Invitation to a hands-on course in phenomenography:
The role of mathematics in higher education in STEM

MINT, the TekNat Centre for Discipline-Based Education Research, hereby invites researchers and PhD students in all subject areas at TekNat to participate in a course on phenomenographic research, based on hands-on investigations of teachers' views of the role of mathematics in STEM higher education, aiming at a joint draft to an article¹.

Mathematics is important in many STEM disciplines, but research shows that success in mathematics courses is no guarantee that students are able to productively use mathematics in problem solving in the contexts of other disciplines. Most of this research agree that mathematics as contextualised in other STEM subjects is perceived significantly different from mathematics in isolation by the students.

The course

Phenomenography is a research approach developed for educational purposes. In a phenomenographic study, the researchers strive to identify and describe the breadth of experiences, or understandings, of a phenomenon found in a certain cohort. Data is often collected through in-depth interviews, while the result of the analysis is an outcome space which describes the qualitatively different ways in which the phenomenon is understood. From here implication for teaching and learning can be drawn, supported by different theories.

This course will give participants hands-on experience in phenomenographical research through conducting a study exploring teachers' views on the role of mathematics in different STEM disciplines, with the potential to contrast between these disciplines. While there exists some research on how students in higher STEM education view the role of mathematics in other disciplines, little is known about university teachers’ perspectives, or how teachers’ views of the role of mathematics in science influence their teaching. Such insights could lead to strategies for teaching and learning that can help to improve students’ ability to use mathematics productively and meaningfully within the context of other STEM disciplines and thereby improve their learning in these disciplines.

Some previous experience of discipline-based education research is an advantage, but the course does not require any previous knowledge of phenomenography or other kinds of qualitative research. After introductory lectures on phenomenography as a research approach, participants are expected to interview some teachers in their own subject area during the course. They will then analyse the data and write up the results under guidance of the course leaders, with the aim of drafting a joint paper for a journal publication or conference contribution.

¹ For applicants with less previous experience in DBER we suggest MINTs course Introduction to Discipline-Based Education Research, given period 1, 2022. For more information, please contact Felix Ho, felix.ho@kemi.uu.se
IMPLEMENTATION AND TIME LINE

Autumn semester 2022, period 2:

- Three hands-on seminars on phenomenography with examples from different STEM areas. Literature reading. Some home-work exercises between the seminars.
- Overview of semi-structured interviews. Planning of interviews together with course leaders.
- All participants will interview teachers in their own disciplines.

Spring semester 2023:

- Guided workshops on data analyses.
- Workshop on how to write an article in DBER.
- Writing up.

OTHER INFORMATION

Sign up at [https://doit.medfarm.uu.se/bin/kurt3/kurt/61998](https://doit.medfarm.uu.se/bin/kurt3/kurt/61998) no later than September 30, 2022. Note that the course will start in period 2.

First meeting: Monday 7 November at 15.15-17.00, with the exact dates for the other meetings to be decided together with the course participants.

As guidance for PhD students participating in the project, we suggest 5 ECTS credits.

The course will be led by Anna Eckerdal and Anders Berglund, Uppsala Computing Education Research Group.

For more information and questions, please contact Anna Eckerdal, Anna.Eckerdal@it.uu.se