PPT principles and influence teachers' pedagogical reasoningand classroom practices? (2) How do teachers perceive the impact of pedagogical reasoning in dialogues between teachers and researchers on their development of adaptive expertise and professional judgment? This paper is based on data from an interventiontilizing both quantitative (through sequential analysis) and qualitative (through ATLAS.ti) approaches for analysis.

THURSDAY 17:00-18:00

SIG 20 Business Meeting
(Room 1.405)

THURSDAY 17:00-18:30

Parallel Slot F

Paper Session F1
Engagement in dialogic learning - SIG 26
(Room 1.401)

Promoting Oral Argumentation in Citizenship Education

Liliane Wenger, Açelya Aydin (FHNW School of Education, Switzerland), Manuel Hubacher (Centre for Democracy Studies Aarau (ZDA)/FHNW School of Education, Switzerland), & Monika Waldis (University of Applied Sciences Northwestern, Switzerland)

Deliberative democracy theories advocate for the communicative activation of citizens in opinion formation. Therefore, civic education should introduce adolescents to deliberative processes and to promote their argumentative competence, which is understood as both a linguistic and a political competence. In accordance with our roots in deliberative democratic theory, we view argumentation as a dialogue-based process. This makes transactivity a key feature of good civic reasoning.Empirical evidence shows potential for instructional interventions to boost oral reasoning and critical thinking across subjects, but their effects often remain inconsistent. Data also suggests that students in deliberative settings are more willing to engage with opposing arguments and revise their own. Dialogues in small groups facilitate the acquisition of argumentation skills. Despite these findings, there's limited research on argumentation training effectiveness. In an intervention study (grades 8 and 9),Gronostay combined a thematic input with argumentation training, leading to more transactive speech acts during the subsequent fishbowl discussion in the experimental group. However, the revision and adaptation of their own arguments remained largely absent. This study investigates the effectiveness of an adapted version of Gronostay's strategy training in promoting transactive dialogues. The research involved six seasoned teachers and their classes in the 2022/23 school year, who were engaging with the subject of a cashless society. Despite standardized argumentation training, the quality of debates varied significantly between the classes studied. Influences on the quality of the debates include the social structure of the class, the influence of didactic scaffolding, such as argumentation training.

Dialogic Pedagogy and Cultural Situatedness: Navigating Tensions in Literacy Coaching

Islam Abu Asaad (Sakhnin College for Teacher Education, Israel) & Aliza Segal (Ben Gurion University of the Negev, Israel)

The dialogic turn in education has championed collaborative, discussion-based approaches to teaching and learning. Scholars have noted the injustice in the perception that only certain students - typically those from more privileged backgrounds - are capable of participating in and benefiting from dialogic classroom talk. However, dialogic pedagogies reflect particular Western, liberal-democratic norms that may not be shared by all students and educational settings. This raises concerns about the cultural accessibility of these approaches, as well of the non-dialogicity of imposing such norms across cultural contexts, yet denying the potential cognitive and personal benefits of dialogic ways of talking and being on cultural grounds is equally unjust.This paper examines these tensions through a case study of literacy coaching in an Arab elementary school in Israel. The study, using linguistic ethnographic methods, analyzes the practice of literacy coach Shirin to explore how her interpretations and enactments of dialogic ideals interface with the cultural norms and values of the Arab school context. The findings reveal a complex and at times contradictory negotiation of these dialogic principles. While Shirin enthusiastically advocates for more dialogic and culturally responsive approaches, her coaching practices exhibit both dialogic and more traditional, teacher-centric elements. Her interpretations of dialogic ideals reflect this ongoing negotiation. This juxtaposition suggests that the path forward lies not in simplistic cultural adaptation, but in an ongoing, dialogic process of translation and hybridization. The cultural situatedness of dialogic pedagogy points to the need to recognize the diversity of professional visiocontexts, highlighting the importance of supporting the co-construction of dialogically-oriented approaches to teacher learning and practice.

Video-based dialogic activity on climate change and its impact on beliefs about mitigation actions

Manuel Bächtold (University of Montpellier, France), Kalypso Iordanou (University of Central Lancashire, Cyprus), & Vasiliki Christodoulou (University of Central Lancashire, Cyprus)

Videos can be a valuable resource for explaining climate change and stimulating deliberative discussion on the actions to mitigate it. The aim of this study was to investigate the effects of watching a video and combining it with a dialogic activity on students' knowledge (Know), their beliefs about the mitigation actions to be taken (Act) and their self-reported pro-environmental behaviour (PEB). Two types of dialogic activity were considered: collective and individual dialogue construction on climate change. An intervention was implemented with 75 undergraduate students in three conditions: watching a video alone or combined with a collective or individual dialogic activity. Repeated-measures ANOVA was conducted to compare the effects. Irrespective of the condition, results showed a statistically significant effect of the intervention on Know, but not on Act or PEB. Watching a video combined with a dialogic activity was found to have a significantly more positive effect on Act than watching a video alone. These findings highlighted the value of watching a video on climate change in changing students' knowledge of the subject, but also the value of combining the video with a dialogic activity to change their beliefs about the mitigation actions to be taken.

Learning climate change deliberating with peers: effect on sustainable citizenship

Antonia Larrain (Universidad Alberto Hurtado, Chile), Paulina Freire, Ana Andaur (Pontificia Universidad Católica de Chile, Chile), Maria Teresa Rojas & Hernán Cofré (Universidad Alberto Hurtado, Chile)

The question of sustainability in general is central to a contemporaneous notion of democracy, that is, whether present generations are able to deal with global crisis without risking the living conditions of future generations. This involve what wecall sustainable citizenship, or the active participation and engagement with the exercising of rights in a field of plural interests, often contradictory and in conflict, in a way that allows needs to be addressed. However, to date this idea of citizenship has not been empirically tested. The aim of this paper is to report a study that explored the relation between deliberative peer interactions around climate change and climate change knowledge and attitudes, and citizenship dispositions. We adapted two questionnaires: one to assess knowledge and attitudes toward climate change and other to assess political and civic knowledge and skills. 317 students (98 female) participated in the study. SEM models show a direct effect of classroom dialogue on deliberative dispositions which in turn has a direct effect on climate change knowledge and political self-efficacy, and on all the dependent variables (willingness to mitigate climate change, attitudes towards human rights of immigrants and expected future participation) except for justification of authoritarism. We also found an indirect effect of classroom climate on all the dependent variables except for justification of authoritarism via deliberative dispositions, which has not been reported so far in the literature.

Paper Session F2
Scientific reasoning and epistemological beliefs - SIG 26
(Room 1.406)

Promoting Apt epistemic performance Through Design

Huma Hussain-Abidi, Clark Chinn (Rutgers University, USA), Susan Yoon, Noora Fatima Noushad & Zhitong Yang (University of Pennsylvania, USA)

In the face of increasing science denial and misinformation, this paper addresses the imperative for science education to cultivate apt epistemic performance in students. The Apt-AIR framework unpacks apt epistemic performance into 3 components and5 aspects, providing a structured 3x5 framework to use as a design tool to help analyze and revise curricula. Through collaboration between researchers and teachers, an inquiry-based unit on epidemics was developed and implemented in high school science classrooms. Analysis revealed both strengths and areas for improvement in promoting apt epistemic performance. Revisions to the curriculum targeted gaps in the initial curriculum design particularly in fostering adaptivity, social engagement, andcaring aspects, resulting in a more comprehensive approach to promoting apt epistemic performance. The use of the Apt-AIR framework facilitated targeted redesign efforts, enabling educators to better prepare students for navigating scientific reasoning in a post-truth world. This study highlights the importance of thoughtful curriculum design to promote apt epistemic performances, offering insights for educators and researchers seeking to enhance students' scientific reasoning using the Apt-AIRframework as a design tool and by presenting a portrait of the types of prompts that can be categorized using the design tool.

Interplay of scientific reasoning skills and epistemological beliefs of medical and physics students

Anna Horrer, Stefan Küchemann, Jochen Kuhn, & Martin Fischer (LMU Munich, Germany)

Scientific reasoning skills are vital components of higher education, especially in disciplines like medicine, where clinical decision-making relies heavily on evidence-based practice. Previous research suggests that these skills may not develop sufficiently without targeted training and that there is a complex interplay between students' scientific reasoning skills and their epistemological beliefs, i.e. the way they think about the nature and acquisition of knowledge. There also appears to bea lack of reliable instruments to assess scientific reasoning skills of university students. Therefore, our study focuses on (1) the assessment of scientific reasoning skills and (2) the interplay of reasoning skills and epistemological beliefs. Taking into account the study domain, we compared students from medicine (n=36) and physics (n=56). SRA skills evidence evaluation and drawing were measured with a decision scenario and short summaries from scientific sources with varying strength of evidence. Eight experts judged the quality of sources and yielded acceptable reliability (ICC=.742). Additionally, we applied a questionnaire for the assessment of epistemological beliefs. Medical and physics students showed comparable reasoning skills when working on the scenario. A MANOVA revealed that physics students outperformed medical students in evidence evaluation, $F_{(2, 88)}=10.24$, $p=.002$, partial $h2=.002$ and drawing conclusions $F_{(2, 88)}=5.60$, $p=.020$, partial $h2=.043$. We found a significant difference in epistemological beliefs on the scale personal justification. Physics students (M=1.98, SD=.69) agreed to a lesser extent that scientific knowledge is merely the personal opinion of a researcher than medical students (M=2.50, SD=.96), $F_{(1, 99.016)}$, i.e., the belief that a statement based on scientific research must be true. These findings underline the need to include epistemological beliefs in future studies on scientific reasoning.

The role of narrative and latent meaning structures in college students' critical online reasoning

Dominik Braunheim, Mita Banerjee, Carla Schelle (Johannes Gutenberg-Universitaet, Germany), Johannes Hartig (DIPF Frankfurt, Germany) & Amina Antonia Touzos & Olga Zlatkin-Troitschanskaia (Johannes Gutenberg-Universitaet, Germany)

In the information age, students increasingly learn with online sources rather than with pre-selected study materials (Osborne et al., 2022). As online sources are often not subject to quality control, these sources can lead to students' acquiring false information and misconceptions (Kortum et al., 2008). In these online sources, information is embedded in narrative frames and latent meaning structures, which may influence or "lead" students in their (critical) reasoning process and when forming opinions. Students are often unaware of this (Authors, 2020). To use online sources competently for successful Internet-based learning, students need specific skills to navigate the Internet critically and reflectively, and to identify the (latent)frames and narrative structures that may be embedded in online information.These skills are part of Critical Online Reasoning (COR) as defined by Molerov et al. (2020). In this paper, we analyzed whether university students were aware of the narrative frames and latent meaning structures found within the online sources they used to solve a generic COR task, and whether they reflected on, questioned, or simply adopted such frames without reservation. Combining the methodologies of narrative analysis (Herman & Vervaeck, 2019) and reconstructive hermeneutics (Wernet, 2009), we reconstructed the students' entire task-solving processes as evidenced by tracked log data, including the online sources used and

students' written statements (i.e. task responses). The qualitative analyses presented in this paper are based on two exemplary cases (from students of medicine and economics), who solved two similar generic COR tasks. Using the multimodal data, we investigated in particular the data pertaining to whether there are case-structural and/or intrapersonal differences in students' COR task-solving processes and/or performance, which can be linked to a specific task topic and or studied domain (medicine or economics).

Interanimating data and theory: abduction as a dialogic approach to qualitative research

Riikka Hofmann (University of Cambridge United Kingdom), Sami Paavola &Anna Pauliina Rainio (University of Helsinki, Finland)

Dialogue theory emphasises the dialogic nature of meaning-making, highlighting how knowledge is generated in a dialogic space in which multiple perspectives are held together and interanimated. In this presentation we explore what this means from theperspective of dialogic methods for researching dialogue. We propose abduction as a dialogic approach to theory-generation about educational dialogues. Abduction has been discussed as central to dialogue itself but less often in relation to methodsin dialogue research. We investigate abduction as a methodology for theoretical discovery in research on educational dialogues. While abduction gives means for 'theorising', to describing and helping to explain how theoretical concepts are constructed during the qualitative research process, the actual practice and nature of abductive inquiry remain underexplored in the literature on dialogue research. We discuss and develop abduction as a basis for forming solid methodology of dialogue analyses. Our discussion outlines seeming contradictions in many discussions around abduction: that it is described simultaneously as 'reasoning' and as following 'hunches'; and that it is described as simultaneously starting from the data and starting from theory. Through two empirical research examples investigating educational dialogues – one on vulnerable young people's participation in dialogic theatre workshops and the other on teachers' professional dialogues during a school improvement intervention - we illustrate how abduction works in practice. We demonstrate how these seemingly contradictory elements actually work together in a dialogic manner to contribute to new conceptual insights. We draw on an intermediate analytic approach.

Poster session F3
(Foyer Ground Floor)

Poster collection 11: Instructional Design - SIG 26

Understanding Digital Capitalism Narratives through Popular Culture

Faisal Khwaileh (European University Viadrina, Germany) & Filip Bialy (European New School of Digital Studies, Poland)

The proposed presentation is based on the experience of teaching a course "Intermedia Reloaded: Digital Capitalism and Popular Culture" to a diverse group of international students at the European New School of Digital Studies (European University Viadrina and Adam Mickiewicz University). The focus of the course was on the role of narratives: those that establish and entrench the capitalist system and those that attempt to reject it using such discursive and practical tactics as withdrawal, satire, and violence.Particular

attention was devoted to the ways in which digital media transform capitalism and how the new socio-economic and political order differs from previous incarnations of capitalist ideology. The interdisciplinarity of the course was expressed not only in the different types of media that were used and discussed – including performance art, films, TV shows, video games, literature, etc. – but also in the theoretical and conceptual framing that referred to philosophy, media studies, political theory, economics, as well as computer science and AI research.In the presentation, we would demonstrate some of the methods used during the course, which included the use of generative AI in writing narratives, playing video games, as well as an art creation/destruction workshop that aimed at deconstructing the concept of value in digital capitalism. We would engage the participants in these activities, giving them a chance to experience challenges similar to those given tothe course's students. Eventually, we want to discuss the importance of understanding the power of narratives in the data-driven information environment, going beyond fact-checking as a method of making sense of the social and political imaginary in digitco-presenters of the demonstration.

Automate What? Examining the Potential of Socratic Challenge for Learning and Technology

Michele Flammia (Italy) & Alina Reznitskaya (Montclair State University, USA)

In this ICT demonstration, we will showcase an innovative dialogue model, called Socratic Challenge (Author, 2023). The model aims to promote critical thinking through emphasizing methodical evaluation of students' ideas. It draws on Socratic brachylogy and uses brief and critical exchanges between the teacher and the learner in the context of strong counterintuitive arguments. Socratic Challenge differs in important ways from many other dialogue-based models. The differences include discourse instructions, the role of the teacher, and argumentation and facilitation practices. These differences make Socratic Challenge a valuable resource for delving deeper into the strengths and weaknesses of established approaches, thus advancing efforts to enhance the effectiveness of dialogue-based pedagogy. During the demonstration, conference participants will first engage in a dialogue about a controversial issue, using Socratic Challenge methodology. The dialogue will be facilitated by the first author, who developed and researched Socratic Challenge in high school philosophy classes. Following the demonstration of Socratic Challenge, conference participants will be invited to compare and contrast normative dialogue models, focusing on the goals, pedagogical mechanisms, and discourse features of various approaches. Participants will also discuss the potential of Socratic Challenge and other models to inform future work on designing automated environments that engage students in academically productive talk.

Design principles for learning of substantive historical concepts: a realistic review

Wouter Smets (Erasmus University Rotterdam Netherlands)

Substantive historical concepts are an essential part of the history curriculum. They are used for instance to read and understand historiography or historical sources. They are used also to construct historical arguments. Dialogue in any history classroom would be meaningless without substantive historical concepts. In contrast to the use of meta-historical concepts, this aspect of historical thinking has received relatively little attention from educational scholars in recent years. This article draws on theory from cognitive developmental psychology, and seeks to apply it to the field of history didactics. In order to foster authoritative judgement its application in history education research evidence is synthesized. Realistic review methodology was used to do so: this means that diverse types of evidence were assembled into recommendations that can inform teacher education and teaching practice. Four context-mechanism-outcome

configurations (CMOc's) were identified: (1) When working memory is overloaded, effective learning is impossible; (2) To acquire knowledge sustainably, it must be stored as a schema in long-term memory; (3) Knowledge is learned more effectively when it builds on previously acquired knowledge; and (4) Knowledge will gradually become easier accessible for the working memory. These CMOc's stimulate insight in, and long-term memory of substantive historical concepts. Based on these configurations four didactic design principles for teaching substantive historical concepts are proposed: Make relevant prior knowledge available for working memory; Explain abstract substantive historical concepts with concrete or visual examples; Build conceptual schemas in long-term memory; Make long-term memory concepts easily accessible. Implications for history education are discussed.

Poster collection 12: Teaching and Teacher Education I - SIG 26

High School Teachers' Perceived Usage of Differentiated Instructional Practices

William Nketsia (University of Western Sydney, Australia)

The use of differentiated instructional (DI) practices has been found as an effective approach to improving student learning in inclusive settings. In 2015, Ghana adopted DI in its policy on inclusive education to address the diverse educational needs of all children. The use of DI hinges on teachers' capability, however, in Ghana, much less is known about high school teachers' understanding of the concept of differentiated instruction, their preparedness and usage of DI strategies to address the diverse learning needs of students. To address these gaps in the literature, this study used an original questionnaire designed based on the conceptual framework of Tomlinson's (2005) comprehensive model of differentiated instruction. In total, 204 high school teachers were recruited from ten high schools that were conveniently selected across three regions in Ghana. The results revealed that the majority of high school teachers have been introduced to differentiated instruction practices (84%) and inclusive education (89%). Although the teachers acknowledged the difference in student's readiness, interests and learning profiles and the relevance of using them to inform instructions, one-sixth felt inadequately prepared to use DI and the majority (84%) still expressed interest in learning more about how to use DI.

Dedication Education: Unveiling its Dialogic Dimensions and Practices

Benzi Slakmon, Orly Shapira (Tel Aviv University, Israel) Dmitriy Skulskiy, & Ori Leshman (Reichman University, Israel)

Dedication is a creative act with unlimited resources, which can be developed and connected, in creating and building relationships. Dedication has a dialogic quality based on a variety of actions whose purpose is to establish contact. In the realm of humanities education, the art of dedication offers a rich intersection of emotional literacy and cultural expression, serving as a pivotal mechanism for fostering dialogic education and deeper social connections. The practice of dedication is critical for social cohesion and support for others. However, education has not yet given adequate recognition to dedication. We describe a teachers' professional development program that trained teachers to dedicate songs and analyze the dedication processes that occurred. Data include an analysis of sixty hours of professional development training in which thirty two teachers participated. We envision dedication as a gift-giving exercise and explore its cognitive, social, and cultural significance.Through an analysis of dedication practices, we describe the different types of dedication, their qualities, and the various ways in which they are created. We

discuss the potential of dedication education as a dialogic, emotional, and social lesson, and suggest pedagogical directions.

Relational aspects of teachers' dialogue in knowledge building interactions

Orly Shapira, Fadia Nasser Abu Alhija, & Benzi Slakmon (Tel Aviv University, Israel)

There is a growing understanding of the central influence of speech patterns to the teaching and learning process which take place in classrooms. At the same time, the importance of relations in general, and teacher-student relations (TSR) in particular for maintaining a positive and successful learning experience at school is well established. And yet, research tying together classroom dialogue intended for knowledge building, and the relational work that goes on during classroom dialogue interactions are scarce. To address the gap and gain a deeper understanding of how relational experts use talk during knowledge building interactions, the current study characterizes the instructional relational and dialogical work of four "relational expert" teachers during disciplinary lessons. Their work is then compared to the work of teachers who were not identified as relational experts. Data collected for this study consists of over 30 hours of classroom documentation given by "relational experts" and "non-relational experts" during disciplinary lessons. The documented lessons are to be analyzed using classroom discourse analysis methods and coded according to classroom dialogue schemes. Data collection is still ongoing, but initial analysis has begun and the analytical measures and preliminary results are discussed here.

Dialogic argumentation to teach critical thinking. A research-based resource for teachers.

Nathanael Jeune (Université Paris Cité, France)

Teaching critical thinking has been a major goal of educational systems in most countries. However, the lack of consensus on critical thinking definitions, how to evaluate it, and how to teach it effectively have limited teachers' practices. We will introduce a resource co-created with researchers and teachers through a design-based research project aimed at facilitating teachers' use of research about teaching critical thinking. Argumentation plays a major role in the resource, both as an operational way to teach critical thinking, but also to make visible students' critical thinking skills and dispositions progress. This presentation will focus on two different aspects which will be open for discussion : the process used for the co-creation of the resource as a tool for resource creation facilitating teachers' use of research, and the suggested elements for teaching critical thinking through dialogic argumentation as a promising way to teach critical thinking as well as to evaluate students' critical thinking skills and dispositions.

Poster collection 13: Teaching and Teacher education II - SIG 26

Leading classroom talk: Beliefs of elementary teacher candidates during a long-term internship

Florentine Hickethier, Alexander Groeschner (Friedrich-Schiller-University Jena Germany), Bernadette Gold (TU Dortmund University, Germany) & Madeleine Müller (University of Erfur, Germany)

Classroom talk is a central part of the interaction between teachers and students. Studies show that teachers are seldom prepared to initiate and accompany dialogic classroom talk. For successful implementation, it is necessary to develop appropriate mindsets for

dialogic teaching (DT). The study aimed to investigate the change in these attitudes of elementary teacher candidates throughout their long-term internships. Additionally, attitudes regarding emotional support for students and teaching and learning as predictors were considered. In total, N=189 teacher candidates participated in the survey at the beginning and end of their internship. Results show a positive change on all dimensions of DT over time (ΔM=.21). Furthermore, differential effects of the predictors on DT are found (-.24 < β < .59).

Pre-service teachers' aspirations and ideologies as civics educators

Maria Leybenson (Universität Potsdam, Germany)

In a world engulfed by the flames of war, mass displacement, and unprecedented global conflict, the urgency of addressing conflict resolution has never been greater. The echoes of Europe's first war in 70 years resound alongside volatile tensions in the Middle East, creating a melting pot of geopolitical uncertainty. Against this backdrop of turmoil, a rising generation disillusioned with bureaucratic stagnation and governmental inertia is taking the reins of change. Young people, disillusioned with traditional power structures, are forging new avenues of activism through heated political discourse, social media mobilization, and urban protests. But this surge in youth engagement is not without its dangers. In Germany, a growing undercurrent of dissatisfaction with mainstream political parties is giving rise to extreme right-wing factions that threaten the very fabric of social cohesion and promote divisive agendas. At this decisive time, the need for effective conflict resolution in education is imperative. The current study delves into the aspirations and ideologies of pre-service teachers within the domain of citizenship education, particularly in the context of Germany's evolving demographic landscape and educational policies.By exploring the intersections of conflict resolution, identity, and social justice, the research aims to inform pedagogical practices that foster intercultural understanding and civic engagement. Utilizing a mixed-methods approach grounded in critical race theory, the study seeks to uncover the challenges faced by educators in promoting inclusive citizenship education and navigating issues of Othering. Ultimately, the research aims to contribute novel insights into fostering socially responsible citizenship educators and enhancing diversity in the classroom.

Teachers´ professional vision of tipping points in controversial argumentation in civic education

Sabine Manzel (Universität Duisburg-Essen, Germany)

Schools are dynamic arenas for the production, representation and regulation of agonistic dissent or conflict. Discussing controversial issues is an essential method of civic education and social science teaching in schools. According to the competency model for civic education, students should learn how to take perspectives different from their own, to tolerate conflict, to form their own opinions, and to take a stand. Epistemic and moral attitudes and beliefs are necessary for deliberation. Arguing and reasoning about conflicts and political problems is seen as a basis for political participation and democratic development in pluralistic societies. Therefore, social science teachers need to develop professional skills to arrange learning opportunities that develop students´ political literacy and argumentation skills. There is growing evidence that the use of video in higher education is generally beneficial to the pedagogical knowledge and the professional vision of pre-service teachers. In a collaborative research project we developed a set of 22 animated videos based on authentic video recordings of civic education classes. With these animated videos we offer freely accessible videos of citizenship education lessons to strengthen teachers´ professional vision and teaching actions in critical situations such as anti-democratic or extremist positions in controversial

discussions. Each video is fully subtitled in English language, created barrier-free and published open access. I will present an example of an animated video of a challenging situation in a social science classroom of 9th graders in North Rhine-Westphalia. The chosen scene can be understood as a tipping point, as it is particularly associated with the success and difficulties of using video in teacher training will be discussed.

THURSDAY 19:00, LEBENSWELTEN BISTRO @ HUMBOLDT FORUM (SCHLOSSPLATZ, 10178 BERLIN)

Conference Dinner

Friday 20/9/2024

FRIDAY 9:00-10:30

Parallel Slot G

Paper session G: Frameworks for dialogue in schools and classrooms - SIG 26 (Room 1.401)

From dialogue to polylogue: frameworks for analyzing educational dialogue in the history classroom

Carla Van Boxtel & Janet van Drie (University of Amsterdam, Netherlands)

Within history education the importance of dialogue is widely acknowledged. The past decades showed a growth in the number of studies that analyze dialogue oriented towards learning history. This raises questions of the theories this emerging field of research is based on, which aspects of dialogue receive attention and what insights these analyses provide. In this theoretical contribution, we present the results of a review of how educational dialogue in the history classroom is investigated. We found that in most studies, dialogue is conceptualized as shared historical inquiry in which teacher and students engage in historical thinking, reasoning and argumentation, negotiate and co-construct historical interpretations and meanings. Although it is generally acknowledged that both students' historical reasoning and dialogue in the classroom are situated in the broader cultural context and personal, interpersonal and cultural processes all constitute each other, in analytic frameworks these sociocultural dimensions often remain underexposed. There are other studies that conceptualize dialogue mainly as a cultural activity based on sociocultural theories of learning, critical pedagogy or linguistic ethnography and focus on the interplay of voices and power imbalance. We argue that the 'dialogue-as-shared-historical-inquiry' approach of analyzing educational dialogue, could be enriched by also addressing the perspectives and voices that are present, silenced or challenged in the dialogue and its relation to the broader sociocultural context. We discuss how this may be achieved through theoretical triangulation, adopting theories of critical historical inquiry and considering dialogue as polylogue. In the discussion after the presentation we will address the question whether the same challenges also hold for other domains.

Calibrating School-Wide Assessment of Students' Dialogic Performances

Ido Gideon, Nezi Slakmon & Orly Shapiro (Tel Aviv University, Israel)

This case study delves into the calibration of school-wide assessment strategies for evaluating students' dialogic performances, a pivotal aspect for the advancement of dialogic pedagogy within educational frameworks. Calibration, in the context of educational assessment, refers to the collective adjustment by teachers of their perceptions of student performance to align with a standardized scale, highlighting the significant gap between research and practice in dialogic pedagogy. Despite the crucial role of assessment in shaping educational instructions, its integration into dialogic pedagogical practices remains minimally explored. We focus on a school committed to the long-term development, implementation, and sustainability of dialogic pedagogy. A crucial part of this commitment was the creation and integration of a novel rubric into the students' report card system for assessing dialogic performance. Through discourse

analysis of teacher discussions during the implementation of this rubric, we identify the challenges and opportunities that arise in the school-wide assessment of dialogic performance, with a particular emphasis on the calibration process by teachers to their educational practice. The findings reveal a complex calibration process among teachers, involving negotiation and decision-making to align assessment phrases with student participation in dialogic activities. This study offers insights into the practical challenges and considerations of embedding dialogic performance assessments within school curricula, thereby bridging the gap between dialogic pedagogy theory and practice.

The purposes of historical canons in multicultural history education

Wouter Smets (Erasmus University Rotterdam, Netherlands)

National canons of history sparked intense debate among historians over the last years, history educators have regularly shown concerns regarding these canons. The main arguments are that history is instrumentalized for political purposes, and that canons are incompatible with multiculturality. In this study the cases of the Netherlands and Belgium (Flanders) are used to discuss these concerns. The aim of this article is to gain a more complex understanding of the use of canonical discourse in the setting of history education. The current study actualizes and reconsiders Banks' typologies of knowledge, and applies them to multicultural history education. Hence the canon debates in the low countries are contextualized from an international perspective of debates on canon and history teaching. It is argued that both national canons specifically intend to confront popular knowledges and historical myths with academic historiographic discourses. More particularly both canons seek to include discourses on minority groups and multiculturality, which may benefit the use of transformative knowledge in history education. The use of canonical discourses however must not be reduced to transmission. Beside qualification history education also strives towards socialization and subjectivation. A thoughtful use of canonical discourse may substantially add to realizing these purposes of education.

ICT Demo Session G: Digital Educational Technologies - SIG 26
(Room 1.301)

Supporting cocreation with technology: The case of Viacocrea.

Manoli Pifarré (Turmo University of Lleida, Spain)

Cocreation is an essential competency to generate novel solutions to the multifaceted challenges faced by contemporary organizations. Recent research has shown that technology is a quintessential tool in fostering engagement within cocreative environments. However, significant research gaps persist in understanding how technology can fully support each stage of a cocreative process and the dialogue of creativity within authentic classroom contexts.In response to this gap, the innovative technology Viacocrea has been designed and implemented in real classrooms. This platform provides both teachers and students with a multi-user, collaborative, and synchronous cocreative space tailored specifically to generate and address complex challenges.Viacocrea structures cocreation into six distinct phases, enriching them with an array of readily accessible creative techniques. Additionally, Viacocrea enhances students' cocreation moves by providing a variety of supportive materials, such as video tutorials and infographics. These materials have been meticulously designed to facilitate the development of divergent and convergent moves, a dialogue of creativity, and the overall cocreative mindset. Aligned with the demands of the 21st-century curriculum, Viacocrea integrates into secondary classrooms, vocational training, and higher

education settings, catalyzing the development of students' cocreative mindset.During the presentation, firstly, I will outline the design-based research process employed in delineating Viacocrea. Secondly, I will expose the platform's design process and its practical application and evaluation by teachers and students. Finally, critically engaging with Viacocrea technology, attendees will collaboratively explore its strengths and challenges, delving into its potential as a transformative tool for promoting cocreation within authentic classroom settings.

An Introduction Into Video-Based Automatic Emotion Detection Software: What it Can and Can't Do

Livia Kuklick (Leibniz Institute for Science and Mathematics Education, Germany)

In recent years, there have been calls to complement self-report-based insights on learners' affect and motivation with alternative automatic measures of such. Thus, the body of research that has proposed models capable of automatically detecting and categorizing students' current emotions continues to increase. This demonstration focuses on video-based automatic emotion detection and aims to illustrate the potentials but also possible pitfalls of employing such methods when students work on indigital learning environments. It will involve a brief introduction to the theoretical background of automatic emotion detection. Then, it will introduce iMotions™ as an example of research software that offers video-based automatic detection of emotions such as joy, surprise, anger, fear, sadness, contempt, disgust, as well as neutral expressions. The presentation will draw upon the findings of a previous study that combined iMotions data with task-level self-reports of student emotions in an online learning context to discuss the aspects that need to be considered in the process of collecting and analyzing data for video-based automatic emotion detection. Different approaches to analyzing iMotions datasets will be presented and compared.This will include a discussion of thresholds that researchers can set within the software and percentage-based coding of emotion rates as compared to dichotomous coding of emotion presence. The demonstration will leave room for the audience to share their view point and/or their experiences working with video-based automatic emotion detection software or self-developed automatic emotion detection models.

Designing tasks and tools that foster dialogue and participation - demonstrating Talkwall

Ole Smørdal, Ingvill Rasmussen, & Anja Amundrud (University of Oslo, Norway)

This demonstration introduces the latest version of Talkwall, an open and freely available micro-blogging platform developed from a decade of design-based research. Initially created for K12 education to foster idea-sharing and support multimodal dialogic interaction, Talkwall now extends to facilitate hybrid teaching in higher education, promoting student activity and participation.The core of our demonstration is the combination of an appropriate pedagogy and a tool that allows students the autonomy to choose their mode of participation in teaching seminars, either remotely via Zoom, a video conferencing system, or in-person on campus. This flexibility supports dialogue-based seminars that integrates student-active learning through preparatory tasks and collaborative activities.Building on this pedagogical foundation, we present a teaching design influenced by a flipped classroom approach, where Canvas, a learning management system, plays a crucial role. Talkwall was used as a flexible and dialogical tool to enhance the students' participation from this dialogical form of instruction.In this session, we aim to leverage participants' familiarity with similar pedagogical and technological approaches, exploring new arenas for implementation in educational settings and laying the groundwork for future research partnerships. Utilising Talkwall, we

will capture and discuss audience insights as part of this collaborative exploration.For practical engagement, participants will directly interact with Talkwall via their own mobile phones or laptops, without the need for prior sign-up. The system is readily accessible through standard web browsers. Talkwall is currently available in English and Norwegian and can be accessed at https://new.talkwall.uio.no.

Symposium G: Taking up [dialogic] space: Arguments for uptake in learning environment design - SIG 26
(Room 1.406)

Chair: Adam Lefstein (The Hebrew University of Jerusalem, Israel)
Discussant: Rupert Wegerif (University of Cambridge, United Kingdom)

How Online Discussion Forums Enable and Inhibit Dialogic Argumentation

Michael B. Sherry (University of South Florida, USA)

Developing arguments through dialogue demands that we respond, interpret, and sometimes disagree with others' ideas—a key component of participation in a literate, democratic society. To foster such participation in online spaces, researchers have used dialogic theory to examine computer-supported collaborative learning (e.g., Discussant, 2006; 2013). Yet dialogic sharing of ideas can be hampered by traditional online platforms which divide students' contributions into isolated threads (e.g., Hewitt, 2005; Author3, 2020). Opportunities remain to explore how alternative forum designs can create spaces that better support online dialogue and foster argumentation.A key dynamic in these alternative forum designs is whether and how they encourage dialogic uptake of what others have already written or said (e.g., Author1, 2021; Collins, 1982; Author3, 2017). For example, prior research on alternative forum designs has found that anchored discussions connecting posts to specific parts of a text, image, or video can enhance coherence among students' contributions. However, anchored forums can also distribute posts across a course text, making them harder to find and resulting in fewer replies (Sun & Gao, 2017). Alternative forum designs can also imply different purposes for discussion, serving as pivots to social, interpretive, or deliberative discussion (Author3, 2024).These previous studies have made it possible now to research how different online discussion forum designs can support or inhibit dialogic uptake, thereby bringing different perspectives into relationship to open dialogic space that fosters argumentation. Through discourse analysis of dialogic modalities (e.g., Arvaja & Hämäläinen, 2021) this presentation will examine argumentative reasoning can emerge as a result.

Opening up and Building upon: Supporting Participation in Dialogic Space

Maureen Boyd (University at Buffalo, USA)

Prerequisites of dialogic space are difference - in what is already known and what is presented - and, as we share, hear, and consider what is presented, a willingness to engage with that difference in a manner that acknowledges multiplicity, and uncertainty (Discussant, 2015; Cook et al, 2019). In other words, dialogic space carries a particular set of values about how differences are brought into relationship. Participants commit to being open to sharing, listening to, investigating, and even taking up other ideas and perspectives in their talk as they consider them. In this paper we argue that student participation in dialogic space is related not only to how, but also what, and whose experiences, ideas, and perspectives are presented, received, and folded into a classroom's way of experiencing teaching and learning (Author1, 2024).This paper examines two oracy practices that signal materials/ideas/perspectives can be questioned

and explored. Language of possibility (LOP) (Author1,2019; Maine, 2024) avoids absolutes and signals provisional language and options (such as with maybe, sometimes, could/might be). Robust presence of LOP is a partial marker of a dialogic discourse modality. Uptake is a coherence condition of talk (Author1, 2021; Nystrand, 1997) and its presence signals a collectively constructed discourse. Data derives from 18 whole-class lessons (22 hours) in an instructional unit in an urban, diverse, US classroom community (25 seven-and-eight-year-olds) toward the end of the school year. Sociocultural discourse analysis charts and categorizes teacher and student use of LOP; and provides a situational and cumulative understanding of types, functions, and scope of uptake. We detail patterns and clusters and inter-relations within and across lessons. Robust findings detail varied ways these two practices signaled value for student experiences/ideas/perspectives and openness to multiplicity, difference, and uncertainty. We share selected exchanges to highlight these findings.

Designing Learning Environments to Create Dialogic Space within Secondary Argument-Based Classrooms

Min-Young Kim (University of Kansas, USA)

Interest in exploring the intersection of dialogic theories and argument practices has grown in the field of teaching and learning of argumentation (e.g., Rapanta & Felton, 2021). Research suggests that this approach is associated with the potentialof addressing the challenges posed by the traditional view of argument as a "winning game" (Tannen, 1998) as well as enhancing students' thinking and learning (Asterhan & Schwarz, 2016). While much is known about the affordances of specific aspects of dialogic argumentation, such as goal setting (e.g., Felton et al., 2015), teacher stance (e.g., Author2, 2023), or reasoning and interactional moves (e.g., Hähkiöniemi et al., 2022), less is known about how these aspects interplay in the nuanced and multifaceted ways in the moment-to-moment classroom lives to create a dialogic space within the 'ecology' of the classroom (Nystrand & Graff, 2001). To enhance our understanding in this regard, this presentation explores how the design of a learning environment engenders a dialogic space in a classroom where argumentation is taught and learned. Specifically, I analyze the classroom environment, focusing on the use of various 'pivots' (Vygotsky, 1978; Author3, 2021) and examine how these aspects interact to create a dialogic space in classrooms centering on argumentation. Adopting a microethnographic discourse analysis (Bloome et al., 2005), this study analyzes a lesson from an 11th-grade Advanced Placement (AP) English class focused on using argumentation as a method for reading literature. The analysis demonstrates that the learning environment, along with the teacher's stance, the use of pivots such as argument tasks, and the positioning of both the teacher and students, contribute to bringing different ideas into relationship, thereby fostering a dialogic space. It also highlights how participation in this dialogic space enhances students' engagement in argumentation.

Keynote SIG26

Think and think about thinking: The power of developing argumentative and meta-level reasoning in confronting the challenges of today's world
Kalypso Iordanou (UCLan Cyprus)

The dominance of emerging technologies in our lives have imposed new challenges to making informed judgments and have greatly increased the importance of understanding the mechanisms that influence people's judgments and behaviours. There is a pressing need to find ways to re-empower humans' thinking and safeguard the democratic foundations of our societies which are at stake.

In this talk, the challenges to reasoning posed by interacting with the world wide web are considered, drawing from empirical studies, network analysis and focus groups. It will be argued that to promote sound reasoning, evidential standards and public trust in science, a multidimensional approach is needed. Epistemic beliefs and reasoning of key actors involved in knowledge production and its dissemination – such as journalists, scientists, AI developers – all matter.

To deal with these challenges we should invest in supporting individuals' argumentive reasoning and the metacognitive competencies that support it. A line of research is presented demonstrating that engagement in purposeful discourse, along with reflection, is a promising path to support the development of reasoning, reflection on it, epistemic standards, and metacognitive control of one's own beliefs. The gains observed encompass both argument construction and argument evaluation. Findings from microgenetic studies are discussed that provide insights on the mechanism of change. Engagement in argumentation as a path to developing epistemic understanding is emphasized in new research findings involving reconciliation of divergent claims on controversial issues.

With rapidly changing technology, investing in empowering human thinking — to set strong evidential standards when deciding what to believe and who to trust, to acquire epistemic vigilance and engage in metacognitive control of one's thinking and beliefs — both online and offline, is probably our best bet to safeguard individual and societal well-being.

Parallel Slot H

Paper Session H1: SIG 20 - 4 11 - Dialog and peer interaction - SIG 20 & SIG 26 (Room 1.401)

Inquiry and design projects: Divergent and convergent thinking during students' group conversations

Martina van Uum & Petrie van der Zanden (Radboud University, Netherlands)

In inquiry- and design-based projects in secondary education, students are asked to take on challenges and design solutions to specific problems that are often based on real-life issues. These projects often involve creative group processes in which divergent and convergent thinking are essential elements. Divergent thinking enables students to generate and expand ideas, whereas convergent thinking contributes to idea evaluation and selection. As it is not clear how divergent and convergent thinking emerge in creative group processes of adolescents, this is investigated in the current study. Data were collected by means of audio-recording the group conversations of 11 groups of students (3-4 students in each group, 40 students in total) during a one-hour lesson. The audio-recordings were transcribed and analyzed via thematic analysis. Results show that divergent thinking was mostly visible when students piled ideas on top of each other. This means that previously mentioned ideas were followed by new ideas or elaborations of earlier mentioned ideas. In addition, criticism or arguments, and clarifications of the context provoked new ideas or elaborations. The latter suggests that involvement in a real-life context with site-visits and/or conversations with stakeholders contributes to students' idea generation. As students mostly agreed with each other during convergent thinking, and promoted visualization of ideas without much reflection or evaluation, teachers are advised to explain how to deviate from group norms (as adolescents tend to follow group norms) and express own opinions in a considerate way. Finally, as divergent and convergent thinking mostly overlapped in the student group conversations, teachers are advised to not artificially separate these, but address and explain both within creative processes during inquiry- and design-based projects in secondary education.

The Contribution of Prompting Source Evaluation During Inquiry Learning With Multiple Documents

Fayez Abed, Sarit Barzilai (University of Haifa, Israel), Clark Chinn (Rutgers University, USA), Danna Tal Savir & Shiri Mor-Hagani (University of Haifa, Israel)

In times of misinformation, the importance of critically evaluating the credibility of online sources is paramount. Previous studies have identified gaps in students' abilities to evaluate sources. Sourcing prompts can enhance source evaluation competence by directing students' attention to key source features. However, the effectiveness of integrating sourcing prompts into classroom-based inquiry learning, especially in early adolescence, has not been sufficiently studied. This study investigated the effects of classroom-based inquiry learning with multiple documents and sourcing prompts on seventh-grade students' sourcing competence. Seventy-one students participated in the study. The experimental group engaged in document-based inquiry on climate change topics and evaluated diverse reliable and unreliable sources with the help of sourcing prompts evaluating the source. The control group learned as usual. Pre- and posttests assessed source evaluation competence through document usefulness ratings, uses of sourcing criteria in rating justifications, a metacognitive prompt about trustworthiness criteria, and a sourcing self-efficacy measure. Results revealed significant enhancements in the experimental group's capacity to identify unreliable sources and in their sourcing self-efficacy compared to the control group. There was also significant growth in uses of expertise and recency criteria following the intervention. However, there was no growth in uses of benevolence and social validation criteria and no increase in metacognitive knowledge about sourcing criteria. These findings suggest that while embedding sourcing prompts in classroom inquiry can be effective to some extent, additional metacognitive discussions may be necessary to further enhance students' understanding and application of source evaluation criteria.

AI literacy education and Inquiry Learning

Koen Veermans (University of Turku, Finland)

During the last EARLI conference the SIG 20 Inquiry symposium was organized around the Pedaste et al. (2015) inquiry model and the discussion centered around its general affordances, but also about potential extensions that would bring out some of these affordances better. What was left out in that discussion was the current developments in AI, how these have brought more attention to the development of AI literacy in education and how inquiry learning and the Pedaste model could play a role in that. This paper aims to start this discussion. It will draw on literature on AI in education that aims to develop AI literacy and what thus far have been main approaches towards bringing AI into the classroom. It points out some limitations for AI literacy education that stem from the approaches that, while making it possible to introduce AI in education, do so by hiding some core aspects of the process, features of the Pedaste inquiry model that could benefit attempts to strengthen AI literacy education and how some aspects of the model might need to be reconceptualized.

Paper Session H2: Teaching and learning in uncertainties - SIG 26 (Room 1.406)

The role of human vs AI feedback providers and metainformation for feedback effectiveness

Ole Engel, Theresa Ruwe, & Elisabeth Mayweg (Humboldt Universitaet zu Berlin, Germany)

In contemporary society argumention skills are important and can be promoted by feedback. Feedback is an integral part of higher education and recently, artificial intelligence (AI) is applied to provide it. Feedback providers and information about them can influence aspects of the effectiveness of feedbacke.g., AI-systems are perceived more trustworthy than educators and the explainable AI has been shown to improve the interaction. Conclusively, this 2X2-between-subject study investigated the effect of different feedback providers (AI-system vs educator) and the provision of meta-information about them (yes vs no) on feedback effectiveness. Path-analyses with data from 168 German teacher students showed that meta-information positively affects feedback perceptions, and that AI-systems are perceived as more trustworthy than educators. Additionally, when providing meta-information about the educator, perceived fairness increased while decreasing when provided about AI-systems. Implications for the design of feedback processes and the importance of research on AI-systems in feedback processes are discussed.

Lateral Reading against Misinformation: Training Increases News Credibility Discernment

Marvin Fendt & Peter Edelsbrunner (Ludwig-Maximilians-Universität Munich, Germany)

In our information-driven society, readers need to be able to focus their attention on valuable information. Otherwise, they often risk consuming and believing misinformation, which can have undesirable behavioral consequences, such as ignoring and opposing climate change policy measures. Lateral reading is a strategy that can help filter information analytically by not reading the content, but instead checking third-party

sources to infer the credibility of a source. Teaching this complex skillset requires an appropriate instructional design like the well-established cognitive apprenticeship. In our preregistered randomized controlled study, N = 344 participants received either Cognitive Apprenticeship-based lateral reading training or short written instructions on the technique. We found that our lateral reading training, even more than our reading material, helped people discern the credibility of sources and consequently ignore unreliable sources. Furthermore, content knowledge moderated the training effect, indicating that teaching both may further enhance the effectiveness of the intervention. More analytic processing of the information further increased the the intervention effects. Future studies can explore the potentialfor mixing lateral reading training with other methods in a longitudinal study as well as short school curricula on the technique. Addressing participants with a more conspiracist mindset could also be of interest.

Learning about risks on social media: safe spaces to share best practices

Santiago Hurtado & Anna Keune (Technical University of Munich, Germany)

This study focuses on uncovering learning opportunities in youth social media practices about risks while sharing, curating, and navigating content. Although social media can be a rich space for connecting with others, building communities, expression, and learning, it can represent significant risks. Social media risks have been commonly investigated in its impact on mental health, but recent reviews on this research have found very weak causation between social media use and mental health risks. Youth's experiences on social media are not always well represented, and understanding what practices they have developed to identify and address risks could be a better way to highlight social media as a powerful learning space. Youth use socialmedia daily and develop practices to identify and address risks on social media to keep themselves safe while navigating platforms such as TikTok, Instagram, BeReal, or Snapchat. This study takes a constructionist approach to learning to investigate(1) how youth make risks they experience explicit, transparent, and explainable in collaborative settings, and (2) how designing social media features around recognized risks in workshops fosters agency. We conducted three workshop sessions with 32 8th-grade participants at a school in southern Germany. This study focuses on the second session. Preliminary findings show that youth identify risks and develop strategies to address them while sharing with their peers in a safe space. This points toward how to provide spaces for youth to share experiences on social media and knowledge about social media within educational settings and how to mitigate shame around these tools.

Teaching Sensitive and Controversial Topics in Secondary Education

Virginie Lemmens, Leonie Vanhove, Machteld Vandecandelaere & Jan Sermeus (KU Leuven, Belgium)

Teachers worldwide confront the complex task of addressing classroom tension induced by teaching sensitive and controversial issues (SCIs) like climate change, decolonization, diversity, or gender identity. This tension intensifies with increased classroom diversity and as critical consciousness and activism in society rise. SCIs span natural science education, including socio-scientific issues and societally denied science, as well as social science and humanities education, where topics touchon students' personal lives, (mental) health, or identity. Contemporary research tends to be confined to specific disciplines, lacking a cohesive framework that unveils subject-specific and subject-general determinants contributing to classroom tension. Yet this is necessary for research, where fragmented fields can learn from each other, and for classroom practice, providing a rich basis for professional development. This systematic review study delves into the insights from various subject-specific didactics. Following the PRISMA

framework, we extract reported determinants of classroom tension and pedagogic frailty in secondary education, particularly identifying the role of system dynamics, identity aspects, and topic and subject nature when SCIs are at play. Preliminary findings highlight that classroom tension stems more from contextual factors than the topic or subject itself, legitimating and facilitating the construction of a cross-disciplinary framework with subject-general and subject-specific determinants of induced tension. Keywords: Sensitive and controversial issues, socio-scientific issues, secondary education, classroom tension, pedagogic frailty.

Symposium H: Uncertainty, Misinformation and Trust: Challenges in the Evaluation of Scientific Information - SIG 26 (Room 1.301)

Chair: Eva Thomm (University of Erfurt, Germany)
Discussant: Eleni Kyza Cyprus (Cyprus University of Technology, Cyprus)

Stewarding Trust in Science: A Multistakeholder Perspective on Actors Responsible

Christiana Varda (University of Central Lancashire, Cyprus) & Kalypso Iordanou (University of Central Lancashire, Cyprus)

The COVID-19 pandemic has pointed to the societal implication that results from uncertainty when evolving scientific issues are communicated to a non-expert public. Research focused on the public, has examined factors that might affect trust in science, while research focused on those who bear the burden of conveying science to the general public (journalists, researchers), examine effective science communication approaches. This work seeks to synthesize insights from these three stakeholder groups (general public, journalists, scientists), thus adopting a multistakeholder perspective to understanding the ways in which trust in science might be bolstered, especially in contexts where there is uncertainty. It achieves this objective by considering who is viewed as responsible for enhancing trust in science, how they affect trust in science, and what proposed actions can be taken by each identified actor. To achieve this objective, focus groups (n=17) and individual interviews (n=10) were conducted across different European contexts, with participants recruited across each stakeholder group; verbatim data were analyzed using thematic analysis. Participants mostly referred to policymakers (including government, politicians, and legislators at the national and international level), media actors, scientific and educational actors as the ones who bear the greatest responsibility for safeguarding trust in science. Additionally, policymakers, media, scientific and social media actors were regarded as occupying a dual function: as facilitators of trust and as hinderers of trust. The weight that participants placed on actors varied across stakeholder group, as indicated by the number proposed actions per actor: participants in the generin the proposed actions are discussed, and point to recommendations for stewarding trust in science at times of uncertainty.

Studying Effects of Methods and Uncertainty Information on the Scientific Impotence Excuse

Eva Thomm, Holger Futterleib, Guido Mehlkopp, & Johannes Bauer (University of Erfurt, Germany)

When people encounter conflicts between their prior beliefs and scientific evidence, they often employ defense strategies such as the Scientific Impotence Excuse (SIE; Munro, 2010) to maintain their prior beliefs. That is, they devalue the potency of science to

investigate a given topic. Yet, little is known about the factors influencing the occurrence of SIE. This study examines the effects of communicating detailed methods information and scientific uncertainty on its occurrence. Both types of information may provide people opportunities to challenge the nature of the individual piece of evidence read rather than questioning the potency of science in general, possibly reducing the need to engage in SIE. Participants of the general public (N = 771) rated their prior beliefs about a health-related topic before and after reading four study summaries. The summaries varied between participants regarding the evidence read (confirming vs. disconfirming evidence), provision of methods information (basic vs. detailed), and indication of scientific uncertainty (without vs. with). Participants assessed their doubt on the potency of science to study the topic and indicated their trust in scientific and non-scientific sources to provide them reliable topic knowledge. The findings provide support for SIE, suggesting that people tend to doubt the potency of science when faced with belief-inconsistent evidence. However, neither detailed method information nor indication of scientific uncertainty influenced its occurrence. Furthermore, the devaluation did not extend to participants' trust in scientific sources. Notably, participants adjusted their prior beliefs in accordance with the evidence read, suggesting a perception of overall strong evidence regardless of detailed methods information and uncertainty cues. These results speak against the assumption that people resort to SIE mostly when they have no other option to challenge the belief-inconsistent evidence (Munro, 2010); and underscore the difficulties in overcoming negative effects of belief-evidence conflicts in science reception.

Do Epistemic Emotions Predict Online Engagement with Uncertain Science on Social Media?

Friederike Hendriks, Monika Taddicken (TU Braunschweig, Germany) & Helena Bilandzic (Augsburg University, Germany)

While social media holds opportunities for incidental learning about science, user and content factors decide whether a user deliberatively processes information and reacts in turn by, for example, commenting and sharing. This study aims at identifying the importance of uncertainty communication in social media posts (a content factor) and epistemic emotions (a user factor) on online engagement with scientific information. In a within-design, we presented participants (N = 241) with (fictitious)Instagram posts about geoengineering technologies, where scientific uncertainty was either communicated or omitted. For each of the two posts, we then measured epistemic emotions (EES, Pekrun et al., 2017) and intended online engagement on the levels of consuming, participating and generating. For example, a user could read additional text to an image on Instagram (consuming), like another users' comment (participating), or write a critical comment themselves (generating). We found that uncertainty communication did not affect online engagement, however, it elicited epistemic emotions which predicted lower enjoyment, higher anxiety, and frustration. The latter mediated online engagement on the level consuming. Epistemic emotions (e.g., surprise, curiosity) did predict online engagement independently of the experimental variation. We will discuss the role of epistemic emotion in incidental learning about science, and implications for designing science communication in social media settings.

Modeling Evaluation Strategies in a Misinformation Game Boosts Players' Evaluation Competence

Sarit Barzilai (University of Haifa, Israel) & Marc Stadtler (Ruhr University Bochum, Germany)

Digital games have been found to help learners to cope with misinformation. However, these games typically include multiple game mechanics, making it hard to identify which mechanics contribute to learning. In this study, we aimed to clarify how misinformation games facilitate learning by experimentally examining the effects of two promising misinformation game mechanics – modeling evaluation strategies and providing explanations about the types of misinformation encountered in the game. The participants included 132 middle school students who played a digital game simulating social network sharing decisions about a fictitious pandemic. Players played different versions of the game that either modeled information evaluation strategies or did not model them, and which either included misinformation explanations or did not include them. The results indicated that evaluation strategies, but not misinformation explanations, led to better accuracy discernment and sharing discernment following the game. Modeling evaluation strategies also led to greater awareness of corroboration and sourcing strategies, whereas the explanations only supported awareness of sourcing. Structural equation modeling revealed that modeling evaluation strategies led to more accurate sharing decisions in the game and that in-game sharing accuracy mediated the effect of modeling strategies on post-game accuracy and sharing discernment. The findings highlight that modeling evaluation strategies in a digital game can help prepare learners to cope with misinformation. Further research is needed to explore the effective integration of misinformation explanations into such games.

FRIDAY 15:15-16:45

Parallel Slot I

Paper Session I1: Critical perspectives on dialogic teaching - SIG 26 (Room 1.401)

Centering Educational Equity: A Critical Review of Research and Practice in Dialogic Pedagogy

Sherice Clarke (University of California San Diego, USA), Bryant Jensen (Brigham Young University, USA), & Adam Lefstein (The Hebrew University of Jerusalem, Israel)

In this review, we draw on critical theories to put into sharp relief core tensions of research and practice of dialogic pedagogy towards theorizing equity-centered dialogic pedagogy. We interrogate the characteristics of these intellective practices– whose voices are centered and whose are silenced, how power and privilege are reified, how linguistic and cultural capital is produced and reproduced, how what counts as disciplinary thinking and knowledge as political and epistemic justice, how access to cognitively demanding instructional dialogue is distributed; and the ways in which these micro-level instructional practices can recapitulate the oppressive logics of social structure (e.g., racism, classism, empire). We identify tensions that arise from the form, content, and systemic conditions of dialogic pedagogy. We see these tensions as an opening for theorizing educational equity through dialogic pedagogy. We name the tensions to center the human dignity of learners, particularly those that have been historically marginalized and minoritized. We seek to reimagine a future of dialogic education that leverages social and cultural repertoires as assets for learning, that redresses histories of epistemic injustice.

How much instruction does a core practice training need? RCT-study on dialogic practices & attitudes

Dennis Hauk (University of Leipzig, Germany) & Alexander Groeschner (Friedrich Schiller University Jena, Germany)

Knowledge about the design of core practice training programs is crucial for shifting teacher education toward effective teaching practices. Grounded on the evidence-based principles of dialogic teaching (Alexander 2017), this study examines the effects of a core practice training program that helps student teachers to lead effective classroom discussions. To this end, we investigate how the instructional phase of a training program must be designed so that student teachers can optimally acquire the core practice of leading classroom discussions. Based on the model of the learning cycle by McDonald and colleagues (2013), two variants of the program are investigated: one with an extensive direct instructional approach (EDI), with a thorough introduction to dialogic teaching practices, and one with a short direct instructional approach (SDI), with a more concise overview of the underlying theory. By analyzing the effects of both programs in a randomized control trail, this study aims to understand how the depth of theoretical instruction affects the development of student teachers' dialogic teaching practices and their attitudes toward dialogic teaching. Participants were N = 31 civic education student teachers who were randomly assigned to either the EDI or SDI group. Their attitudes were measured by assessing the Dialogic Teaching Questionnaire (DTQ; Authors, 2020), and their dialogic teaching practices by evaluating video-based microteaching simulations. The results indicated medium significant effects of the EDI approach on one (out of three) subscale of the Dialogic Teaching Questionnaire. In the video simulations, the EDI group exhibited a broader range of dialogic teaching prompts than the SDI group. In sum, this study underlines the important role of a well-structured theoretical introduction for the effectiveness of a core practice training program.

Teachers' perspectives of the benefits and challenges of dialogic teaching

Merav Sara Levin (Hebrew University of Jerusalem, Israel), Alexander Groeschner (Friedrich Schiller University Jena, Germany) & Christa Asterhan (Hebrew University of Jerusalem, Israel)

Teachers are pivotal in the facilitation of academically productive classroom dialogue (APCD), as well as in the success of intervention programs that promote it. Yet, in APCD research, they are predominantly positioned as either objects of research(documenting their behavior in classrooms) or as agents for change (realizing ideals of APCD so that it will positively affect students), bypassing a deeper understanding of how teachers understand, interpret and think of this subject. In the present study, we focus on the teachers' voices and explore their interpretations and beliefs about dialogic teaching. The current research contributes to our understanding of this field, by focusing on specific elements of teachers' perspectives and exploring how they perceive dialogic teaching's benefits and challenges, their aims for using it, and the difficulties and shortcomings they associate with it.Dialogic teaching provides students with academic and social gains. Consequently, a wide range of professional development initiatives have been enacted in different countries to promote it; nevertheless, it is still not common practice in most classrooms (Hennessy & Davies, 2019). By exploring teachers' perspectives on dialogic teaching, we aimto examine whether we can better understand the challenges of implementing it in classrooms. The research is part of a four-year initiative to promote dialogic teaching in language arts in 4th—6th grades. We interviewed 17 teachers who participated in this initiative and used a thematic analysis approach for our analysis. Preliminary findings have shown that teachers mention various benefits stemming from dialogic teaching. These benefits relate to academic gains, such as thinking

development, includ map the challenges that teachers relate to using this approach. Given the importance of teachers' role in dialogic teaching, this research could help explain why implementing dialogic teaching is challenging and why the results often do not meet expectations.

School-level dialogic teaching: A Longitudinal Study of teachers' learning

Orly Shapira, Bezi Slakmon, Ido Gideon & Osnat Rakia (Tel Aviv University, Israel)

Science supports dialogue as a well-established psychological principle for learning. A wide range of research addresses the implementation of dialogic pedagogies within classrooms where they involve transformations in teaching and learning practices as well as in teacher professional development (TPD) programs (Sedova, et al., 20Wilkinson, et al., 2017; Hardman, 2019; Osborne et al., 2019; Calcagni et al., 2023).20; Dialogue-based approaches can transform education when schools align with these principles. The consensus, however, is that it is essential to further investigate and integrate dialogue deeper into educational contexts. However, incorporating dialogic pedagogies into the everyday routines of larger cohorts of educators at an institutional level has been largely unexplored. Within a school committed to developing a comprehensive dialogic pedagogy, we examine the evolution of dialogic teaching and learning. As a response to Lefstein's (2010) call for dialogue to be seen as a problem, and in keeping with the RPP mission of exploring dialogue as a question, the partnership aims to develop and research dialogue as a school pedagogy. This study examines how teachers perceive dialogue, the ways the perceptions evolve over time, and the pedagogical practices that reflect both their initial views and any subsequent shifts over three years. Data consisted of a large body of ethnographic field work, including 36 interviews with participating teachers over the subsequent years. As teachers learn more about dialogue, their personal identity and societal engagement are profoundly impacted. Dialogue can be seen as part of personal development, social interaction, and civic responsibility. Six conceptualizations were found, rangocial, and emotional dimensions. The findings underscore the significance of dialogic RPP in enriching educational missions and fostering transformative educational change.

Paper Session I2: Trust and credibility in digital interactions - SIG 26 (Room 1.406)

Science-related public discourse on social media: The role of topic and sociodemographics

Dorothe Kienhues (University of Münster Germany), Monika Taddicken (TU Braunschweig, Germany), Stephan Winter (RPTU Kaiserslautern-Landau, Germany) & Nadine Bol (Tilburg University, Netherlands)

Societies need scientifically literate individuals, not only because of the role science plays in everyday reasoning in a knowledge society, but also because individuals can easily get involved in the generation of and argumentation about science-related information on social media. For a better understanding of the science-related public discourse on social media, we aimed to capture how individuals perceive different socio-scientific issues and how these perceptions are affected by sociodemographics (age, gender, education, political orientation). We also wished to investigate which characteristics of issues and individuals drive online engagement. With regard to online engagement, we differentiated between three typical social media behaviours, that is consumption of information, participation (liking, sharing) and content generation. In a representative German sample

(N=1014, age: M=45.3, SD=14.41), we explored the (socio-) scientific topics vaccinations, climate change, genetically modified food, autonomous driving, psychological effects of video games and cosmology. In a randomised order, participants were asked to judge these topics regarding their meaningfulness (interestingness, individual and societal relevance) and their state of research (uncertainty, complexity, contestedness). Initial findings highlight a differentiated perception of the topics, with climate change and vaccinations receiving the highest meaningfulness ratings and cosmology the lowest. Regardingthe state of research, for all topics higher levels of education predict higher perceptions of controversy, while right-wing political orientation particularly predicts higher perceived controversy for vaccinations and climate change. Information seeking,cipation. Our findings will offer valuable insights into the discussion surrounding the public's online engagement with science. It sheds light upon dialogue and argumentation in the most influential informal learning space which shapes the public's understanding of science.

Towards explaining the effects of jargon on information credibility and source trustworthiness

Julian Fick, Friederike Hendriks & Luca Rudolph (TU Braunschweig, Germany)

An advice often given in science communication training ist to avoid jargon, but communicating in a too easy way may also have downsides. Specifically, it may lead to an recipients' over-confidence in their own abilities to decide on an issue (easiness effect, Scharrer et al., 2012, 2017) and to lower ratings of the author's expertise (Zimmermann & Jucks, 2018). With our study, we ask whether there is a middle-ground, where the advantages of reducing jargon - namely increasing text comprehensiveness - are utilized, while avoiding its downsides. Therefore, we introduced a third condition (in addition to maximized and minimized jargon) with a medium amount of jargon. Additionally, we empirically investigated whether processing fluency can explain the easiness effect. We conducted an online survey (n = 1092 participants), randomly assigned participants to three groups and confronted them with a scientific text about a fictional drug varying in the applied amount of jargon (low, medium, high). Subsequently, they were asked whether they agree with the central claim of that text, how confident they were with this decision, whether they wanted to consult an expert, and how they perceived the author's expertise, integrity, and benevolence. We could not conceptually replicate the adverse effects of avoiding jargon. Instead, only using low or medium amounts of jargon led to higher perceptions of the author's benevolence and integrity. Additionally, fluency significantly mediated the relationship between jargon usage and the approval of claims. We will discuss the specific topic (health) and the overall text comprehensiveness in our study n as reasons for the failed replication, and how implications for using jargon in science communication and informal learning contexts.

How Corrections and Epistemic Explanations Impact the Public's Trust in Science Journalism

Maura de Vos, Kalypso Iordanou (UCLan Cyprus) & Clark Chinn (Rutgers University, USA)

News consumption plays a crucial role in knowledge production, updating, and subsequently decision-making. Individuals will often turn to the news as their primary source of information, especially for novel issues. Simultaneously, in today's 24/7 news cycle, corrections are crucial to reduce the spread of misinformation. Yet it is not well understood how corrections impact the readers' perceived trustworthiness of journalists and journalism. The current study examined whether corrections to scientific newspaper articles and epistemic explanations of the value of the practice impact the public's

perceived trustworthiness of the author, article, and journalism. Participants (N = 178) were randomly assigned to one of four conditions: corrections only, corrections and epistemic explanations, epistemic explanations only, and control. Participants read two vignettes based on authentic sources on AI and oyster mushrooms. Results revealed a positive impact of epistemic explanations on trust in article and author. Corrections had a negative effect on the author's Expertise. Epistemic explanations also had a mitigating effect on trust in journalism after reading, when the correction was present. The study highlights the influence of epistemic explanations on trust in science journalists and the information they convey. Moreover, the findings reveal important implications for educational settings and news organizations.

"It isn't really reliable": Creative writing with AI toward rethinking assessment

Santiago Hurtado, Živa Simšič & Anna Keune (Technical University of Munich, Germany)

AI generative text tools and their rapid adoption promise to support learners in creative writing processes. AI tools can assist students with brainstorming and language refinement. However, ethical concerns arise, such as the limitations of AI detection tools in identifying whether texts are written by other AI tools or not. There is a need to investigate how to support creative writing with AI tools that do not take ownership of learner creativity and how to assess this in educational contexts. Building on constructionist approaches to learning, we developed AI-based scenarios through the design of personally meaningful projects to foster conversations about AI ethics. We conducted a qualitative video-based research in a 4-day workshop setting with nine girls (self-identified; 13-14 years old) and analyzed how youth discussions and practices reflected engagement with the OECD AI ethics principles. We analyzed the data by developing a codebook of the OECD principles, including subcodes per principle that specify how youth interactions and talk evidence the principles in the data. In this paper, we show three examples of how youth engaged in an AI-supported creative writing activity and tested an AI detection tool. Youth discussedAI tools in relation to creative writing and identified the human aspect of writing processes according to the AI detection tool in relation to genre and errors. Additionally, youth also discussed the need for developing new assessments that account for AI in educational settings. This study points to ways to support student creative writing approaches with AI and how to critically evaluate AI tools.

Symposium I: Training and Assessment of Critical Evaluation Strategies - SIG 26 (Room 1.301)

Chair: Philipp Marten Ruhr (University Bochum, Germany)
Discussant: Frank Fischer (Ludwig-Maximilians-Universität LMU, Germany)

Examining an Argument-Based Intervention on Cognitive Text Processing on a Historical Controversy

Kalypso Iordanou (University of Central Lancashire, Cyprus), Constantina Fotiou Athina Manoli & Michalinos Zembylas (Open University Cyprus, Cyprus)

The aim of this study was to examine whether individuals' my-side bias regarding a historical controversial event benefit from engagement in an argument-based intervention on a different topic that individuals were less affectively engaged. A second objective was to examine the think-aloud methodology as a tool to assess my-side bias on a controversial historical event. 104 elementary-school students engaged in a nine-session argument-based intervention. Students' my-side bias was assessed before and after their engagement in the intervention

using a think-aloud methodology, where students were asked to read two accounts about a recent war in their country, an own-side account – from a historian of their ethnic group – and an other-side account – from a historian from the adversary ethnic group and think-aloud. Participants engaged in different cognitive processing when reading the own-side account vs the other-side one. Moreover, they made more evaluative comments post-assessment compared to pre-assessment. Still, students made only partial progress in their reasoning, showing how resilient my-side bias is to change. Participants exhibited significantly more statements that supported the other-side when reading the other-side's account than when reading their own-side's account. Our findings suggest that the think-aloud methodology is a promising approach to offer novel (a) methodological and (b) epistemological contributions to research on my-side bias and critical evaluation strategies. It is a sensitive tool for identifying change in my-side bias and the conditions that facilitate it. Engaging with the other-side, as revealed by the think-aloud, can promote an empathetic understanding of the other-side.

Can Tom Cruise Do Magic Tricks? Enhancing Critical Evaluation Strategies Among Secondary Students

Philipp Marten, Sandra Assmann & Marc Stadtler (Ruhr University Bochum, Germany)

Promoting the development of critical evaluation strategies for assessing online information has recently received increased attention. This research examined how a teacher-led training program, focused on utilizing the key evaluation strategies sourcing and corroboration ("strategy training"), could improve the ability of lower secondary students to evaluate information critically. The study compared the short and midterm effects of this strategy training with a knowledge-focused training thataimed to enhance participants' conceptual understanding of misinformation. Data was collected from 21 seventh and eighth grade classrooms, assessing students' self-efficacy in handling online misinformation, their meta-strategic knowledge, discernment of source credibility, debunking manipulated social media content, and identifying deep fakes at three different measurement points. Data collection is scheduled to be completed by end of April 2024. Preliminary analyses of variance using partial pre- and posttest data from twenty classes for three dependent variables indicate that participants who underwent strategy training experienced greater benefits from their training compared to those who received knowledge training. The strategy training participants showed more improvement in their discernment of credible from less credible sources, in debunking misleading social media images, and in identifying deepfake videos. These preliminary results suggest that strategy training may have a stronger impact on enhancing adolescents' critical evaluation skills than knowledge-based training. Long-term effects will be further explored once data collection is finished. These findings could have significant implications for improving educational ape available as an open educational resource, such a program would allow teachers to help their students in building crucial resilience against widespread online misinformation on a wide scale.

"I Have Eyes, I'm Not Stupid": How Students Evaluate Visual Misinformation

Shai Goldfarb Cohen (Haifa University Israel) Liron Primor Greenfield (Hemdat Academic College, Israel), Thuraia Copti-Mshael, Sarit Barzilai & Linor Hadar (Haifa University, Israel)

In an era in which misinformation and advanced artificial intelligence spread in online platforms, the ability to discern reliable information has emerged as a crucial skill for informed decision-making across personal, professional, and civic domains. This study examines 193 8th and 9th grade students' abilities to evaluate fabricated and manipulated images and videos, and the strategies they use to evaluate such visual misinformation. Students evaluated authentic online visual misinformation using an online

questionnaire. The findings indicated that students were partially able to identify the visual misinformation, with relatively high success in identifying AI-generated images and lower success in identifying manipulated images and videos. All visual items were primarily evaluated based on their visual appearance. Students were attentive to indicators of image processing or AI and also relied on identification of implausible visual details. Students also evaluated the content of the images, relying on prior knowledge and plausibility judgments. Students infrequently used source evaluation and corroboration to ascertain image trustworthiness. We conclude that contemporary education has a key role in promoting critical digital information literacy skills that will enable students to identify manipulated visual media so that they can distinguish between fake and reliable information.

Impacts and Side Effects: Boosting Students' Lateral Reading and the Risk of Overconfidence

Thomas Nygren & Markus Alafifi (Uppsala University, Sweden) & Carl-Anton Werner Axelsson (Mälardalen university, Sweden)

We have designed and tested scalable digital interventions to enhance secondary students' abilities to critically evaluate online information, particularly in Sweden's social science education context. Through a series of interventions involving a thousand middle and high school students, we have explored the efficacy of lateral reading and reverse image searches in combating misinformation. Our findings highlight the positive impact of digital literacy skills development, evidenced by improved abilities to navigate and verify online content. However, we have also uncovered significant challenges, including the inadvertent reinforcement of overconfidence among less proficient students. Our research points toward complex nuances of teaching young individuals to discern misinformation effectively and, not least, how maturity and subject-specific knowledge are essential. This research underscores the critical importance of educational strategies that foster media and information literacy and address the potential for unintended consequences, ensuring a balanced and critical approach to digital information consumption.

FRIDAY 17:00-17:30

SIG 26 Business Meeting

FRIDAY 17:30

Post-Conference Social Meet (optional)