Digital tracing and analysis of collaborative learning with knowledge objects

E-CER founding date: January 1, 2020

E-CER SCOPE

Our E-CER focuses on advancing the digital analysis of collaborative learning with knowledge objects and students’ development of collaborative competence. An enriched understanding of complex processes of collaboration will be achieved by exploring the analysis of digital data in combination with traditional data types.

In current education, students engage in collaborative learning that involves joint exploration and inquiry, discussion and negotiation, writing or creating together, and managing collaborative work. Knowledge objects, which are artefacts encompassing knowledge particular to a discipline (assignments, essays, research or project reports, etc.), are often created jointly, as tangible representation of students’ individual or collective learning outcomes. These collaborative activities are of importance, as students’ learning performance is often assessed based on the knowledge objects produced. Yet, there is little research about the way these object-oriented collaborative activities take place and how they can be supported. While dialogical aspects of collaborative learning have been extensively examined, also by using automated dialog analysis, research on collaborative learning with knowledge objects has been mostly of qualitative nature. Developing methodologies and approaches to trace and analyze data collected digitally enables novel ways to investigate how students engage in the process and how they employ digital technologies to create such objects collaboratively. A specific challenge is represented by the difficulty of scaling up the tracing and analyzing processes rigorously. By scaling up, the rather situational and case-based understanding of collaboration could be expanded to find underlying patterns of interaction and object development as well as the competence required from students to collaborate effectively.

To further the understanding of practices of object-oriented collaboration, our E-CER aims to: a) advance understanding of learning practices involved in students’ object-oriented collaboration; b) develop approaches based on learning analytics and automated analysis techniques to trace and interpret object-oriented collaboration at various levels (individual, collective and institutional); and c) contribute to the
development of indicators for measuring and assessing competences for object-oriented collaboration.

The planned work will include analytical explorations that combine qualitative approaches with learning analytics and automated analysis techniques. This analytical approach will allow examination of digital traces using: social and epistemic network analysis of network and digital trace data, i.e., online discussions, aggregated collaboration and artefact development contributions, experienced interaction; dynamic Bayesian networks and breakpoint analysis of temporal manifestation in interaction data; automated content analysis of developing knowledge objects, produced collectively, versioning, commenting), inspired by qualitative analyses and text data mining techniques.

The work of the collaborating teams will build on the coexistence of both prior knowledge and newly acquired conceptions and ideas about how collaborative learning can be captured in its complexity. Future learning and instruction are foreseen to be supported by automated analytical practices, therefore, our E-CER aims at contributing to theoretical, methodological and ethical knowledge on data analytics practices. The team includes interdisciplinary and complementary expertise on qualitative study of collaboration and competence development, and on quantitative techniques, such as learning analytics and automated analysis of learning dialogues.

**E-CER MEMBERS**

**Assoc. Prof. Dr. Crina Damsa** is associated with the Department of Education at the University of Oslo in Norway. Her teaching is in the area of university pedagogy and learning design. In her research, she examines the learning of students and work of teachers in various disciplinary areas in higher education, using an ecological perspective and rich, analog and digital, data to capture processes, context features and outcomes. Her learning research focuses on collaborative processes, the way digital technologies aid inquiry and the way learners use various resources in their learning activities. Crina is a member of the EARLI EC and of the International Society of the Learning Sciences, is associate editor of the Frontline Learning Research and board member of several learning research journals.

**Prof. Dr. Hanni Muukkonen** (Educational psychology, Faculty of Education, University of Oulu, Finland) current research focuses on collaborative learning, knowledge creation, learning analytics, and educational technology development. In the area of educational psychology, she has focused on technology-mediated collaboration and understanding of competence development as a result of engagement in various learning activities. Hanni has been involved in several large scale international educational technology development projects funded by the Academy of Finland, EU,
Muukkonen has also experience in academic leadership e.g., as programme director and vice-dean for academic affairs. She currently leads a large national learning analytics research and development project funded by the Ministry of Education and Culture to support students' study paths, guidance and leadership in higher education (https://analytiikkaaly.fi/in-english/).

Prof. Dr. Dragan Gasevic (Information Technology, Monash University, Australia) is director of the Centre for Learning Analytics at Monash University, Australia. He served as the past president (2015-2017) of the Society for Learning Analytics Research (SoLAR) and has held several honorary appointments in Australia, Asia, Europe, and North America. A computer scientist by training and skills, Dragan considers himself a learning analyst who develops computational data analysis methods that can shape next-generation learning technologies and advance our understanding of self-regulated and collaborative learning. Dragan received competitive funding in excess of over AUD $41M (equivalent) from research bodies in Australia, Europe, and North America. Dragan is a (co-)author of numerous research papers and books and a frequent keynote speaker. The Australian, a leading newspaper in Australia, identified Dragan as the national field leader in educational technologies based on citations of his publications. He received the best project of the year award (2019) by the Association for Learning Technology for the work on the SHEILA framework that influenced the adoption of learning analytics in hundreds of higher education institutions.

Assoc. Prof. Dr. Jeroen Janssen is associated with the Department of Education at Utrecht University, The Netherlands. His research interests include (computer-supported) collaborative learning, self-regulated learning, and educational technology. Jeroen is associate editor of the Journal of Computer-Assisted Learning. In Utrecht he is involved in projects on Massive Open Online Course, Flipped Classrooms, and self-regulated learning. He received grants for research on collaborative learning and teacher guidance of collaborative learning.

Asst. Prof. Dr. Anouschka van Leeuwen (Department of Education, Utrecht University, the Netherlands) has a background in Artificial Intelligence and Educational Sciences, which she combines in her research into educational technology. Her particular research interests include computer-supported collaborative learning, learning analytics, and blended learning. Anouschka is a member of the executive committee of the Society for Learning Analytics Research (SoLAR), for which she organizes bi-monthly webinars. She is also part of the editorial board of the Journal of Learning Analytics.
Dr. Rachelle Esterhazy is a Postdoctoral Researcher at the Department of Education at the University of Oslo, Norway. In her PhD thesis, she has studied productive feedback practices in higher education using qualitative methodology and sociocultural theories. Her current research interests cover feedback, assessment and pedagogical design practices in higher education as well as collegial approaches to academic development.

Dr. Alex Whitelock-Wainwright is a Research Fellow in Learning Analytics at Monash University, focusing on institutional-level implementations of Learning Analytics services. His interests are in Psychometrics, focusing on evaluating proposed factor structures. Currently, Alex is working on evaluating the validity of the Bigg’s Approaches to Learning survey and implementing OnTask to support personalised student feedback at scale.

Andres Araos is PhD candidate at the Faculty of Education at the University of Oslo (UiO). His background is in Industrial Engineering and Higher Education studies. His PhD research is focused on how undergraduate students engage in learning practices using non-curricular resources available on the Internet and connected to their disciplinary domain. The project examines learning processes from an ecological perspective, by collecting and analyzing multiple data streams, including digital traces, activities in digital environments, surveys and interviews.

Anni Silvola is a PhD student at the Faculty of Education, at the University of Oulu, Finland. Her PhD thesis focuses on researching how to support study engagement with learning analytics during university studies. Her research interests are study engagement and competence development during higher education studies, collaborative learning and learning analytics. Currently, she is working on a national learning analytics research and development project, funded by the Ministry of Culture and Education (https://analytiikkaaly.fi/).

Egle Gedrimiene is a PhD student in Oulu University, Faculty of Education. She has a background in psychology and is currently doing research on learning analytics and technology supported transitions in education. Her research interests are career guidance, self-efficacy and learning analytics. Currently, she is working on a national learning analytics research and development project, funded by the Ministry of Culture and Education (https://analytiikkaaly.fi/).

E-CER MEETINGS 2020
◇ 21 February 2020, 9-11am GMT+2 (on Skype)
◇ Proposed: 19-20 March 2020 (Utrecht University, The Netherlands)
◇ Proposed: October 2020 (University of Oslo, Norway)