
# Conference Program

UNIVERSITY OF GOTHENBURG
UMEÅ UNIVERSITY
UPPSALA UNIVERSITET
Swedish Research Council

# Contents

## Program Schedule

### Monday, 15 June 2026

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| 09:00-12:00 | Workshop B<br>*Using Register Data in Educational Research - with Examples in R* | AK2 135 |
| 12:00-12:45 | Lunch | |
| 12:45-13:00 | Opening | AK2 136 |
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## Tuesday, 16 June 2026

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| 15:00-16:30 | Paper session 5<br>*Schools in their Social and Organisational Environment* | AK2 134 |
| 16:30 | Farewell | |

## Conference Venue

The conference takes place at Pedagogen, located at the very heart of Gothenburg within walking distance to the central station and many nearby hotels and tourist attractions.

**Location:** Pedagogen Hus A, Västra Hamngatan 25, 411 17 Gothenburg

**Nearest Tram/Bus Stop:** Grönsakstorget

**Registration:** Foyer (Main Entrance)

**The conference takes place in the following rooms, located in the basement**:

AK2 134

AK2 135

AK2 136 (K-G Stukát)

AK2 138

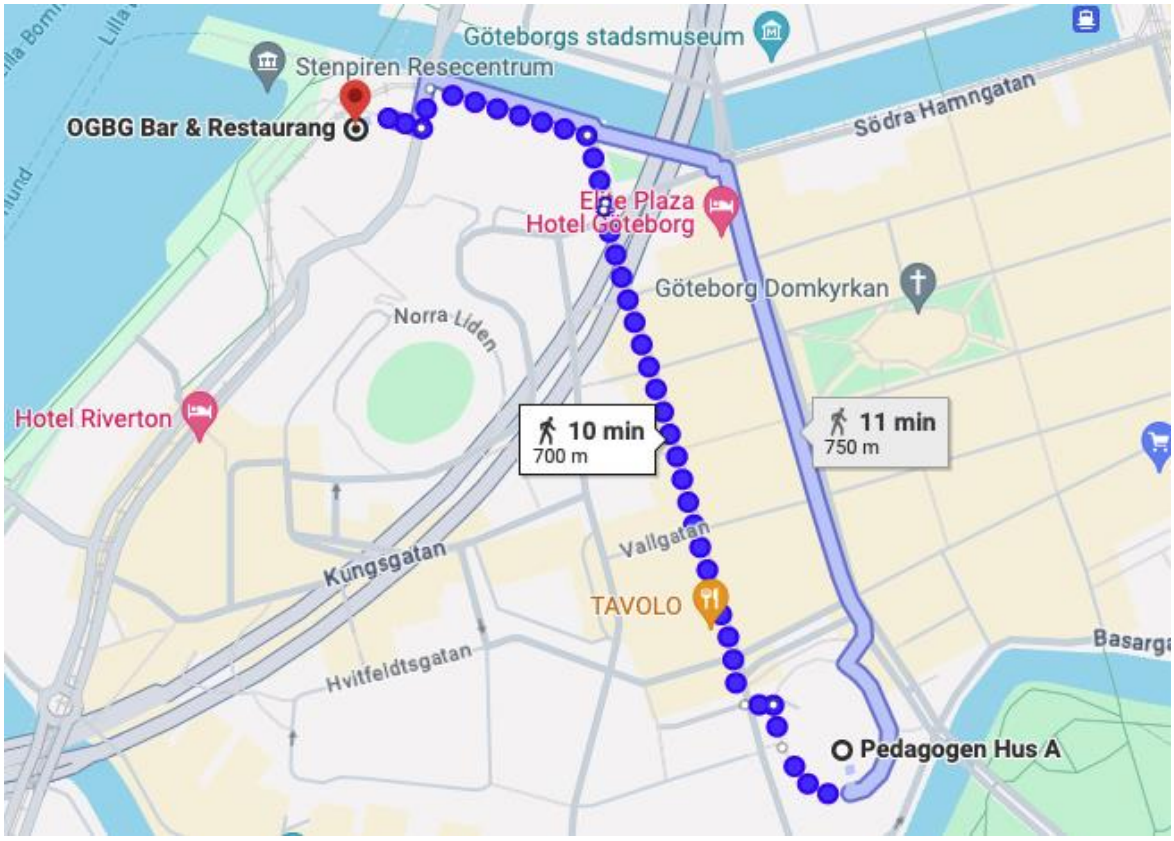
Luggage and jackets can be stored at AK2 139.

## Conference Dinner

The conference dinner takes place at OGBG Bar & Restaurang. A vegetarian buffet will be served to those who signed up (free of charge).

**Address:** OGBG Bar & Restaurang, Skeppsbroplatsen 1, 411 21 Gothenburg

**Nearest Tram/Bus Stop:** Stenpiren



# Program Overview

## Keynote: Classmates, Families, and Futures: Understanding Educational Choices and Achievement

**Monday, 15 June 2026, 13:00-14:00**

Speaker: Maria Brandén
Room: AK2 136

Educational outcomes and choices are not shaped in isolation but emerge from the social environments in which students are embedded. This talk examines how classmates and their families are associated with students' educational achievement and decision-making, focusing on mechanisms related to peer influence, social exposure, and access to resources. Drawing on Swedish population register data, it brings together evidence from several studies that leverage rich longitudinal information and addresses selection into schools.

The findings show that the composition of schoolmates, both in terms of achievement and parental resources, is systematically related to students' educational choices, even conditional on prior performance, with important differences across socio-economic groups. At the same time, broader contextual factors, such as geographic proximity to higher education institutions, shape students' aspirations and pathways, particularly among those from less advantaged backgrounds. While some dimensions of school composition appear to have limited consequences for academic performance, they may still matter for key educational transitions, highlighting the importance of moving beyond achievement as the sole outcome of interest.

Extending the perspective beyond students themselves, I will also consider how schools function as arenas for social interaction among parents. Our ongoing research suggests that connections formed through children's school networks can facilitate access to labor market–relevant resources, contributing to the economic integration of immigrant families. Taken together, the results underscore the role of schools as social contexts that shape both individual trajectories and broader patterns of inequality.

**Maria Brandén** is Professor of Analytical Sociology at Linköping University and Director of the Institute for Analytical Sociology. Using large-scale population register data, her research focuses on how social contexts—such as neighborhoods, schools, and networks—shape life outcomes such as income, educational choices and educational achievement.
Linköping University profile page: https://liu.se/en/employee/marbr31

## Keynote: Unlocking Potential - How the Combination of Survey and Administrative Data can Inform Research in Education

**Tuesday, 16 June 2026, 13:30-14:30**

Speaker: Astrid M. J. Sandsør
Room: AK2 136

As education systems grapple with increasingly complex societal and developmental challenges, researchers need data infrastructures that allow them to understand these issues in deeper and more nuanced ways. In Norway, the possibility to link national administrative data with large-scale survey and genetic data offers exactly such a powerful infrastructure. Drawing on ongoing work within this major linkage project, the talk will describe data sources and access and illustrate how combining administrative records with longitudinal family and health data opens new possibilities for educational research, particularly in understanding learning, development, and inequality. Current limitations will also be discussed, as well as the substantial future potential as additional administrative data and possible linkage to ILSAs become available.

**Professor Astrid M. J. Sandsør** uses register data in combination with quasi-experimental methods to uncover causal effects of educational policies, with a particular focus on educational inequality. She holds a PhD in Economics and is professor at the Centre of Excellence CREATE - Centre for Research on Equality in Education and at the Department of Special Needs Education, University of Oslo. She has been a member of a government-appointed public commission examining the national admission system to higher education (Norwegian Official Report NOU 2022: 17) and the expert group on how childcare, schools and after school care can contribute to reducing social inequalities (2023-2024). She is an IZA fellow and a CESifo affiliate and was a member of the Young Academy of Norway (2021-2025).
You can find her on LinkedIn https://www.linkedin.com/in/astrid-sandsor/
UiO profile page: https://www.uv.uio.no/isp/english/people/aca/amsandso/index.html
Personal website: https://sites.google.com/site/astridsandsor/home

## Workshop A: An Introduction to Latent Class Analysis

**Monday, 15 June 2026, 09:00-12:00**

Room: AK2 134

Workshop leaders: Kajsa Yang Hansen

Department of Education and Special Education, Gothenburg University, Sweden

This workshop offers a practical introduction to latent class analysis (LCA). LCA is an individual-centered, model-based method that classifies cases into unobserved, homogeneous groups based on the conditional probabilities of a set of observed categorical variables, given the latent classes. This approach makes LCA particularly valuable for examining individual differences in domains such as learning strategies, study habits, or behavioral patterns. The primary objectives of LCA are to determine the optimal number of latent classes, estimate the proportions of cases in each latent class, and identify their unique response patterns. Moreover, class membership can be used as a predictor or an outcome in relation to other variables, enhancing its analytical potential. This workshop introduces key LCA concepts, outlines detailed procedural steps, and explains decision criteria for model and latent class selection. Examples will be given using available data and the statistical software Mplus and R. Please note that the workshop serves a gentle start of LCA modeling, a preparation for researchers into the more advanced latent variable mixture modeling world.

Targe group: Doctoral candidates and senior researchers in social and behavioral sciences

Prerequisites: basic statistics, regression analysis and basic structural equation modeling technique.

Learning outcomes: After the workshop, participants are expected to gain some understanding of the methods and be able to apply basic LCA/LPA models to their own data. Additionally, they will be equipped to read and critically assess the credibility of scientific articles that utilize these methods.

## Workshop B: Using Register Data in Educational Research - with Examples in R

**Monday, 15 June 2026, 09:00-12:00**

Room: AK2 135

Workshop leaders: Marie Wiberg

Department of Statistics, Umeå School of Business, Economics and Statistics (USBE), Umeå University, Sweden

In this workshop, we will explore how register-based measures can be applied in educational research. Particular attention will be given to the use of covariates or background variables and to methods for combining them—specifically through the construction of propensity scores. We will illustrate how these scores can be employed in studies using register data. We will use regression and logistic regression with the focus on drawing valid conclusions from register data. Throughout the workshop, we will provide concrete examples using available datasets and demonstrate the implementation in the statistical software R, together with RStudio.

Target group: Doctoral students and senior researchers in the social and behavioral sciences.

Prerequisites: Basic knowledge of statistics, descriptive statistics and basic knowledge of R.

Learning outcomes: After completing the workshop, participants will understand how to incorporate covariates in educational research, and for drawing inferences from register data. Participants will also be equipped to critically evaluate scientific articles that apply covariates in their analyses.

## Panel Discussion: Beyond National Tests: Equating, Linking, and the New Role of Final Examinations in Sweden

**Tuesday, 16 June 2026, 11:00-12:30**

Moderator: Christina Wikström

Room: AK2 136

The recent inquiry Ett likvärdigt betygssystem (SOU 2025:18) proposes a fundamental reconfiguration of the relationship between national tests, grades, and merit values in Sweden. Under the proposed model, national tests are given a new, system-defining role: they are explicitly designed for statistical calibration, with the aim of ensuring comparability of teacher-assigned grades and merit values across schools. As a result, the former national tests are redesigned and repositioned from instruments intended to support teacher's grading practices and to some degree also teaching and learning to tools primarily serving as sources of statistical information within the grading and selection system.

Taking this proposal as its point of departure, the panel examines what it means to make linking and equating core purposes of assessment rather than technical add-ons. The discussion addresses key concepts and designs, as well as methodological prerequisites in test construction and statistical modelling. Particular attention is given to the psychometric assumptions underlying calibration models that link professionally assigned grades across subjects to test results, and to the consequences these assumptions may have for the interpretation, use, and legitimacy of test scores and grades.

The session begins with a brief presentation by Anders Auer, who has particular expertise related to the current inquiry. He will provide an update on the proposed reform and outlines the final exams replacing the current national tests, and their purposes. This is followed by a presentation by Per-Erik Lyrén and Erika Majoros, both researchers in educational measurement with special expertise in equating and linking, who will introduce equating and linking designs and discuss their implications for test development and administration, thereby establishing a shared conceptual foundation for the panel discussion.

The subsequent panel adds additional expertise in equating and psychometrics, educational policy, test development, and assessment and grading in Swedish schools. Active audience participation is encouraged throughout the session through questions and discussion. The panel is moderated by Christina Wikström (Umeå University). It includes Anders Auer (Swedish National Agency for Education/Skolverket), Hannes Theander (Swedish National Agency for Education/Skolverket), Alli Klapp (University of Gothenburg), Inga Laukaityte (Umeå University), Per-Erik Lyrén (Umeå University), Erika Majoros (Umeå University), Peter Nyström (University of Gothenburg), and Marie Wiberg (Umeå University).

## Paper session 1: Modelling Classroom and School Processes: The Role of Peers and Teachers

**Monday, 15 June 2026, 14:30-16:00**

**Chairperson: Tobias Dalberg**
**Room: AK2 134**
**Abstract pages: 16-18**

Ida Laug: *From Latent Traits to Relational Systems: A Network Psychometric Re-examination of Persistence in Collaborative Learning*

Nils Kirsten, Mari Paloniemi Lindström, Jannika Lindvall, and Pontus Bäckström: *Do Teaching Practices Explain Composition Effects on Student Achievement? Evidence from the TALIS Video Study*

Shiri Lavy and Felix Weiss: *Teachers against the trend? The increase of perceived teacher support in Denmark and its correlates*

Rebecka Persson: *Survey-Based School Classifications and the Risk of False Positives*

## Paper session 2: Knowledge Construction and Test Taking

**Monday, 15 June 2026, 14:30-16:00**

**Chairperson: Erika Majoros**
**Room: AK2 135**
**Abstract pages: 19-20**

Marie Grice and Fredrik Olsson: *Personal Epistemology and Mathematics Performance in Upper-secondary School*

Calum James: *Test-taking Strategies and Examination Performance Prediction*

Hampus Jarhede and Anna Lind Pantzare: *Examining convergent validity evidence for written science tests of skills developed through practical work*

## Paper session 3: Learning in Context: Assessment, Cognition, and Student Experience

**Tuesday, 16 June 2026, 09:00-10:30**

**Chairperson: Leah Natasha Glassow**
**Room: AK2 134**
**Abstract pages: 21-22**

Yohanes Wolde-Senbet: *Exploring the Canonical Correlation between National and School-Based Exam Outcomes in Ethiopia.*

Daniel Bolander Blomberg: *Self-rated mental health in grade 9 and school satisfaction in grade 6 for children with ADHD or autism*

Lisa Palmqvist*: Cognitive Architecture of Decoding in Intellectual Disability: Examining Moderation by Co-Occurring Autism Spectrum Disorder*

## Paper session 4: Instrument Construction and Validation

**Tuesday, 16 June 2026, 09:00-10:30**

**Chairperson: Panagiotis Patsis**
**Room: AK2 135**
**Abstract pages: 23-24**

Ida Laug and Rune Müller Kristensen: *Development and Validation of the Perceived Shared Reflective Persistence Scale for Adolescents in Collaborative Learning Contexts*

Kajic Diana, Kapetanovic Sabina, Olsson M. Tina, and Skoog Therése: *Development and Validation of the Relational School Climate 9-Item Student Report Instrument*

Johan Espenberg: *Examination of knowledge subscales in PISA 2015 science by Habermans method*

## Paper session 5: Schools in their Social and Organisational Environment

**Tuesday, 16 June 2026, 15:00-16:30**

**Chairperson: Tobias Dalberg**
**Room: AK2 134**
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Ricardo Cevallos: *Investing in social sciences in Swedish higher education: Temporalities and capital conversions*

Rebecka Persson and Iman Dadgar: *A Comparison of Crossed-Random Investigations of Educational Leadership in Psychology and Economics*

Mikael Börjesson, Pablo Lillo Cea, Laura Giorio, Laureline Brun, and Clara Comte: *The Spaces of Municipalities and Regions in Sweden and the Distribution of Educational Assets*

## Poster Session

## Monday, 15 June 2026, 16:30-18:00

**Chairperson: Leah Natasha Glassow**

**Abstract pages: 27-29**

Thom Kunkeler, Anastasiia Menshikova, and Aletta Nylén: *Capital and the Transition from Upper Secondary to Higher Education in Computing*

Chonghui Li: *Affordances and Constraints in Swedish Work-integrated Teacher Education: Perspectives from Three Key Stakeholders*

Michalis Linardakis and Panagiotis Karkanidis: *Eliciting Teachers' Preferences for Behavioural Strategies in Special Education: A Discrete Choice Modelling Approach*

Jeongin Yoon Blomstervall: *Dynamic Community of Inquiry in Engineering Education*

Alexander Jon Kennerley: *Male Sprezzatura and Female Diligence: An Exploratory Analysis of Student Typologies in Swedish Schools*

# Abstracts

## Papers

### Session 1: Modelling Classroom and School Processes: The Role of Peers and Teachers

**Monday, 15 June 2026, 14:30-16:00**

**Chairperson: Tobias Dalberg**

**Room: AK2 134**

**From Latent Traits to Relational Systems: A Network Psychometric Re-examination of Persistence in Collaborative Learning**

Ida Laug
Aarhus University, Denmark

Persistence in educational research is most often operationalized within a latent variable framework, where observed indicators are often treated as interchangeable reflections of an underlying trait. While approaches such as multidimensional item response theory (MIRT) offer rigorous tools for assessing dimensionality and measurement quality, they typically assume local independence, meaning that associations among items are explained through shared latent causes rather than direct relationships. This raises questions about their adequacy for capturing relational structure in socially embedded phenomena such as persistence in collaborative settings.

This study advances a network psychometric approach to Perceived Shared Reflective Persistence, reframing persistence as a relational system in which components are directly connected through conditional dependencies. Using survey data from students in collaborative STEM learning environments, regularized Gaussian graphical models, specified as undirected pairwise Markov random fields, were estimated to model partial correlation structures among items, where edges represent conditional dependencies. Exploratory graph analysis (EGA) was applied to identify communities of conditionally dependent items and examine whether these groupings align with dimensions identified through MIRT. Findings show clear convergence between the MIRT-derived factor structure and the communities identified through EGA, suggesting that conventional latent models capture meaningful structure. However, the network psychometric analysis moves beyond dimensionality by identifying how specific components function within the system. Centrality analyses (node strength) indicate that items reflecting social aspects of persistence consistently occupy the most central positions in the network. Robustness of these findings is evaluated through nonparametric bootstrapping and case-dropping procedures, demonstrating that centrality estimates are stable and not driven by sampling artefacts. Notably, the central role of social items persists across estimation conditions, indicating that their prominence is not incidental but structurally embedded in the network.

Taken together, these results challenge a purely reflective interpretation of persistence. Rather than viewing social dimensions as one component among several, the findings suggest that they may function as organizing hubs within the construct. This shifts the interpretation of persistence from an individual attribute with social influences to a system in which social processes are constitutive. Methodologically, the study illustrates how network psychometrics can be used to interrogate the assumptions of latent variable models. By modelling inter-item dependencies directly, the approach opens new possibilities for examining construct structure, centrality, and potential pathways of influence. For quantitative research in education, these points toward a broader methodological repertoire in which constructs are understood not only as latent variables, but as dynamically structured systems.

Keywords: Network psychometrics; Persistence; Collaboration; Educational measurement; Multidimensional modeling

**Do Teaching Practices Explain Composition Effects on Student Achievement? Evidence from the TALIS Video Study**

Nils Kirsten, Mari Paloniemi Lindström, Jannika Lindvall, and Pontus Bäckström
Uppsala University; Högskolan Dalarna; Mälardalens University; Jönköpings University, Sweden

A longstanding question in educational research is whether classroom peer composition shapes student learning beyond individual prior achievement, and if so, through which mechanisms. Although numerous studies report composition effects, typically operationalized as the influence of class-average prior achievement on individual achievement growth, findings remain inconsistent, in part due to methodological limitations related to measurement error, aggregation bias, and reliance on self-reported teaching practices. Furthermore, few studies have examined whether teaching practices mediate composition effects, and cross-national evidence remains scarce. This study addresses these gaps using the TALIS Video Study 2018, which links externally observed mathematics teaching to longitudinal student achievement data across multiple school systems.

The study has two aims: (1) to estimate the magnitude and robustness of composition effects under increasingly stringent corrections for measurement error and aggregation bias, and (2) to assess whether teaching practices and opportunity-to-learn (OTL) vary systematically with class-level prior achievement, and whether such differences help explain composition effects. We analyze data from 12,440 students nested in 478 classrooms across six participating school systems (Chile, Colombia, England, Germany, Madrid, and Mexico). Student achievement was measured with IRT-scaled pre- and post-tests on foundational mathematics and quadratic equations. Teaching practices were captured through video observations and teachers' instructional logs.

Findings show strong and consistent composition effects across countries, with between-classroom relations substantially larger than within-classroom relations. In other words, differences in the average prior achievement of classrooms are more strongly predictive of subsequent student learning than differences between students within the same classroom. Because part of this pattern may arise from measurement error at the individual level being misattributed to between-classroom effects, we corrected for student-level measurement error through latent-measurement/manifest-aggregation (LM/MA), which increased the estimated within-classroom effects. Conversely, modelling classroom composition as a latent construct by doubly latent modelling (DLM), thereby accounting for aggregation bias and sampling error, led to increased estimates of between-classroom effects.

Against this more robust measurement framework, teaching practices and OTL showed weak and inconsistent associations with class-level prior achievement across countries and did not mediate the estimated composition effects. Thus, even under models that address key measurement and aggregation bias, we find no evidence that the measured instructional differences explain composition effects. We discuss these results in relation to methodological limitations and to classroom- or school-level mechanisms beyond the instructional measures used in this study, as well as more persistent structural processes, that may contribute to the emergence of composition effects.

Keywords: Classroom composition, Achievement growth, Teaching practices, TALIS Video Study, Multilevel modelling

**Teachers Against the Trend? The Increase of Perceived Teacher Support in Denmark and its Correlates**

Shiri Lavy and Felix Weiss
Aarhus University, Denmark

Teacher support is considered one of the main contributors to student well-being in school. It is often also thought to impact student academic efficacy and achievement. Considering the recent declines in student achievement and test scores, rising criticism of schools in public debates, and changes in youth behavior, we explored changes in teacher support of students with different ethnic and social backgrounds over the last decade. Using administrative register data and a national survey of students at the end of compulsory education (9th grade) in all public schools in Denmark, we examined trends across 10 birth cohorts (1998-2008). Beyond the levels of perceived support, we explored associations of perceived teacher support with students' academic self-efficacy, school satisfaction and academic achievement. Each cohort comprised 57,295-64,064 students. Perceived teacher support, students' academic self-efficacy, and students' school satisfaction (i.e., how much they like school) were each measured using two questions from the students' self-report questionnaire completed in 9th grade. Academic achievements in math and Danish were measured as the final exam grades at the end of compulsory education, which are considered high-stakes exams.

Results indicated an increase in perceived teacher support between the 1999 and 2008 cohorts, consistent across the different student groups. Across the 10 cohorts, immigrants reported receiving more support than other students, and descendants reported receiving somewhat more support than students of Danish origin. Perceived teacher support was also slightly higher among students with secondary or post-secondary educated parents, followed by those with tertiary education, and lowest among those with vocational education. As expected, perceived teacher support was positively associated with academic efficacy, school satisfaction and achievement in all cohorts, and the correlations remained relatively stable over time. However, the associations differed significantly across students with different backgrounds, and these differences were less stable over time, especially among immigrants and students with parents with vocational education. For these students, some of the associations with teacher support were negative. Overall, against the notion that the situation in schools is worsening and in contradiction to the decline in test scores, students perceive more support from the teachers over time. This cannot be explained just by the higher share of immigrants (who are more positive). However, changes in the associations of perceived teacher support with experiences and achievement of students in potentially vulnerable groups delineate a more complex picture. Different mechanisms for explaining these trends will be discussed.

Keywords: Socioeconomic status, PISA, Measurement invariance, Differential item functioning, Immigrant background

**Survey-Based School Classifications and the Risk of False Positives**

Rebecka Persson
Center for Educational Leadership and Excellence, Stockholm School of Economics, Sweden

Teacher surveys are widely used in educational research and school inspection to generate school-level estimates of constructs such as teacher collaboration and principal leadership to select schools for study or inspection. In this study, I test three modeling approaches to arrive at such estimates: raw school means, nested two-level multilevel models (MLM), and three-way crossed random effects models that partition variance across schools, respondents, and items. These approaches rest on different assumptions about the structure of survey data, yet the choice among them is rarely made explicit and rarely evaluated for its inferential consequences.

Using data from a Swedish national teacher survey (N = 718 schools, 2015–2019), I compare how the three approaches classify schools on two constructs that differ substantially in their variance structure. For teacher collaboration, the approaches yield highly concordant school-level classifications, and modeling choice has negligible practical consequences. For principal leadership, the crossed model reveals that approximately 49% of total variance resides at the respondent level, reflecting stable individual rating tendencies rather than genuine school-level signal. The school-level ICC estimated by nested MLM (27.7%) is near zero under the crossed model. As a consequence, 148 schools, 45% of those flagged as significantly above average under nested MLM, lose that classification under the crossed model.

A counterintuitive finding emerges in that schools most at risk of false positive identification are those with the lowest within-school variance, where teachers agree most strongly. This occurs when high within-school agreement is consistent with shared respondent rating tendencies rather than genuine school consensus. I introduce the ratio of respondent-level to school-level variance as a practical diagnostic for researchers to assess, before committing to an analytical approach, whether modeling choice is likely to matter for their data.

These findings have direct implications for school accountability and for the selection of schools as cases in qualitative and mixed-methods research. When quantitative screening for extreme or deviant case selection is based on nested MLM estimates for constructs with high respondent variance, the schools identified may represent extremes of a measurement artifact rather than extremes of the underlying construct. I discuss the conditions under which the three modeling approaches diverge and provide guidance on principled method selection in educational survey research.

Keywords: Crossed random effects, Multilevel modeling, School surveys, Case selection, School accountability

## Session 2: Knowledge Construction and Test Taking

**Monday, 15 June 2026, 14:30-16:00**

**Chairperson: Erika Majoros**

**Room: AK2 135**

**Personal Epistemology and Mathematics Performance in Upper-secondary School**

Marie Grice and Fredrik Olsson
University of Gothenburg, Sweden

Assumptions about the nature of knowledge and how knowledge is acquired guide students in processes of knowledge development and action. Perry (1968) was a pioneer in examining epistemological beliefs among university students. He showed that epistemic beliefs developed from simple, certain and authority in the early years to highly interwoven, tentative, and derived from multiple sources in later years. Schommer (1990) identified five dimensions of epistemological beliefs, which develop more or less independently, and showed that more sophisticated beliefs correlate positively with academic success. A few studies have examined students' personal epistemology in mathematics using different survey tools (Schoenfeld, 1989; Schommer-Aikins, Duell & Hutter, 2005; Wheeler, 2007). The aim of the precent study is to investigate students' personal epistemology in mathematics, and how mathematics teaching can be reflective of the students' personal epistemology.

A survey instrument based on Ghanie (2023) has been adapated to measure students' domain-specific epistemic beliefs in mathematics. It consists of 32 items and a sixpoint Likert-scale with the endpoints No, not at all and Yes, absolutely. The four assumed dimensions are beliefs about the source of mathematical knowledge (SOU), 8 items; beliefs about the structure and stability of mathematical knowledge (STR), 16 items; beliefs about speed and control in mathematics learning (SPE), 14 items, and beliefs about the usefulness of mathematics (USE), 8 items. In all dimensions there is an assumed continuum from a naïve to a sophisticated view of knowledge.

The participants in the present study are 277 upper-secondary students years 1, 2 and 3 studying on the natural science programme and the technical programme. The questionnaire was distributed using Microsoft Forms. An exploratory factor analysis was performed in which five factors were manifested. In bivariate analyses correlations were found between various factors and performance, study programme and gender.

Our tentative conclusions manifest the assumed dimensions and a fifth one is suggested. The SPE factor correlates strongly with performance, and is thereby most interesting to address to improve students' success in mathematics education. The USE factor correlates negatively with performance. Further statistical analyses such as multiple regression analysis can contribute to the understanding of the interrelationship of the factors and other variables. Our findings empirically support the critical role of mathematics teaching that develops personal epistemic beliefs, by for example challenging students to think critically about the mathematics content and expecting students to compare multiple ways of solving problems (Muis & Duffy, 2013).

Keywords: Personal epistemology, Mathematics, Epistemic cognition, Factor analysis, Teaching sequences in mathematics

**Test-taking Strategies and Examination Performance Prediction**

Calum James
Umeå University, Sweden

Test-wiseness, or strategies used by examinees in optimising test performance on bases other than their relevant content knowledge, is an important consideration in relation to test-score interpretations of for-the-test relevant abilities. This is particularly salient in the context of high-stakes tests, such as in the case of university admissions. Here, score increases due to test-wiseness could invite construct-validity and fairness concerns regarding whether higher/lower scores really represent greater/lesser proficiency. Examinee engagement in test-wiseness behaviours has been described in several exam contexts, including within the SweSAT (högskoleprovet), where previous studies

reported positive associations between certain strategies and scores. However, these studies described strategies broadly, or overtly in relation to risk-taking. A further investigation into test-wiseness within the SweSAT with a greater focus on categorising strategies by behaviour and function would contribute to an understanding of which behaviours are used by test-takers, and how these relate to test performance. With that in mind, this study investigated what types of test-wiseness were reported by SweSAT examinees, and their performance associations.

The data for this study consisted of responses to a questionnaire of test-taking strategies before, during, and after the test along with SweSAT scores collected in 2016. The analyses built on the responses from 1540 examinees. Exploratory factor analysis (EFA) was used in initially assessing the dimensionality of responses. Then, confirmatory factor analysis (CFA) was used in evaluating the factor structure under stricter assumptions; and finally, structural equation modelling (SEM) was used in evaluating the association between reported strategies and test performance.

A 7-factor model from the EFA was refined into a 6-factor model in CFA, representing information-seeking and practice behaviours before the test; error avoidance, test-wiseness, and ineffective strategies during the test; and self-reflection after the test. This was then further developed into a hierarchical model, where the before-test and after-test strategies were subsumed under a higher-order test preparation factor, and error avoidance and test-wiseness behaviours were subsumed under a during-test factor – while ineffective-strategies remained a separate first-order factor. A SEM based on the hierarchical model predicted quantitative and verbal SweSAT scores from the three factors. While the preparation factor was not significantly related, the during-test factor predicted performance positively, and ineffective-strategies predicted it negatively. As a preliminary conclusion, the present data supported the notion that during-test behaviours significantly predicted SweSAT performance, while test preparation had less influence.

Keywords: Test-wiseness, Test-taking behaviours, Test performance, Questionnaire, SEM

**Examining Convergent Validity Evidence for Written Science Tests of Skills Developed through Practical Work**

Hampus Jarhede and Anna Lind Pantzare
Umeå University, Sweden

As practical work is widely regarded as an irreplaceable part of science education, it is important to develop tests with substantial evidence supporting valid inferences on the skills students develop through such work. A recurring concern is whether written tests should be used to measure these skills. This study aims to provide empirical evidence regarding this validity question. A teacher survey (n=418) on instructional practice was therefore administered to investigate the presence of convergent and discriminant evidence bearing on the appropriateness of today's predominant reliance on written tests. The reported frequency of different practical and theoretical classroom activities related to practical work was then regressed on students' performance on the Swedish national subject tests in biology (n=545), chemistry (n=880) and physics (n=619), using a hierarchical mixed-effects model with teacher as a random intercept and controlling for subject and preliminary course grade. The assumption underlying the model is that if written tests support valid inferences on skills developed through practical work, higher frequencies of practical classroom activities can be expected to show positive associations with test performance.

Only one classroom activity showed a small but significant positive association with students' performance on the written national tests: the frequency with which students conducted laboratory work or other investigations using pre made instructions ($\beta = 0.0051$, $SE = 0.0024$, $t(312) = 2.12$, $p = .035$). These results are interpreted as providing tentative convergent evidence that written tests may, to a certain extent, support valid inferences about skills developed through practical work. However, as no significant associations were found for several other classroom activities typically classified as practical work, further research is needed to clarify which aspects of practical work that can be captured by written tests and how. Additionally, the results are somewhat inconsistent with previous research, which has often questioned the instructional efficiency of practical work based on pre-made instructions and instead emphasized more open-ended, "minds-on" forms of practical work. To explore these issues further, a second and more extensive round of data collection is scheduled.

Keywords: Science education, Practical work, National assessment, Convergent validity

## Session 3: Learning in Context: Assessment, Cognition, and Student Experience

**Tuesday, 16 June 2026, 09:00-10:30**

**Chairperson: Leah Natasha Glassow**

**Room: AK2 134**

**Exploring the Canonical Correlation between National and School-Based Exam Outcomes in Ethiopia**

Yohanes Wolde-Senbet
University of Gothenburg, Sweden

School-based assessment (SBA) is intended to provide a credible measure of students' preparedness for high-stakes national examinations (NE). However, the degree of alignment between SBA and NE may differ across subjects and school contexts. This concern is particularly salient in English-medium science subjects, where performance is influenced by both conceptual understanding and the ability to interpret technically worded examination items. This study investigated the alignment between SBA and NE performance, with a particular focus on Physics, in two boarding secondary schools, Gelan (boys' school, n = 77) and Menen (Girls' school, n = 33). Specifically, it examined whether internal and national scores differed across Physics, Chemistry, Biology, Mathematics, and English, and whether the two assessment systems reflected a common multivariate academic structure. Archived data from the 2024 school year were analysed for 110 students. The analysis included descriptive statistics, paired-samples t-tests, canonical correlation analysis (CCA), and redundancy analysis.

NE scores were consistently lower than SBA scores across all subjects and in aggregate. The most pronounced decline was observed in Physics, suggesting heightened vulnerability under national examination conditions. Canonical correlation analysis revealed a statistically significant multivariate relationship between the SBA and NE score sets. The first canonical function represented the dominant shared dimension, with English identified as the strongest contributor on both the SBA and NE sides. Physics also contributed substantially to the shared science-related achievement profile, although its national performance was comparatively weaker. School-specific analyses indicated stronger alignment in Menen than in Gelan. The findings demonstrate that SBA and NE are closely related, yet not identical, indicators of academic achievement. Notably, Physics exhibited the greatest discrepancy between internal and external assessments, and academic language played a significant role in demonstrating physics knowledge in English-medium national examinations.

Keywords: Canonical correlation, Physics achievement, School-based assessment, National examination, English-medium assessment

**Self-rated Mental Health in Grade 9 and School Satisfaction in Grade 6 for Children with ADHD or Autism**

Daniel Bolander Blomberg
Uppsala University, Sweden

Both poor mental health and low satisfaction with the school situation has been reported as an issue for children with ADHD or autism-diagnosis. Using data from UGU-1998 for school satisfaction and mental health combined with data on diagnosis from the Swedish national patient registry, I will present preliminary results from a latent class analysis of school satisfaction and a SEM of self-rated mental health for these children. In the latent class analysis, a 6-class model was chosen, based on lower BIC and AIC than the models with less classes. Models with more than 6 classes showed even lower BIC and AIC, but were discarded due too finding multiple small classes, which hurt interpretability. In the 6-class solution, two groups, 5 and 6 are most dissatisfied with their school, with 5 having more issues with school work, while 6 reports more issues with relationships with peers and teachers. Both of these groups also show a higher proportion of students with diagnosis: 10% respectively 15%, compared to the sample average of 6%. The SEM-analysis shows lower self-rated mental health in grade 9 for students who report more school difficulties in grade 6 and for students with ADHD or autism. Taken together these results indicate that children with ADHD or autism

more often experience their daily life in school as challenging and that this could be one of the reasons for the higher amount of reported mental health issues in this group.

However, students with ADHD or autism shows a consistently higher non-response-rate which limits the generalisability of these results. Only about a third of the students with ADHD or autism completed the survey in grade 9 compared to about half of the general sample. This has implications for extrapolating non-responses in survey-data and shows the value of combining registry data with surveys to investigates who drops out.

Keywords: ADHD, Autism, Mental Health, School Satisfaction, Latent Class Analysis

**Cognitive Architecture of Decoding in Intellectual Disability: Examining Moderation by Co-Occurring Autism Spectrum Disorder**

Lisa Palmqvist
University of Gothenburg, Sweden

Decoding in students with intellectual disability is typically explained by code-based models in which preliteracy skills, such as phonological awareness and letter–sound knowledge, play a central role. However, these models rarely account for the high co-occurrence of autism spectrum disorder, raising questions about whether the same cognitive architecture applies across subgroups. This study examines whether co-occurring autism spectrum disorder is associated with differences in decoding and whether it moderates the relations among nonverbal reasoning, preliteracy skills, and decoding.

The sample comprised 109 Swedish students with intellectual disability (mean age = 8.4 years), including 65 with co-occurring autism spectrum disorder and 44 without. Measures included standardized assessments of decoding, preliteracy skills, language comprehension, and nonverbal reasoning. Analyses combined group comparisons, regression-based moderation models with robust standard errors, and a structural equation model (SEM) testing indirect effects from nonverbal reasoning to decoding via preliteracy skills.

Students with co-occurring autism spectrum disorder demonstrated higher decoding performance than students with intellectual disability only, despite similar levels of preliteracy skills and language comprehension. Across groups, preliteracy skills were the only unique predictor of decoding in regression models. A non-significant interaction suggested that the strength of this association did not differ reliably between groups. SEM results indicated that nonverbal reasoning was associated with decoding indirectly via preliteracy skills, with no significant direct effect.

The findings support a common code-based architecture of decoding in intellectual disability while highlighting heterogeneity in performance levels associated with co-occurring autism spectrum disorder. From a quantitative perspective, the study illustrates the use of complementary approaches (regression and SEM) to evaluate moderation and indirect effects in relatively small and heterogeneous samples, and underscores the need for cautious interpretation of interaction effects under limited statistical power.

Keywords: Intellectual Disability, Decoding, Preliteracy Skills, Structural Equation Modeling, Moderation

## Session 4: Instrument Construction and Validation

**Tuesday, 16 June 2026, 09:00-10:30**

**Chairperson: Panagiotis Patsis**

**Room: AK2 135**

**Development and Validation of the Perceived Shared Reflective Persistence Scale for Adolescents in Collaborative Learning Contexts**

Ida Laug and Rune Müller Kristensen
Aarhus University, Denmark

Learning is increasingly organized as a collaborative endeavor, yet most existing measures of students' engagement in learning processes conceptualize these processes as individual qualities detached from the social and interactional contexts in which much class based learning unfolds. This paper addresses this gap by introducing the construct of Perceived Shared Reflective Persistence (P-SRP) and presenting the development and validation of a scale designed to measure this construct among adolescent learners engaged in collaborative, project-based activities.

The first aim of the presentation is to advance a conceptualization of persistence as shared and reflective. While traditional frameworks commonly portray persistence as an individual disposition – emphasizing sustained effort, self-regulation, and endurance – recent theoretical perspectives in the learning sciences highlight that persistence is enacted within joint activity. From this view, persistence emerges as learners interpret difficulties together, negotiate responsibilities, and collectively make sense of challenges. The construct of P-SRP builds on this perspective, defining persistence as a process that is both individually experienced and socially co-constructed, shaped through interaction, dialogue, and reflection within a shared learning task.

The second aim is to present a transparent and systematic approach to developing an instrument aligned with this conceptualization. The scale development followed a six-phase mixed-methods process: (1) theory-driven conceptualization, (2) item generation informed by adjacent literature on engagement and collaborative learning, (3) structured qualitative item reduction, (4) cognitive interviews with adolescents, (5) dimension-specific pilot testing, and (6) integrated psychometric evaluation. Each phase involved explicit decision criteria, documented to ensure traceability from conceptual framework to final items. The process resulted in a refined pool of items capturing both individual and social dimensions of persistence as situated in collaborative learning environments.

Finally, the paper presents the resulting Perceived Shared Reflective Persistence Scale for Adolescents and its psychometric properties. Exploratory factor analyses, multidimensional item response theory models, and differential item functioning analyses converged on a five-factor structure comprising three individual and two social dimensions. The final 27-item scale demonstrates strong internal consistency, conceptual coherence, and measurement precision across dimensions. Importantly, the findings show that persistence in collaborative contexts cannot be meaningfully reduced to individual effort alone; instead, learners' perceptions of shared engagement, mutual support, and collective sensemaking constitute distinct but interrelated dimensions. Together, the study provides both a conceptual – redefining persistence as a socially situated and reflective process – and a validated instrument enabling empirical investigation of such processes in collaborative learning contexts.

Keywords: Collaborative learning, Persistence, Psychometric scale development, Adolescent learners

**Development and Validation of the Relational School Climate 9-Item Student Report Instrument**

Kajic Diana[1], Kapetanovic Sabina[2], Olsson M. Tina[1], and Skoog Therése[3]
[1]Jönköping University, [2]University West, [3]Gothenburg University, Sweden

Nordic schools carry an explicit compensatory mission to ensure quality education for all students regardless of background. School climate — particularly its relational dimensions — is a key factor in student achievement and well-being, yet no validated instrument exists for measuring relational school climate in the Nordic context.

Drawing on the nano-system perspective of the Systems View of School Climate (SVSC), this paper describes the development and validation of a 9-item Likert-type student self-report instrument across two studies. Study 1 describes initial instrument development using middle school data from the Gothenland Millennium Cohort. Confirmatory factor analysis supported a higher-order three-factor structure with good global fit ($\chi^2(24) = 94.71$, $p < .001$; CFI = .996; TLI = .993; RMSEA = .048 [.038–.058]; SRMR = .026). Second-order factor loadings ranged from .65–.89 and first-order loadings from .63–.90. Analyses of measurement invariance, convergent validity, and discriminant validity confirmed sound measurement properties.

Study 2 tested a revised version of the instrument on an independent middle school sample, incorporating an expanded Likert response scale to improve uniformity and sensitivity. The revised instrument showed comparable global fit ($\chi^2(24) = 63.37$, $p < .001$; CFI = .993; TLI = .990; RMSEA = .064 [.045–.083]; SRMR = .031) with slightly improved factor loadings (second-order: .70–.88; first-order: .72–.92), and equivalent measurement invariance and validity evidence. Both versions demonstrate strong psychometric properties and are suitable for research and practice. The revised version is recommended due to its improved uniformity and response sensitivity. Both instruments are available as supplementary materials.

Keywords: Relational School Climate, Middle School, Measurement, Psychometric Properties.

**Examination of Knowledge Subscales in PISA 2015 Science by Haberman's Method**

Johan Espenberg
University of Gothenburg, Sweden

The framework for PISA 2015-2022 measures scientific literacy as consisting of three competencies, each drawing on three aspects of knowledge called, content knowledge, procedural knowledge, and epistemic knowledge (OECD, 2017). Content knowledge is described as: "a knowledge of the facts, concepts, ideas and theories about the natural world that science has established" (OECD, 2017, p. 21), which also can be named the products of science. Procedural knowledge is described as "Knowledge of the procedures that scientists use to establish scientific knowledge" (OECD, 2017, p. 21), and epistemic knowledge as "an understanding of the role of specific constructs and defining features essential to the process of knowledge building in science" (OECD, 2017, p. 21). Each science item in PISA is related to one of the three competencies and to one of the three aspects of knowledge.

PISA is designed to compare regions/nations with each other, which the matrix design there each test-taker is given a version of the test with a subset of the items. Data from PISA 2015 will be used. The distribution of items marked as assessing epistemic knowledge is uneven, ranging from 2 up to 8. Epistemic knowledge reflects knowledge about the nature of science, seen as an important part of scientific literacy. This study aims to examine if the subscale has empirical meaning in versions of the test with 6 or more EK-items, which is 10 of 36 versions of the digital test. The method by Haberman (2008) will be used, where the reliability of the subscore is compared with the coefficient of determination between the subscore and the total score. The hypothesis is that the subscore meaning would be rare due to high correlation between the scales in earlier examinations. On the other hand an analysis with Rasch measurement indicated significantly higher mean difficulty of EK-items. One interesting follow up analysis would be to compare the EK-subscale with the PK-subscale, and with a combined PK-EK-subscale.

Keywords: PISA, Subscales, Haberman, Epistemic knowledge

## Session 5: Schools in their Social and Organisational Environment

**Tuesday, 16 June 2026, 15:00-16:30**

**Chairperson: Tobias Dalberg**

**Room: AK2 134**

**Investing in Social Sciences in Swedish Higher Education: Temporalities and Capital Conversions**

Ricardo Cevallos
Uppsala University, Sweden

Research on Swedish higher education suggests that the subfield of social science encompasses a heterogeneous set of social and academic profiles across its diverse subject areas and programmes. This heterogeneity reflects both its dispersion across socially diverse institutions and the diversity of its occupational destinations – which involve distinct temporal demands: while some pathways lead to highly professionalised trajectories with direct access to specific occupational niches, others rely on general credentials that might require a prolonged and less clear occupational integration. Against this backdrop, the study examines implications of investing in social sciences in Swedish higher education. Its aim is to analyse the joint unfolding of educational and occupational paths among individuals engaging in a social science training, by identifying temporal patterns in which such investments are embedded across the life course. Using register data, sequences covering the period 2001-2018 were constructed across four domains – educational status, educational level, occupational status and income percentile – for individuals born in 1981 who committed with social sciences at higher education during this period. Multidomain sequence analysis was used to quantify pairwise distances and, through cluster analysis, derive a typology of temporalities capturing different modes of investment, accumulation and conversion of field-specific educational assets.

Results suggest that trajectories primarily differ in the timing and duration of educational investment and, secondarily, in the order of post-secondary educational forms and modalities within higher education – and its subject areas relative to social sciences. These temporalities have implications in subsequent displacements in the occupational structure and its corresponding benefits: lengthiness and structured order usually facilitate an early, direct transition into well-rewarded professional positions; whereas shortness and turbulent order often prevent or delay the acquisition of credentials, favouring a stagnation in the lower part of occupational and reward structures. Moreover, these temporal patterns are inscribed in broader processes of social reproduction and accumulation of advantages along the life course: less socially and educationally endowed individuals more often unfold through minor investments producing more limited symbolic and material returns; whereas the most socially and educationally endowed – especially those issued from households whose position strongly relies on educational assets – were more likely to engage in more devoted investments for accessing the most profitable paths. Finally, social scientific credentials appear to be converted into different forms of capital according to the field in which these are mobilised and deployed: professional capital, bureaucratic capital, and field-specific embodied cultural capital.

Keywords: Social sciences, Higher education, Trajectories, Investment, Capital conversion

**A Comparison of Crossed-Random Investigations of Educational Leadership in Psychology and Economics**

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Educational leadership research is interdisciplinary, but the different expressions of analysis and the terminology across disciplines hinder conversation and knowledge exchange. The goal of our work is to compare the treatment of crossed random data, and the causal inference claims that can be made, in the typical psychological approach versus the econometric approach, in order to enhance mutual understanding. Both economists and psychologists study educational leadership and share the goal of making causal inference (Höfler et al., 2024; Martin et al., 2021). We aim to test the conditions under which different conclusions result and to promote mutual understanding between the two

approaches. The crossed-random data in our example consist of schools and principals that overlap. Grades and teacher ratings of principal leadership are nested both in schools and in principals. Since principals quite frequently change jobs in our longitudinal data of 3,445 principals, they do not entirely overlap, which enables us to decompose the principal's influence on their schools. We test the conditions under which methods in psychology and economics arrive at different conclusions based on crossed data. In psychological and organizational research (Eckardt, 2021), a multilevel modeling approach is often employed (e.g., Snijders & Bosker) and the variance of data at different levels is explicitly modeled. In the econometric approach, the variance stemming from a hierarchical data structure is instead ascribed to the error variance compound of the model, by means of fixed or random effects (e.g., Böhlmark et al., 2015).

We focus on two aspects in the comparison of analytical procedures: the assumptions imposed on data and the levels of analysis at which interpretations are made. Econometric standards of data assumptions can be stricter and prompt more restrictive sample selection criteria for schools and principals than in multilevel modeling. We run simulations to test at what point these assumptions cause different analytical paths to the degree that conclusions differ. We then test whether interpretations at different levels of analysis, within and between schools and principals, differ by modeling approach. We discuss these differences and their feasibility relative to research aims and policy making. This comparison has implications for how researchers across traditions can align their analytical choices with their substantive aims, and for how findings on principal leadership can be accumulated and communicated across disciplinary boundaries.

Keywords: Crossed random effects, Multilevel modeling, Econometric methods, Principal leadership, Causal inference

**The Spaces of Municipalities and Regions in Sweden and the Distribution of Educational Assets**

Mikael Börjesson, Pablo Lillo Cea, Laura Giorio, Laureline Brun, and Clara Comte
HERO, Uppsala University, Sweden

The responsibility for providing and running preschools, compulsory education and upper secondary education is blended, but the municipalities take the largest part. They care for the education of the majority of children up to 19 years of age, and in many cases, there are few private options. They raise the funds through taxes, employ the staff, build and maintain the facilities, and plan and develop the educational provision. However, the conditions for taking on such responsibility differs substantially. Municipalities greatly vary in population, the smallest municipalities amount to just above 2,000 inhabitants, while the largest, Stockholm stad, has almost 1 million. Due to the low population density and a concentration of inhabitants in urban areas, there is a large difference between urban and rural municipalities. Urban regions are divided into wealthier central parts and poorer suburbs, while rural areas are differentiated along their economic activity. Demographic conditions vary, where rural areas face problems of depopulation, while urban centres often have growing population anduneven housing markets.

To understand how these dimensions interplay with each other, we have used geometric data analysis to build a space of Swedish municipalities and a space of Swedish regions. The municipalities and regions are characterised through demographic and socioeconomic indicators, as well as specific educational ones such as educational attainment, the number of graduates, and the number of adult students. Preliminary results show how the spaces are primarily structured by economic and educational assets. The first dimension of the space shows the opposition between on one hand high levels of capital, a dominance of the service industry and a prevalence of tenant owned dwellings as a residence type, and on the other lower levels of capital, owner-occupied dwellings, and primary and secondary sector employment. This first axis sets urban municipalities against rural. The second axis, the second largest differentiating dimension in the dataset, is primarily a characterization of the urban municipalities, separating wealthier suburbs, with mixed types of dwelling ownership and high educational attainment, from urban centres of more industrial character, strongly characterised by rented dwellings. Furthermore, we focus on the educational offer, attempting to understand its spread and variation over time, in terms of educational levels, public and private providers, and putting it in relation to the place that the municipalities and regions occupy in our analysed spaces.

Keywords: Space of municipalities, Space of regions, Educational offer, Geometric Data Analysis: Correspondence Analysis

## Posters

**Monday, 15 June 2026, 16:30-18:00**

**Chairperson: Leah Natasha Glassow**

**Capital and the Transition from Upper Secondary to Higher Education in Computing**

Thom Kunkeler, Anastasiia Menshikova, and Aletta Nylén
Department of Information Technology, Uppsala University, Sweden

Participation in computing higher education is strongly stratified, yet the structural pathways that shape access remain insufficiently understood at the population level. This study examines how socioeconomic background and upper secondary programme choice are associated with completing computing higher education in Sweden. Using register-based data, we analyze the full population of 1,014,519 individuals who graduated from upper secondary school between 2014 and 2024, with a special focus on those who completed a computing higher education degree as their first post-secondary qualification. Drawing on Bourdieu's framework of economic, cultural, and social capital, we operationalize family income, parental education, parental occupation, academic performance, migration-related background, and geographic region to examine structural patterns of educational transitions in computing. Descriptive analyses and correspondence analysis reveal that computing participation is strongly associated with prior accumulation of institutionalized cultural capital, particularly through upper secondary programme choice and academic performance. Students from Technology and Natural Science programmes account for the majority of computing graduates, reflecting alignment between technical upper secondary education and computing higher education. In addition, computing graduates are disproportionately drawn from families with higher education, technical and managerial occupations, with an added effect for gender: fathers are more likely to have studied engineering subjects and work in computing-related fields. Geographic analysis further reveals a concentration of computing graduates who completed their upper secondary education in metropolitan regions with greater institutional access. These findings demonstrate that entry into computing higher education is shaped by cumulative forms of capital across educational and family contexts.

Keywords: Computing Education, Broadening Participation, Upper Secondary Education, Higher Education, Capital

**Affordances and Constraints in Swedish Work-integrated Teacher Education: Perspectives from Three Key Stakeholders**

Chonghui Li
Dalarna University, Sweden

This study examines how student teachers, mentors, and teacher educators perceive the affordances and constraints of WITE programs in Sweden as conditions for student teachers' professional development. Drawing on ecological affordance theory, the study conceptualizes WITE as a relational learning ecology in which opportunities for professional learning emerge differently depending on participants' roles, access, and positions in the work–study environment. A mixed-methods design was employed. Quantitative data were collected through three similarly structured questionnaires administered to student teachers (n = 137), mentors (n = 59), and teacher educators (n = 84), while qualitative data were generated through open filed comments and open-ended questions. Quantitative analysis comprised descriptive frequencies to examine patterns of endorsement across domains, one-way ANOVA to test group differences in a composite measure of perceived professional development, and Kruskal–Wallis test to analyze ordinal indicators relating to workload, mentoring, and university–school coordination. Qualitative material was analysed using reflexive thematic analysis. The findings indicate that WITE is broadly perceived as supporting most domains of professional development, particularly professional identity formation and theory–practice integration. However, inclusive practice was perceived as less consistently supported. Heavy workload, insufficient mentoring, and weak university–school coordination were identified as central constraints, with student teachers reporting these pressures most acutely. The study concludes that WITE holds strong potential for professional development, but its effectiveness depends on stronger institutional coordination, protected mentoring conditions, and organizational structure that enable reflection, study, and sustainable participation.

Keywords: Work-Integrated Teacher Education, Ecological Affordance Theory, Professional Development, ANOVA, Kruskal–Wallis Test

**Eliciting Teachers' Preferences for Behavioural Strategies in Special Education: A Discrete Choice Modelling Approach**

Michalis Linardakis and Panagiotis Karkanidis
University of Crete, Greece

Understanding teachers' preferences for behavioural management strategies in special education is critical, yet traditional self-reported questionnaires are prone to social desirability bias and are limited in capturing trade-offs between competing practices. This study applies Discrete Choice Modelling (DCM) to elicit revealed preferences for behavioural response strategies, focusing specifically on verbal and material interventions.

The study aims to (a) quantify teachers' latent utilities for selected behavioural strategies and (b) examine preference heterogeneity between general and special education teachers. Data were collected from 430 teachers working in general and special education settings through a discrete choice experiment, where respondents completed multiple choice scenarios based on two groups of attributes (verbal and material responses). Preferences were modelled within a random utility framework using McFadden's conditional logit model.

Results indicate clear and statistically significant preference structures. Across both groups, non-material rewards and positive reinforcement strategies exhibit the highest utilities, while punitive verbal responses are strongly dispreferred. Segmentation analysis reveals meaningful differences: special education teachers assign substantially higher utility to material reinforcement strategies compared to general educators.

These findings demonstrate the added value of DCM over self-reported approaches by capturing implicit trade-offs and uncovering preference heterogeneity that would likely remain obscured in conventional survey designs. The study highlights the potential of DCM as a robust quantitative tool for informing evidence-based decision-making in education contexts.

Keywords: Stated Preference Experiment, McFadden's Conditional Logit Model, Special Education, Behavioural Strategies, Segmentation

**Dynamic Community of Inquiry in Engineering Education**

Jeongin Yoon Blomstervall
KTH Royal Institute of Technology, Sweden

Engineering education is inherently collaborative and inquiry oriented. This longstanding disciplinary characteristic has been further extended and accelerated into online environments. Consequently, collaborative inquiry-based pedagogic approaches have become essential in contemporary engineering education across online and blended settings. Within this context, researchers grounded in the Communities of Inquiry (CoI) theoretical framework have examined participants' interactions as well as learners' reported learning experiences. These efforts aim to identify conditions that support the framework's central objective, namely, achieving an optimal balance among the three CoI presences: Teaching presence (TP), Social presence (SP), and Cognitive presence (CP). However, the dynamic and evolving traits of CoI learning process remains underexplored. Particularly, the effect of teacher presence reconfiguring the CoI presences' occurrence, development over time, and sequencing remains insufficiently explored. In response, this work-in-process (WIP) exploratory study examines how teacher's presence reconfigures participants' CoI presences within engineering education in online and blended settings. This three-phase study proceeds to explore both teacher-present and teacher-absent settings. First, the study measures the frequency of CoI presences across both settings. Second, the study explores how CoI presences evolve over time by conducting temporal analysis. Third, the study examines how CoI presences develop in sequences in parallel with presenting transiting probability estimations. Preliminary result show that teacher's presence is associated with more TP and CP, and less SP, implying more direct instruction and less open communication. It also supports more consistent idea sharing over

time, whereas teacher's absence fosters more open communication and more persistent participant interactions once established.

Keywords: Qualitative Content Analysis, Temporal Analysis, Sequence Analysis, Collaborative Interaction, Community of Inquiry (CoI)

**Male Sprezzatura and Female Diligence: An Exploratory Analysis of Student Typologies in Swedish Schools**

Alexander Jon Kennerley
Research platform Higher Education as a Research Object (HERO), Uppsala University, Sweden

Males have underperformed females in the Swedish education system for generations and are consistently unrepresented – in absolute terms – in higher education. While this phenomenon has gained significant social and political traction, the underlining mechanisms behind these differences remain elusive. Hypotheses in previous research are expansive: biological, social, economic, pedagogic, psychological, and cultural explanations have all risen and fallen in potency and popularity overtime, with minimal consensus and even less effective intervention. Understanding and potentially mitigating the dependencies of the gender gap in education requires analysing all these factors relationally – thereby giving them their full potency. Identifying how students across the performance and social spectrum construct their identities, school engagement, futures, and even leisure activities are all sources of potential advancement or hinderances to a fully realised education. This paper analyses how student attitudes, identities, backgrounds, and education metrics coalesce into a coherent a social room. The Evaluation Through Follow-up (cohort 1998) dataset has been utilised, whereby a range of survey items have been applied to a Multiple Correspondence Analysis (MCA) to generate attitudinal contingencies between 4,000+ Grade 9 pupils. The analysis reveals a range of intra-and inter-gender struggles, with four dominant attitudinal profiles arising: dilettante males, recusant males, aspirational females, and emotionally despairing females. These profiles are highly congruent with particular social backgrounds, self-conceptions, school performance, leisure investments, and future orientations. These results offer ways in which pupils manage their schooling and performance in relation to themselves and one another.

Keywords: Gender Gap in Education, Student Identities, Student Typologies, Academic Achievement, Multiple Correspondence Analysis