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Book of abstracts

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## Session information

# Session 1: Education, Society and Inequality

20.5.2026 14.00–15.30

This session addresses how educational processes are embedded in wider social and economic structures.

## 1.1 Unpacking contextual factors in school leadership: Principals' experiences across ecological systems

**Mailis Elomaa**, Olli-Pekka Heinimäki, and Lauri Hietajärvi

University of Helsinki

School principals operate in complex contexts shaped by conditions largely beyond their control and requiring continuous adaptation. Although contextual factors are recognized as major sources of strain in school leadership, their content and mechanisms remain insufficiently understood. This qualitative study examines how principals describe the contextual factors influencing their work and school functioning, and how these factors can be understood when broken down into subcomponents. Drawing on Ecological Systems Theory, the study addresses two research questions: (1) What contextual factors do principals experience as influencing their work and school functioning? and (2) How do principals interpret the meaning and significance of the subcomponents of these contextual factors?

The data consist of semi-structured interviews with 37 Finnish principals from primary and upper secondary schools representing diverse geographical locations and municipality sizes. Theory-guided content analysis was applied. The findings identify eleven contextual factors organised across four ecological systems (micro-, exo-, macro-, and chronosystem). These factors were internally diverse, with subcomponents exerting distinct—and sometimes opposing—effects on leadership work. Importantly, the relevance of these subcomponents varied across school contexts. The results highlight the context-specific nature of principals' experiences and indicate that support for principals and schools should be tailored to specific leadership contexts rather than based on one-size-fits-all approaches.

## 1.2 Intergenerational Effects of Social Security Cuts

**Rasmus Mellanen**[1], Marc Riudavets[2]

[1] University of Helsinki
[2] Autonomous University of Madrid

We investigate how reductions in social security benefits, such as unemployment insurance and housing allowances, affect not only the individuals who receive them directly but also their children's educational outcomes. By analysing how these cuts shape parental behaviour and youth development the project aims to assess whether the short-term fiscal savings from benefit reductions might be outweighed by long-term societal costs.

We use comprehensive Finnish register data and exploit natural experiments from major policy reforms of elimination of the child supplement in unemployment benefits for all unemployed parents and the housing allowance cuts of 2024 and 2025. These reforms allow us to identify causal impacts of social security cuts on children's educational outcomes and parent's welfare dependency. Our difference-in-difference strategy uses other children as control group for the children of unemployed people. Our outcomes are grades, parental employment and applying to secondary education.

## 1.3 Towards a Cohesive Conceptualization of Crises for Education and Beyond

**Marc Perkins**[1] & Stefan Lundborg[2]

[1] Finnish Institute for Educational Research, University of Jyväskylä, Finland
[2] Department of Learning, KTH Royal Institute of Technology, Sweden

The term crisis is widely used in modern academia and society. Yet what is required for something to be discussed as a "crisis", and how crisis differs from related concepts such as change, problem, emergency, or disaster, is often unclear, even in crisis-focused research.

Building on organizational and philosophical crisis literature and our own datasets from Finnish and Swedish higher education, we argue that crises emerge when people or organizations perceive that the outcomes they value are threatened in a sufficiently severe and urgent manner to overcome their resilience. That, rather than being a single event, crisis is a constructed, ethically grounded, and subjective framing of an overall situation that emerges through the interaction of occurrence and observation in a socially mediated manner.

This perspective shifts the analytical focus away from single events towards key common characteristics (severity, urgency, and resilience) of how overall situations are socially perceived, and in doing so should facilitate enhanced understanding of, and responses to, crises by educational, and other, organizations. This work also facilitates an exploration of power and social influence on crisis, as those with influence may shape whether situations are, or are not, "crisis".

# Session 2: Evaluating Interventions and Reforms

20.5.2026 14.00–15.30

The presentations examine how studies address implementation fidelity, effects of interventions, and how structural policy changes shape educational outcomes.

## 2.1 Implementation fidelity in teacher delivered whole-classroom interventions: A systematic review

**Valtteri Eskola**[1], Vesa Närhi[1], Pilvi Peura[1], Juho Polet[1], Miia Sainio[1], Mikko Aro[1]
University of Jyväskylä

Implementation fidelity is an essential feature of intervention studies, as it provides researchers with information about the relationship between implementation processes and intervention outcomes. This synthesis examined implementation fidelity conceptualization, measurement, and analysis practices in 223 studies published between 2000 and 2024 that focused on teacherimplemented, wholeclassroom interventions targeting elementary students (Grades 1–5). The findings indicate that the majority (80%) of studies described their implementation fidelity evaluation practices, but there was substantial variability in the precision of these descriptions. Significant differences were found in the level of detail with which studies reported their measurement methods. Many studies collected adherence data (i.e., correct application of intervention elements) or dosage data (i.e., amount of intervention delivered), whereas considerably fewer studies assessed other dimensions of implementation fidelity. Observations were frequently reported as the primary data collection method for fidelity assessments, although a notable proportion of studies relied on teacher selfreports. Implementation fidelity data were rarely utilized in the analysis of intervention effects. Overall, the findings highlight inconsistencies in the reporting of implementation fidelity in studies of schoolbased, teacherimplemented interventions. Transparent fidelity reporting promotes more accurate causal inferences and enhances the replicability of intervention findings.

## 2.2 Effects of Multiplication Interventions on Multiplication Learning in Elementary School Students: A Systematic Review and Meta-Analysis

**Sonja Julkunen**[1], Johan Korhonen[2], Mathilda Sandman[2], Pirjo Aunio[3]
[1]University of Turku
[2]Åbo Akamemi University
[3]University of Helsinki

**Introduction**

Learning multiplication is a fundamental skill, necessary for advancing more complex mathematical concepts, crucial for future success and overall competence in life (De Smedt, 2020; Duncan et al., 2007). Although numerous educational interventions (e.g. Dotan & Zviran-Ginat, 2022; Skarr et al., 2014) have been developed to support multiplication learning, reported effects vary across studies, leaving uncertainty about which educational approaches are most effective. Despite the important role of multiplication in numerical cognition, the field lacks a systematic review and meta-analysis that evaluates the effectiveness of these interventions and examines how instructional characteristics influence learning outcomes.

**Aim**

This meta-analysis quantitatively synthesizes intervention studies on multiplication learning in elementary school and examines associations between instructional characteristics and learning outcomes.

**Methods**

The meta-analysis protocol was preregistered in the Open Science Framework (OSF) registry in November 2025 (https://osf.io/5rgkn/overview?view_only=4dde57d5a1a348fbbb8011ef0c80b7cd). A systematic search was conducted and reported according to PRISMA guidelines (Page et al., 2021). Studies were included if they implemented a multiplication-focused intervention with elementary students using randomized or quasi-experimental designs and reported sufficient data for effect size calculation. Two independent reviewers conducted screening. A total of 213 reports met inclusion criteria.

**Preliminary Results**

A random-effects meta-analytic model indicated a large overall pre–post effect of multiplication interventions ($d$ = 1.27, 95% CI [1.09, 1.44]). Substantial heterogeneity

was observed across effect sizes (Q = 218.17, $p < .001$), suggesting variability in intervention effects. Data extraction is ongoing, and final moderator analyses will be completed in spring 2026.

## 2.3 Effects of the Bologna Degree Reform on Time to Graduation and Labor Market Outcomes

**Li, Tong**

Aalto University

This paper examines the effects of the Bologna degree reform, implemented on August 1, 2005, in Finland, on time to graduation and the real wages five years after graduation for master's students in universities. The reform introduced the two-tier degree structure to harmonize the higher education system in Europe.

To evaluate its effects, I apply the event study methodology using comprehensive register data maintained by Statistics Finland on university master's students enrolled between 2001 and 2008 as the treatment group. Bachelor students in the university of applied sciences (UAS) enrolled in the corresponding year are not subject to the degree reform, thus served as the control group. The study finds that the implementation of the Bologna degree reform significantly reduces the time to graduation for university master's graduates. Conversely, the impact of the reform on real wages five years after graduation are less pronounced. The estimated effects on real wages five years after graduation are positive and statistically insignificant, suggesting no clear earnings impact in the medium run.

# Session 3: Mathematics Learning, Instruction and Skill Development

20.5.2026 14.00–15.30

This session examines instructional interventions, conceptual development, and classroom practices in mathematics. They highlight both cognitive and pedagogical dimensions of mathematics education.

## 3.1 Fraction learning in a digital learning environment: A pilot study

**Heli Nurminen**[1], Hilma Halme[2], Arto Kortelainen[1], Jake McMullen[1,3], Jo Van Hoof[1]

[1] University of Turku, Turku Research Institute for Learning Analytics
[2] University of Oulu, Special and Inclusive Education
[3] University of Turku, Department of Teacher Education

Fraction understanding is important for students later mathematical development. Yet many students' struggle with fractions. This pilot study examined 6th graders' (n=29) fraction understanding and magnitude related misconceptions over a five-week teaching period. We assessed students' knowledge before and after their use of a curriculum-based fraction learning environment delivered through a digital learning platform. Using a pre-post-test design, we measured students' basic arithmetic skills and ability to compare fractions. The findings demonstrate significant improvement in students' performance in fraction arithmetic and comparison skills. However, these improvements were not accompanied by a decrease in students' misconceptions about fraction magnitude, indicating that erroneous magnitude misconceptions persisted despite general skill growth. Accordingly, the present results suggest that a curriculum-based digital learning, which emphasis procedural practice, may be insufficient on its own to refute misconceptions regarding fraction magnitude. Addressing these misconceptions may require more conceptual instruction targeted directly at magnitude reasoning.

## 3.2 Predictions between students' anxiety, self-efficacy, and perceived difficulty during math tasks

**Nuutila, Katariina**[1], Metsämuuronen, Jari[2], Tuominen, Heta[3], Tapola, Anna[4], Alanko, Katarina[2], & Laakso, Mikko-Jussi[2]

[1]University of Helsinki
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[3]University of Eastern Finland
[4]Åbo Akademi University so, Mikko-Jussi[2]

Math anxiety (Richardson & Suinn, 1972) impairs performance and motivation in mathematics (Ashcraft, 2002). It influences and is influenced by self-efficacy (Bandura, 1986; Pekrun et al., 2007), but little is known about their on-task dynamics. Perceived difficulty (Efklides, 2009) may also influence emotions such as anxiety, but its role in motivation and performance has been overlooked (Eccles & Wigfield, 2020). Thus, the present study examined these temporal on-task relationships during mathematics tasks. Participants were 8th and 9th graders ($N$ = 333) who completed math tasks in an online learning environment during a 75-90 min session. In three different tasks, students rated their anxiety, self-efficacy, and perceived difficulty before and after the task.

By utilising structural equation modeling, their mutual predictions and effects on performance were examined. Results showed that anxiety predicted higher perceived difficulty in all of the tasks, and self-efficacy, in turn, to predict performance positively in each task. The finding that anxiety predicted perceived difficulty, even though it was mostly unrelated to performance and not predicted by prior ability, implies that anxiety affects task perceptions independent of actual skills, and the consequences of higher perceived difficulty should be investigated more in the future.

## 3.3 The Development of Preservice Primary School Teachers' Rational Number Knowledge During a Mathematics Didactics Course

**Pauliina Salonen**, Jake McMullen, and Juulia Lahdenperä

University of Turku

Future teachers need both strong subject knowledge and pedagogical skills to become proficient educators. Primary school teachers are responsible for teaching more than half of the mathematics content in basic education, yet their subject knowledge is often a weak spot. In mathematics education, rational number knowledge is crucial component, still many children and even adults struggle with it. In this study we examined preservice teachers' (N = 102) rational number knowledge at the beginning and end of their first mathematics didactics course. Our research questions are: (1) How do preservice teachers differ in their rational number knowledge when they enter the course? (2) How does their rational number knowledge develop during the course? We identify three groups – low, medium, and high – that differed in their initial level and developmental trajectories. Although the course focuses primarily on didactics rather than mathematical content, preservice teachers' rational number knowledge improved significantly during the course. However, the different developmental patterns suggest that rational number knowledge consists of various aspects that may develop at different rates across the groups. Overall, the results highlight the importance of both pedagogical and subject content knowledge, as together they form basis of effective teaching.

# Session 4: Student Engagement and Learning

20.5.2026 14.00–15.30

This session examines how students engage with learning through motivational, emotional, and behavioral processes. The presentations focus on how curiosity, persistence, and individual responses to learning situations shape engagement in school.

## 4.1 Uncovering Hidden Learner Profiles: A Narrative-Based Approach to Diagnosing Student Engagement

**Prince Das Adhikary**, Jari Metsämuuronen, Mikko-Jussi Laakso,

Romila Aziz, and Jukka Heikkonen

University of Turku

Traditional learning analytics often rely on aggregated numeric metrics to evaluate student performance. However, purely numerical data can obscure critical behavioural nuances, struggling to differentiate between a student demonstrating "fast mastery" and one engaged in "rapid guessing". To bridge this semantic gap, we propose a novel profiling approach that transforms raw interaction logs into coherent natural language narratives to better capture learner contexts. Applying this framework to interaction data from the Finnish national mathematics assessment (N=537, Grade 3), we compared our narrative approach against standard numeric clustering. While numeric models stabilized at broad performance categories, the narrative-based framework successfully isolated nine highly granular behavioural profiles. Crucially, this method differentiated students engaged in "unproductive struggle" from those exhibiting "rapid guessing"—a distinction vital for providing appropriate cognitive scaffolding rather than mere behavioural motivation. Furthermore, the "rapid guessing" profile served as a robust early-warning indicator for severe underperformance. By shifting from numeric representations to semantic narratives, this approach equips educators with a deeper, actionable understanding of latent student learning strategies.

## 4.2 Mind the Trap: The Complex Role of Curiosity and Persistence in School Engagement and Burnout

**Haoyan Huang**[1], Xin Tang[2,1], Katja Upadyaya[1]

[1] University of Helsinki
[2] Shanghai Jiaotong University

Background

School engagement and burnout represent core indicators of adolescents' school-related well-being, yet engagement declines and burnout intensifies during adolescence. Social-emotional skills, particularly curiosity and persistence, are widely viewed as malleable resources that enhance engagement and reduce burnout. However, little is known about their potential non-linear effects or how these skills jointly operate.

Method

Using a two-wave longitudinal sample of 699 lower-secondary students in China (Mage = 12.65), this study examined the linear, non-linear, and interactive effects of curiosity (interest- and deprivation-type) and persistence on school engagement and burnout. Response surface analysis (RSA) within a structural equation modeling framework was applied, controlling for demographic, socioeconomic, and academic covariates as well as prior outcomes.

Results

Persistence showed significant non-linear effects on both engagement and burnout. More importantly, RSA revealed a repulsive interaction: the co-occurrence of interest-type curiosity and persistence predicted higher school burnout, with the strongest exacerbation occurring when both were at moderate levels—a "Middle Curiosity–Persistence Trap." Deprivation-type curiosity showed no significant effects.

Conclusion

These findings challenge the assumption that higher curiosity and persistence are uniformly beneficial, highlighting the need to consider their complex and non-linear dynamics when promoting adolescents' school well-being.

## 4.3 Beyond passive use: cognitive engagement and technology use in Finnish secondary classrooms

**Auli Lehtinen**, Saswati Chaudhuri, Takumi Yada, Emilia Ahlström,

Päivi Häkkinen, Piia Näykki

University of Jyväskylä

This study examines 7th grade students' cognitive engagement and the purposes of technology use in Finnish lower secondary classrooms. Although prior research has analyzed the frequency of technology use, fewer studies have explored *how* technology is integrated into authentic learning situations and how it relates to students' cognitive engagement. Drawing on 427 observed lessons from three secondary schools in Finland, this study applies the ICAP framework—Passive, Active, Constructive, and Interactive—to identify forms of cognitive engagement, while also introducing a new category, Passive offtask, to capture unproductive student engagement. In addition, The ICAP Technology Scale is used to examine the purposes of technology use.

Preliminary analyses of 186 lessons indicate that students spent 27.7% in Passive modes, 33.6% in Active mode, and 38.7% in Constructive or Interactive modes, suggesting a stronger emphasis on higher-order engagement than was previously found. Preliminary analysis of 24 technology-using lessons showed that most technology use supported Active, Constructive, or Interactive engagement, with online quizzes dominating Active use and collaborative knowledge creation characterizing Interactive use. These findings highlight the importance of purposeful pedagogical choices in technologyintegrated instruction. Theoretically, this study deepens insights into off-task behavior and contributes to refining the ICAP framework for classroom observations.

# Session 5: Technology and Student Experiences

20.5.2026 14.00–15.30

This session examines how digital technologies shape students' experiences of learning. The presentations focus on motivation, attention, emotions and social relationships when technology is present.

## 5.1 Associations between students' ICT use, academic emotions and cognitive engagement in 7th grade

**Saswati Chaudhuri**[1], Auli Lehtinen[1], Takumi Yada[1,2], Emilia Ahlström[1], Piia Näykki[1] & Päivi Häkkinen[2]

[1] Faculty of Education and Psychology, University of Jyväskylä
[2] Finnish Institute for Educational Research, University of Jyväskylä

Despite the growing use of ICT in schools, relatively little is known about how students' ICT use during lessons relates to their academic emotions and cognitive engagement, particularly in secondary school classrooms. This study collected data with Experience Sampling Method (ESM) and classroom observation and investigated the associations between students' (N = 187) ESM-reported ICT use and their situational academic emotions, and classroom-level observed (134 lessons) cognitive engagement in authentic classroom settings. The aim of this study was twofold: first, to investigate whether 7th grade students' individual ICT use predicts their academic emotions; and second, to explore whether students' individual ICT use nested at classroom-level and their observed cognitive engagement predict students' academic emotions at the classroom level. The results showed that students who reported using ICT more frequently during lessons reported lower levels of surprise, anxiety, curiosity, and boredom. At the classroom level, observed higher cognitive engagement was associated with lower boredom and higher confusion, whereas students' individual ICT use nested at classroom-level was not related to students' academic emotions. Results imply that students' ICT use during lessons could benefit their learning, particularly when teachers address students' confusion and boredom adequately through their cognitive engagement.

## 5.2 “As Long as You Have Your Smartphone, You’re Connected with Friends“ – Lower Secondary Students’ Perceptions of Smartphones’ Role in Social Relationships

**Sonja Hartio**, Kati Sormunen, Kai Hakkarainen & Kalle Juuti **Hartio, Sonja**

University of Helsinki

Smartphones’ role in schools has been widely debated in recent years, and this study foregrounds students’ voices on their role in social processes at school. Data were collected from 58 students in two Finnish lower secondary schools through open-ended questionnaires and focus group interviews and analyzed inductively using qualitative content analysis. The findings emphasize that, according to students, smartphones play a central role in forming and maintaining interpersonal relationships in school. Students view smartphones’ role in face-to-face interaction ambivalently: while they can facilitate interaction, their pervasive presence can reduce conversations and expose students to social tensions and loneliness. Smartphones provide opportunities for social support and a sense of safety, while exposing students to inappropriate content and uncertainty. Overall, students’ peer relationships are strongly mediated through smartphones, reflecting a transformed media ecology and underscoring the need for schools to support face-to-face peer socialization and students’ interpersonal and digital citizenship skills. Students’ voices showed active agencies in smartphone use, particularly in school-day coordination and collaboration, underscoring the importance of including student perspectives in educational planning.

## 5.3 Problematic Internet Use and Adolescent Well-Being: Cognitive and Emotional Impairment as a Key Mechanism

**Fatemeh Irani**[1], Ali Moazami Goodarzi[2], JanicaVinni-Laakso[1] ,Katja Upadyaya[1], Arniika Kuusisto[1]

[1] Faculty of Educational Sciences, University of Helsinki
[2] Department of Psychology and Speech-Language Pathology, University of Turku

Problematic Internet Use (PIU) has been widely associated with adolescents' mental health and social functioning; however, few studies have simultaneously examined PIU effect on multiple dimensions of well-being and social interaction while clarifying the psychological mechanisms underlying these associations. In particular, the roles of cognitive/emotional impairment remain insufficiently integrated within a single explanatory framework. The present study investigated whether these mechanisms mediate associations between PIU and two domains of adolescent functioning: well-being (depressive symptoms and life satisfaction) and social-relational outcomes (ostracism and loneliness). Path models were estimated in a sample of 215 adolescents (Mean age = 16.10, SD = 1.18, 50% female) using full-information maximum likelihood and bootstrapped confidence intervals (5,000 resamples). Results indicated that PIU was strongly associated with cognitive/emotional impairment, and cognitive/emotional impairment consistently mediated associations between PIU and all well-being and social-relational outcomes. Taken together, the findings identify cognitive/emotional impairment as the dominant mechanism linking PIU to both intrapersonal and interpersonal difficulties. This integrative approach advances current PIU research by clarifying the specificity of mechanisms across multiple domains of adolescent functioning.

# Session 6: Well-Being of Student Teachers, Teachers, and Principals

20.5.2026 14.00–15.30

These studies examine educator well-being through subjective and physiological perspectives.

## 6.1 Invisible Pressures, Measurable Strain: Educator Well-Being through Wearable Technology and Work Activity Mapping

**Ema Demir** & Fabian Gunnars

Stocholm School of Economics

Educator well-being has emerged as a central challenge for the sustainability of contemporary education systems, with recent increasing research interest in work-related stress (Alegre & Labajo, 2023; Gudelos & Mabitad, 2025). Work-related stress remains a leading cause of sick leave and exhaustion among educational professionals, occurring in a context characterised by increasing instructional demands, diverse student needs, chronic absenteeism, mental health challenges among students, and expanding administrative responsibilities (Howard & Howard, 2020; Pavlidou & Alevriadou, 2022; Skaalvik & Skaalvik, 2017). Although schools have introduced organisational responses for teacher well-being, such as co-teaching, inclusive classroom arrangements, and expanded support staff, there is limited empirical knowledge of how such arrangements and educators' everyday work experiences relate to physiological stress and recovery over time.

The study examines how emerging data practices reshape what is known about educator well-being and how this knowledge may inform organisational action in schools. Rather than conceptualising stress as a psychological outcome from respondent metrics (e.g., Mañas & Ang, 2025), the study approaches well-being as an embodied, practice-based phenomenon produced through the temporal and organisational conditions of school work.

Methodologically, the study employs a mixed-methods design integrating three data sources: (1) continuous physiological data from wearable smartbands (e.g. stress and sleep-related indicators), (2) individual-level survey data based on the Swedish version of

the Warwick–Edinburgh Mental Well-Being 7 Item Scale (SWEMWBS) (Stewart-Brown et al., 2009), and (3) administrative and observational data capturing daily work activities.

The empirical material is collected across multiple school contexts and includes a range of professional roles, such as principals, teachers, teaching assistants, and support staff. Biometric data are linked to temporal distinctions between work, non-work, and sleep to examine patterns of stress and recovery across individuals and educational roles (Gunnars, 2026).

Initial findings from the first sub-study demonstrate systematic differentiation between activity states. Preliminary analyses indicate heightened stress during scheduled work hours than during non-work time, suggesting distinct physiological patterns associated with the temporal organisation of school work. When linked to survey data, tentative patterns further indicate that lower self-reported well-being tends to co-occur with elevated physiological activation during work and less pronounced differentiation between work and recovery periods. While exploratory, these findings expand research that emphasises roles of meaning in life (e.g., Yildirim et al., 2024) by suggesting an alignment between subjective well-being and physiological embodied stress regulation.

It also highlights the importance of developing organisational temporal work structures that enable proper recovery at home, rather than isolated high-intensity intervention events.

In subsequent phases, the study will extend this integration by linking biometric and survey data to individual scheduling information detailing activity type, duration, and instructional formats, enabling fine-grained analyses of how pedagogical organisation and workload configurations shape physiological stress and collaboration over time (Gunnars, 2025).

The study contributes to health and well-being research in education in two key ways. Empirically, it provides, through the smartbands, a granular account of educator stress that moves beyond self-report by situating well-being within everyday educational work practices (Gunnars, 2026). Methodologically, it demonstrates how combining wearable data, survey instruments, and organisational information expands the epistemic conditions of education research, making otherwise invisible pressures visible and supporting more informed and actionable approaches to designing sustainable and health-promoting educational work environments.

## 6.2 Mapping Occupational Wellbeing: A Structural Topic Modelling Study of Teachers' and Principals' Perspectives

**Olli-Pekka Heinimäki**, Lauri Hietajärvi, Katja Upadyaya, Mailis Elomaa, Hiroyuki Toyama, Kelly Ferber & Minna Huotilainen

University of Helsinki

Teachers and principals occupy central roles in school systems, yet increasing job demands continue to intensify pressures on their occupational wellbeing. This study examines the factors that these professionals themselves identify as most critical for supporting their wellbeing. Drawing on two datasets collected in spring 2025 from over 1200 teachers and 300 principals in Finland, participants responded to an open-ended question concerning what had most supported their occupational wellbeing. Structural Topic Modelling was applied to the responses to identify latent wellbeing themes. Educational role (teacher/principal), gender, age, and two perceived stress indicators (own wellbeing and workload) were included as covariates in estimation and to examine how topic prevalence varied across participant characteristics. The analyses identified several distinct wellbeing topics that clustered into two broader domains: work-related factors (supportive work community, students' success and growth, effective leadership, sufficient resources, and personal agency and professional development) and off-job factors (work–life balance, physical activity, and close personal relationships). Moreover, systematic differences emerged in how participant characteristics were associated with topic prevalence. The findings contribute to understanding occupational wellbeing from the professionals' own perspectives and provide empirically grounded insights for supporting teachers' and principals' wellbeing in practice and policy.

## 6.3 A person-specific study of an ACT online intervention for pre-service teachers' mental well-being during teaching practicum

**Ella Kämper**, Kristiina Räihä, Minna Huotilainen, Nina Katajavuori, Veera Lampinen & Henna Asikainen

University of Helsinki

Acceptance and Commitment Therapy (ACT)-based interventions have shown benefits for university students' and teachers' well-being, yet evidence for pre-service teachers remains unexplored (Haldimann et al., 2024). The core goal of ACT is developing psychological flexibility; being present, open to inner experiences and living a value-based life despite challenges (Hayes, 2004). These skills are crucial for teachers' well-being and coping as the transition into teaching can be highly stressful (Zaimoğlu & Dagtas, 2023), hence the need for preventive support in teacher education. In addition to evaluating outcomes, understanding person-specific processes of change is essential (McLoughlin & Roche, 2023).

This study evaluates a 7-week ACT-based online intervention completed alongside teaching practicum. Using a mixed-method, person-specific design (N=16), we combined pre–post assessments of well-being, self-compassion, and psychological flexibility with daily Ecological Momentary Assessment (EMA) and open reflections capturing stress, happiness, life satisfaction, stress mindset and ACT processes. Person-specific slopes, within-person regressions, and contemporaneous networks examined dynamic associations between ACT processes and daily well-being outcomes.

Well-being increased significantly (d = 0.83), psychological flexibility showed no overall change and self-compassion showed a non-significant upward trend. Daily self-compassion showed the most consistent negative associations with stress, while values and presence displayed more heterogeneous effects across individuals, which were echoed in the reflections. Further findings will be presented at the conference.

Parallel sessions 7-12 (Wed, May 20, 16:00-17:30)

# Session 7: Artificial Intelligence in Education

20.5.2026 16:00–17:30

This session examines how artificial intelligence is entering educational contexts through literacy research, teacher professional learning, and human–AI interaction in pedagogy.

## 7.1 Generative AI in AI literacy research for elementary school in 2021—2025, themes from a systematic literature review

**Tero Lakkonen**

University of Lapland

The impact of Generative AI on elementary education remains less established. This study asks how Generative AI is included in research of AI literacy education, which implementations have been researched at the elementary school level, and how AI literacy is taught for elementary pre-school teachers. A systematic literature review was conducted, yielding 216 studies published from 2021 through 2025 on the use of Generative AI and AI literacy education at the elementary school level. The review data was analyzed using thematic content analysis.

Positive and negative themes affecting the adoption of Generative AI were identified. Fundamental issues such as diminished human interaction, unreliability, the digital divide and the need for critical AI education call for broad discussion of Generative AI's role in elementary education. However, clear promise in Generative AI was identified in established use-cases, especially in self-regulated learning, foreign language studies as well as a holistic approach across different subjects for AI literacy education for students and pre-service teachers.

This study identifies research gaps for longitudinal research of Generative AI in elementary schools and the parents' role in AI literacy education and calls for a scholarly consensus on the definition of AI ethics.

## 7.2 Changes in Teachers' AI Literacy and Pedagogical Positioning after Professional Development

**Daranee Lehtonen**

University of Turku

Artificial intelligence (AI) is rapidly transforming educational practice, requiring teachers to develop both practical competence and critical understanding of its pedagogical implications. Yet empirical evidence on how short-term professional development influences teachers' AI literacy and pedagogical positioning remains limited. This study examines changes in teachers' AI literacy and pedagogical positioning following professional development. Fifty-three primary and secondary school teachers participated in a short training programme comprising 2–4 hours of online self-study (readings and assignments) and a one-hour synchronous group discussion. AI literacy was assessed using 10 items from the open-source *Scale for the Assessment of Non-experts' AI Literacy* (SNAIL), addressing practical application and critical appraisal; 39 teachers completed both pre- and post-assessments. Content analysis of the group discussions examined pedagogical positioning regarding (1) when and how AI can support teaching and learning, (2) which teacher responsibilities should not be delegated to AI, and (3) how students' critical AI literacy can be promoted. Results show improved AI literacy following the training. Qualitative findings indicate that teachers demonstrated both practical understanding and critical reflection on the pedagogical uses and limits of AI. The study provides empirical evidence on short-term AI professional development and its contribution to responsible AI integration in education.

## 7.3 “Just tell me the answer”: How pre-service teachers engage with a pedagogical AI chatbot

**Viik, Thomas**

University of Eastern Finland

AI is reshaping teaching and learning across educational levels and disciplines. While enabling personalization and support for collaborative learning, it also raises concerns about overreliance and cognitive offloading. Pedagogical AI chatbots may help address these challenges by scaffolding learning. This study examines how pre-service teachers (N=113) interact with a pedagogical AI chatbot designed to support them in identifying and comparing Finnish bird species. The data consist of chatbot–student conversation logs produced during a university course assignment, analysed using qualitative content analysis. A key finding is search-engine-like querying: students seek direct answers and treat the interaction as information retrieval rather than guided knowledge building. The results indicate that meaningful use of pedagogical AI chatbots requires explicit instruction and practice, supported by AI literacy that helps learners distinguish between answer-getting and learning-oriented scaffolding. Moreover, clear task framing and interaction guidance are needed to model how to engage with the chatbot in learning-supportive ways. Variation in engagement further suggests that chatbot-supported tasks should accommodate diverse approaches to learning. The study contributes to understanding how learners engage with pedagogical AI tools and informs the design of chatbot-supported learning tasks.

# Session 8: Development of Core Academic Competencies

20.5.2026 16.00-17.30

These presentations focus on foundational learning processes that support academic development across domains, including reading, mathematics, and self-regulation.

## 8.2 Deciphering the Reading Puzzle: Teacher Value Added Across Core Literacy

**Norgren, Axel**

Stocholm School of Economics

This project aims to disentangle the teachers contribution to different reading skills. Using student-level data from a Swedish educational technology platform, I apply value-added models to quantify teachers' contributions to overall reading comprehension as well as to specific foundational literacy skills, such as decoding, vocabulary, and listening comprehension. By disaggregating reading comprehension into its subcomponents, the project provides new evidence on how teacher effectiveness varies and correlates across different foundational dimensions of reading development. The findings reveal that teachers appear to be more consequential for decoding abilities relative to other reading skills, but that teachers who are good at teaching decoding are distinct from teachers who are good at improving pupils' vocabulary and listening comprehension. The findings contribute to the literature on teacher effectiveness and offer insights into the potential of digital assessment data for measuring learning outcomes in education.

## 8.3 5-year-old Finnish children's self-regulation profiles: the role of child characteristics and educators' support practices

**Tekla Seppälä**[1], Jenni Salminen[1], Eija Pakarinen[1], Niina Rutanen[1]
[1]University of Jyväskylä

This study examined children's self-regulation by 1) identifying profiles based on educator ratings and direct assessment and 2) exploring whether child characteristics and educators' support practices were associated with these profiles. Using multiple indicators provides a clearer understanding of how different aspects of self-regulation co-occur and what factors shape distinct patterns.

The study drew on longitudinal data collected at ages 2–3 (T1, N = 245) and 5–6 (T4, N = 179). At both timepoints, educators assessed learning-related self-regulation (LRSS) and interpersonal skills (IPS) with the Child Behavior Rating Scale. At T4, behavioral self-regulation was additionally measured with the HTKS task. Educators reported support practices via questionnaire.

Latent profile analysis identified four profiles: Low regulators, High behavioral self-regulation with low educator ratings, Low behavioral self-regulation with high educator ratings, and Competent regulators. Profile membership was associated with gender, age, parental education, and earlier LRSS and IPS. Competent regulators were typically girls, older, showed stronger early skills, and had higher parental education, whereas Low regulators displayed the opposite pattern.

Findings indicate that educator ratings and direct assessments may diverge, highlighting the need for comprehensive evaluation. Younger children, boys, and those with weaker early skills may particularly benefit from targeted support.

# Session 9: Learning Processes, Cognitive Demands and Task Engagement

20.5.2026 16.00–17.30

These presentations focus on how students manage cognitively demanding learning situations involving attention, task interpretation, and self-regulation.

## 9.1 The effects of students' reading comprehension skills and instructions' linguistic complexity in computational thinking tasks

**Heidi Kaarto**[1], Tapio Nojonen[2], Pekka Räsänen[1,3], Valentina Dagiene[4], Daranee Lehtonen[1], Mikko-Jussi Laakso[1] and Jo Van Hoof[1]

[1]Turku Research Institute for Learning Analytics, Faculty of Science, University of Turku
[2]Department of Computing, Faculty of Technology, University of Turku
[3] Department of Pediatric Neurology, Epilepsia Helsinki, HUS Helsinki, University Hospital
[4] Institute of Data Science and Digital Technologies, Vilnius University

At the previous EDUCA Mini-Conference (September 2025, Jyväskylä), we presented results of the task difficulty analysis for the Bebras Challenge on Informatics and Computational Thinking. Bebras tasks are problem-solving activities related to informatics topics that require computational thinking skills to solve, yet do not assume any prior subject knowledge. Given that Bebras tasks typically involve substantial written instructions, participants at the EDUCA Mini-Conference raised the question of whether performance on Bebras tasks is associated with students' reading comprehension. To examine this potential relationship, we included a reading comprehension task in the 2025 Finnish Bebras Challenge for Grades 8–10. The design enabled us to investigate the relationship between reading comprehension and Bebras task performance among 171 students aged 15–16. Additionally, we will analyse the length and linguistic complexity of the task instructions to examine their influence on the results. Our findings will provide information on the effects of reading comprehension skills in the Bebras Challenge, and more broadly, in computational thinking related problem-solving tasks.

## 9.2 When digital devices distract learning: An experience sampling study of student motivation (EDUCA-DIGI)

**Elina Ketonen**[1], Jussi Järvinen[1], Lauri Hietajärvi[1], Janica Vinni[1], Elisa Vilhunen[1], Junlin Yu[1], Katja Upadyaya[1], Veli-Matti Vesterinen[1], Arttu Brax[1], Eija Juntunen[1], Piia Näykki[2], Päivi Häkkinen[3]

[1] University of Helsinki, Faculty of Educational Sciences
[2] University of Jyväskylä, Faculty of Education and Psychology
[3] University of Jyväskylä, Finnish Institute for Educational Research

Educational technology can enhance engagement but may also elicit distraction, amotivation and multitasking. With the EDUCA-DIGI team, we examined how in-class device use and non-study multitasking relate to students' situational motivation during lessons in authentic classrooms. Using experience sampling across two school weeks, 545 high school students (17–18 years) reported after each class on device use (yes/no), multitasking (yes/no), and motivational experiences (interest, perceived competence, participation, distraction, judgments of learning). After a ≥3 on-class response criterion, analyses included 5980 reports from 442 students. Technology use occurred in 76.8% of class reports, multitasking in 22.4%. Intraclass correlation coefficients indicated substantial within-student variability in class-specific motivation. Random-intercept mixed models were used to assess associations. The findings indicated that when students used technology in class, they reported finding the lesson less interesting, participating less actively, having more difficulty concentrating and feeling less competent with accounts of attentional costs and cognitive load. Furthermore, the added harms linked to multitasking: students feeling they learned less and perceiving technology as less helpful for learning, suggests that technology-related costs are bigger when multitasking is salient. Together, these results highlight the need for device practices that minimize off-task exploration while preserving the benefits of purposeful technology use.

## 9.3 Lower secondary school students' perception of errors: how do gender, achievement, and grade-level predict adaptive error beliefs and reactions?

**Reetta Kyynäräinen**[1], Veli-Matti Vesterinen[1]

[1] University of Turku

Errors are integral to learning, and they may trigger various affective, cognitive, and behavioral reactions that further influence how one processes them. Yet research on students' perceptions of errors is limited, particularly among Finnish adolescents. This study 1) validates an instrument, measuring students' beliefs about errors and their reactions to making errors, and 2) examines how gender, prior achievement, and grade level predict them. The data consists of responses from 1,200 lower secondary school students participating in the ViLLE Chemistry Learning Path pilot, in which a newly developed digital learning material was implemented. Based on the exploratory and confirmatory factor analyses, a hierarchical factor model emerged. The first-order factors reflect theory-based error beliefs, affective-motivational error reactions, and behavioral error reactions, and the second-order factor reflects students' general error-processing dispositions. The findings indicate that higher achievement was associated with more positive error-processing dispositions, error beliefs, and reactions. Older students carried slightly more positive error-processing dispositions, error beliefs, and behavioral reactions, and girls reported more negative affective-motivational reactions.-The results emphasize the importance of supporting error-processing, particularly in experimental natural sciences, such as chemistry, where errors are central to the nature of science.

# Session 10: Migration and Supporting Integration

20.5.2026 16.00-17.30

The presentations examine factors that promote immigrant integration.

## 10.1 Supporting Newly Arrived Migrant Students through Teacher Collaboration: A Culturally Responsive Education Perspective

**Riikka Jaatinen**[1], Mirja Tarnanen[1], Mervi Kaukko[2] and Inkeri Rissanen[2]

[1] University of Jyväskylä
[2] Tampere University

Increasing cultural and linguistic diversity in classrooms necessitates that teachers are equipped to implement culturally responsive teaching (Gay, 2013; Ladson-Billings, 2014). Fostering intercultural school culture and teachers' professional development calls for facilitating collective learning and collaboration among teachers (Hauge, 2019; Tarnanen et al., 2023). According to our previous research project *VOITTO* (Tarnanen et al., 2025), there is a need to develop collaboration between teachers to better support newly arrived migrant students. This study is part of our follow-up research project *Silta* (funded by Teacher Education Forum, 2025-2026) that focuses on teachers' collaborative practices and professional development when teaching newcomer students.

In this study we examine teachers' collaboration and classroom practices, particularly how they attend to students' diverse backgrounds and enact culturally responsive teaching. We use validated observation sheets (CTOI, SPC Plus/CRIOP) to measure and evaluate teachers' co-teaching practices and their culturally responsive teaching practices in both co-taught lessons and lessons taught by a single teacher. This way we aim at providing insights into the possibilities of teacher collaboration in promoting newcomer student support. Preliminary findings show that facilitating collaborative learning in school communities can foster teachers' professional development for cultural diversity.

## 10.2 Certified language skills, citizenship, and immigrant integration

**Lachlan Paterson**[1]

[1]Aalto University

This project estimates the economic value of certified language skills and the causal effects of Finnish citizenship for adult immigrants using linked administrative data from Finland's National Certificates of Language Proficiency (YKI) and population registers. To satisfy the language requirement for citizenship, applicants need to achieve score cutoffs at CEFR B1 for eligible pairs of subtests (speaking+writing, listening+writing, speaking+reading). I implement a sharp regression discontinuity design (RDD) in binding-component subsamples where one subtest score lies near the cutoff while the partner subtest is above it, identifying for first time test-takers the local effect of narrowly passing on citizenship application, approval, and time-to-decision. To address repeat test-taking and staggered eligibility, I also adapt a stacked dynamic regression discontinuity (DRD) design that treats each test session as a cohort and compares barely-pass to barely-fail candidates within cohorts, while tracking outcomes over event time and accommodating later passes. These discontinuities provide a first stage for an instrumental variable IV design estimating the long-run impacts of earlier versus delayed (or foregone) naturalization on employment, earnings, and occupational mobility. Complementary descriptive analyses document gradients across certified language proficiency levels and across subtest skill components.

## 10.3 Teacher educators' perceptions of and approaches to cultural diversity in initial teacher education

**Leandra Ve Saskia Romey**[1], Sotiria Varis[1], Eija Pakarinen[1], and Ville Mankki[1]

[1]University of Jyväskylä

Teacher educators (TEs) need to prepare student teachers for increasingly culturally diverse contexts within initial teacher education (ITE). Nonetheless, their perceptions and approaches to this topic are often overlooked. This study employs reflective thematic analysis to investigate interview data from 20 TEs working in ITE programmes. Four overarching themes were found, relating to the state and scope of student teachers' preparation for cultural diversity, TEs' preparedness to address these topics, and how discomfort can be used to challenge beliefs and initiate development. TEs expressed the need for more institutional support for professional development and peer-collaboration to navigate knowledge gaps and sociopolitical challenges. Furthermore, TEs highlighted the

need for more practical teaching experiences in culturally diverse contexts in ITE. Our study contributes to research on student teachers' preparation for cultural diversity by providing an often-overlooked TE perspective, offering insights and suggestions for TEs, faculties and other units organising teacher training.

# Session 11: Parents, Home Environment and Development of Children and Youth

20.5.2026 16.00-17.30

These papers examine how parental practices and home environments shape children's development and educational decisions across different stages of childhood and youth.

## 11.1 Young adults' narratives of parental support during their school path

**Arto Lehtola**, Miia Sainio, Tanja Vehkakoski, Noona Kiuru, and Kati Vasalampi

University of Jyväskylä

Both family related difficulties and positive parenting experiences shape young people´s identity development and readiness to cope with difficult situations. How young adults subjectively experience the support received can be important for their sense of agency and wellbeing. Because previous studies have rarely examined parental support from a temporally expanded perspective, we need more information on how young adults experience it as part of their earlier life experiences. This study addresses the gap by examining how young adults position themselves and their parents when narrating parental support during their school paths. The research data consists of interviews with thirty-three young adults (18 women, 14 men, and one "other" gender) aged 22–23. The data were analyzed narratively using Bamberg's Positioning Theory and by focusing on both young adults' stories of their childhood events and their here-and-now storytelling. The results revealed five distinct narrative types: Parents who (1) provided emotional support for their child's needs during their school years, (2) advocated for their children, (3) pushed and guided their children, (4) pressured their children, and (5) ignored their child's needs. The results highlight the need to target support to the agency positions young people take in their parental relationships during schooling.

## 11.2 How parental wealth shapes selection and success in tertiary education

**Lauri Turkia**
[1]Tampere University
[2]FIT

Using Finnish administrative data, I study how parental wealth shapes tertiary educational attainment in a tuition-free, highly subsidized setting. Preliminary estimates show that parental wealth strongly predicts bachelor's degree completion, capturing 15 percent of the explained variation even after conditioning on parental earnings and education. To determine why wealth matters when direct credit constraints are minimal, I propose decomposing this gradient using age-specific wealth measurements, fine-grained neighborhood area types, and extended family fixed effects. This empirical strategy will isolate whether wealth operates through timing-sensitive resources, neighborhood sorting, or stable unobserved family traits.

## 11.3 Key Parental Factors for Children's Positive Social Development: A Cross-National Study of Parental Involvement, Parenting Style, and Social Skills

**Yixin Zhang**

University of Helsinki

Parental involvement has long been linked to children's social development, but prior research often focused on academic achievement and tends to rely on broad categories of parenting practices. This study examined parental involvement and parenting style as two distinct parental factors associated with children's social skills across cultures. Using OECD Survey on Social and Emotional Skills 2019 data from 31,187 10-year-olds in ten regions, we examined their associations with cooperation, empathy, trust, and sociability through three-level hierarchical linear modeling (student/class/school), with missing data handled by full-information maximum likelihood. Across regions, autonomy and relatedness support showed the most consistent positive associations with all social skills. Among the parental involvement factors, short-term educational expectation stood out, but its association varied more across regions, being positive in most regions but negative in Finland. Other involvement variables showed more context-dependent patterns: parent–child communication was related to cooperation in Canada and Finland,

long-term educational expectation was related to empathy in the United States, and parental coercion was associated with lower cooperation in Colombia. It suggest that parenting style may show more cross-culturally consistent associations with children's social skills, whereas parental involvement variables appear to be more context-dependent.

# Session 12: Teachers' and Principals' Professional Practices and Organization of Work

20.5.2026 16.00–17.30

This session examines how teachers and principals shape their work, collaborate, and engage in professional practices and decision-making.

## 12.1 Collaborative ICT-Related Learning Among Finnish Teachers: Insights from the ICILS Study

**Sahsenem Öz**[1], Asko Tolvanen[2], Kaisa Leino[3], Raija Hämäläinen[1]

[1] Department of Education, University of Jyväskylä
[2] Faculty of Education and Psychology, University of Jyväskylä
[3] Finnish Institute for Educational Research, University of Jyväskylä

Collaboration among teachers is a key element in ICT integration, yet little is known about how teachers collaborate in learning about ICT. Thus, this study aimed to identify teachers' collaborative ICT-related learning groups, their stability over time, and factors associated with group membership. Latent class and latent transition analyses were used to analyse longitudinal data from 1,246 Finnish teachers participating in ICILS 2018 and the ICILS Teacher Panel 2020 (during the COVID-19 pandemic). Three distinct classes emerged at both time points (High–Collaborator, Observer–Discusser, and Low–Collaborator) with a fourth class, Non–Observer, emerging in 2020. The High–Collaborator class was the largest at both time points, while the Low–Collaborator class grew substantially between waves. ICT self-efficacy, participation in formal learning activities, support for student collaboration, and time availability were associated with High–Collaborator class membership relative to Observer–Discusser and Low–Collaborator classes. Latent transition analysis showed that classes were largely stable, except the Observer-Discusser class, which showed considerable movement over time. The findings provide insights into teachers' everyday learning in the ICT integration context and the conditions that support higher collaboration, which is an important factor in teachers' ICT integration and ultimately in students' learning.

## 12.2 Does job crafting help school principals mentally detach from work during off-job time?: Investigating the effect of approach- and avoidance-oriented job crafting on the long-term dynamics of psychological detachment, job performance, and health

**Hiroyuki Toyama**, Olli-Pekka Heinimäki, Kelly Ferber, Mailis Elomaa, Sanna-Mari Muta, Lauri Hietajärvi, Katja Upadyaya, Minna Huotilainen

University of Helsinki

Job crafting—an employee-initiated, bottom-up approach to job design—has been suggested as a useful strategy for school principals to manage their demanding job framework and promote occupational well-being. This study examined how two forms of job crafting (approach- and avoidance-oriented crafting) relate to long-term intrapersonal dynamics of psychological detachment from work, job performance, and health problems. In addition, we tested whether workload moderates the relationship between job crafting and psychological detachment. Data were drawn from a two-wave longitudinal study of Finnish school principals (N = 233), with an interval of approximately one year between measurements. Using a latent change score modeling approach, we found that approach-oriented crafting predicted later increases in psychological detachment, whereas avoidance-oriented crafting did not predict changes in this construct. Increases in psychological detachment, in turn, predicted improvements in job performance and reductions in health problems. The effects of approach-oriented crafting on job performance and health problems were fully mediated by psychological detachment. No moderating effect of workload was found. These results suggest differential effects of the two job crafting strategies on a key recovery experience that is crucial for both job performance and health.

# Parallel sessions 13-17 (Thu, May 21, 8:30-10:00)

# Session 13: Computational Thinking and Technology Use in Learning

21.5.2026 8.30–10.00

This session focuses on how students approach cognitively demanding tasks that require reasoning, interpretation, and structured problem solving. The presentations examine computational thinking and inquiry-based learning.

## 13.1 Profiles of computational thinking task behaviour

**Cristiana Mergianian**[1], Laura Nyman[2], Muhterem Dindar[1], Ninja Hienonen[1], Mari-Pauliina Vainikainen[1]

[1]Tampere University
[2]University of Helsinki

In educational assessment, performance scores derived from final products may not fully capture students' knowledge and skills. Supplementing these scores with task behaviour observed from log data can offer further insight. In this research, we used block-based programming tasks to measure computational thinking (CT). Our aims were to 1) identify patterns of CT task behaviour (i.e., profiles) from log-based indicators: time, trials, and solution efficiency; 2) compare CT performance across the profiles; 3) predict profile membership from grade and gender; and 4) describe the performance of the profiles in areas related to CT, such as mathematics. We analyzed data from 6509 Finnish lower-secondary school students, applying latent profile analysis and the manual BCH method. Four profiles emerged with distinct combinations of the three indicators. Efficient solutions coupled with little time and few trials led to above-average CT performance, and membership in some profiles varied across grades and by gender. Profiles of task behaviour that were associated with below-average CT performance did not consistently correspond to low performance in related areas. These results suggest that leveraging technology-enhanced assessment can improve our understanding of how students approach tasks, and consequently, inform the development of scalable, adaptive support for learning.

## 13.2 Examining the relationship between ICT utilization in enquiry-based learning activities and student academic achievement in PISA 2022 in Finland

**Inka A. Palimo**[1], Lauri Hietajärvi[1], Arto K. Ahonen[2], Kirsti Lonka[1]

[1]University of Helsinki
[2]University of Jyväskylä

The aim of this study was to examine how using ICT in enquiry-based learning activities predicts learning achievement in PISA 2022 in mathematics, reading, and science in Finland. To conduct our analysis, we used nine items measuring time spent utilising ICT (PISA 2022 Technical Report) on various school-related activities (e.g., "Analyse data that you have collected yourself (e.g. using [Microsoft® Excel™])"). Our analysis included student gender and the index for Economic, Social, and Cultural Status as covariates.

The predicted effect on student performance was evaluated with two different Structural Equation Models: by dividing the nine items into three separate ICT factors ("Standard activities", "Investigative activities", "Project management"), measuring different categories of enquiry-based activities, and by combining all nine items into a singular composite variable.

Our results indicated a great discrepancy between models, demonstrating the dimensionality of enquiry-based learning and ICT utilisation. Combining all nine ICT items into a singular variable predicted wholly negative effects, while using three factors showed three types of associations: 1. Positive, 2. Negative, 3. Unrelated. Our study shows that ICT utilisation can yield several types of results depending on what ICT is actually used for.

## 13.3 Exploring the Role of Computational Thinking in Mathematical Word Problems

**Marika Parvianen**[1]
[1]University of Turku

Mathematical word problems require students to integrate linguistic comprehension with formal mathematical reasoning and therefore provide a key domain for examining representational and structural competence in primary education. Solving such problems

involves identifying relevant information, constructing appropriate representations, and coordinating multi-step solution processes. These demands closely align with core components of Computational Thinking (CT), including decomposition, abstraction, and algorithmic reasoning. Although theoretical connections between CT and word problem solving have been widely proposed, empirical evidence directly examining their structural relationship remains limited.

This presentation outlines a series of studies investigating the association between CT skills and mathematical word problem solving in 4th grade school students. The studies are conducted within the DigiMaths4All project, which implements a 16-week integrated mathematics and CT intervention. Using an experimental design, three groups receive different instructional conditions. The total sample includes approximately 1,100 students.

Across studies, we examine whether CT skills predict word problem performance, whether CT-focused instruction leads to improvements in word problem solving, and which CT components are most strongly related to different problem structures. The findings aim to clarify the role of CT in mathematical reasoning and inform the design of integrated instructional approaches in primary education.

# Session 14: Leadership Among Teachers and Principals

21.5.2026 8.30-10.00

These studies examine teachers' and principals' leadership, agency, and flexibility in community and networks.

## 14.1 Principals' perceptions of leadership in a school's professional community

**Janni Alho**[1], Mailis Elomaa[2], Elina Fonsén[1], Eija Hanhimäki[1]

[1] University of Jyväskylä
[2] University of Helsinki

School leadership is a complex entity requiring effort from formal leaders together with a school's professional community. However, a better understanding is needed of how principals perceive leadership and the related competencies and challenges in a professional community, together with their own roles as 'leaders of leadership' in professional communities. These aspects were examined in the present study with 37 principal participants working in basic education. The data were collected via semi-structured individual interviews and analysed with inductive qualitative content analysis. According to preliminary findings, the principals perceived leadership competencies needed by a professional community as 1) leadership structures, 2) division of responsibilities, 3) self-leadership in a community, 4) collective construction of empowering leadership culture, 5) shared knowledge and 6) leadership in a classroom. They recognised their roles as enablers of professional community's leadership together with certain restricting factors. Principals' understandings of these aspects are related to their abilities to support and utilise a professional community's leadership for school improvement, and can inform the design of relevant professional development support for school leadership.

## 14.2 Teachers' transformative professional agency in multi-level professional networks

**Satu Kulmala**, Kaiju Kangas, Kai Hakkarainen, Tiina Korhonen

University of Helsinki

This study examines how teachers' professional networks shape their transformative professional agency in digital pedagogical development. The study draws on theoretical perspectives on teachers' agency and on sociocultural approaches to professional learning and communities of practice.

The qualitative data consist of interviews with teachers (n = 12) who participated in the Learning and Teaching in Digital Environments Professional Specialization Program (DigiErko) in Finland, complemented by ego-centered professional network maps that participants created prior to the interviews. The analysis combines qualitative content analysis with a systematic visual analysis to explore how both within-school and external networks shape teachers' capacity to initiate and lead digital change.

The findings show that teachers' professional networks form multi-level, overlapping ecosystems spanning school-based, municipal, national, digital, and international contexts. These networks support transformative professional agency by lowering the threshold for experimentation, providing access to shared expertise, legitimizing developer roles within schools, and fostering collective knowledge creation. Through network participation, teachers act as brokers and change agents, extending their influence beyond their own classrooms.

The study highlights professional networks as key infrastructures that support teachers' transformative professional agency and suggests that network-based professional development should be more intentionally recognized and supported in educational change efforts.

## 14.3 Finnish Principals' Work Passion Profiles and Associations with Psychological Flexibility

**Sanna-Mari Muta**, Olli-Pekka Heinimäki, Hiroyuki Toyama, Katja Upadyaya

University of Helsinki

As teachers and students increasingly experience ill-being, the ability of school principals to support the well-being and flourishing of the school community has become more critical. To meet these demands, principals must have sufficient personal resources such as work passion, and psychological flexibility to sustain both high-quality leadership and their own occupational well-being. To that end, this study explored work passion profiles among Finnish principals using the dualistic model of passion including harmonious and obsessive forms of passion and their associations with psychological flexibility, age, and gender. The findings were interpreted through the conservation of resources theory.

Data from the Finnish Principal Barometer (N = 511) were analysed using latent profile analysis and multinomial logistic regression. Sixty-four percent of the respondents were female, with an average age of 51.9 (SD = 6.9) years. Three profiles emerged: harmonious (65%), harmonious-dominant (25%), and harmonious-obsessive (10%). Higher psychological flexibility predicted membership in the harmonious profile rather than harmonious-dominant profile, while female principals were more likely to belong to the harmonious-obsessive profile than the harmonious. Findings suggest that psychological flexibility can particularly strengthen harmonious passion at work, highlighting its potential in interventions to enhance principals' occupational well-being.

# Session 15: Perspectives of Parents and Education Professionals on Children's Development

21.5.2026 8.30-10.00

This session examines the perspectives and support of parents and education professionals on childrens development.

## 15.1 Parents' experiences of interaction with school welfare professionals during Finnish comprehensive school

**Anniina Eklöf**, Jaanet Salminen, Miia Laasanen, Minna Kyttälä

University of Turku

Schools are obligated to collaborate with parents to support children's comprehensive well-being and learning. Interaction has been broadly recognized as an important component for effective home-school collaboration, but parents' perspectives on functional interaction between home and student welfare personnel have been studied only a little.

In this study, we are interested in parental agency in home-school interaction. Parental agency refers to parents' participation in activities, capability to act, and possibilities to influence matters concerning their child. The research question is: How does parental agency appear in interactions between home and school?

The research data consists of 19 interviews with parents of children participating in the "Steps to the Healthy Development and Well-being of Children" (STEPS) follow-up study. The interview themes addressed parents' and their adolescents' experiences with well-being support throughout comprehensive school. The data was analyzed using directed content analysis.

According to the preliminary results, factors supporting or undermining parental agency included communication, staff availability, atmosphere, and parents' experience of being heard. Effective interaction had the potential to promote parental empowerment and trust, while experiences of not being heard could lead to either withdrawal or seeking support

elsewhere. The results increase understanding of the meanings and consequences of home-school interaction.

## 15.2 Longitudinal Profiles of Socio-Emotional Support and Their Associations with Academic and Psychological Functioning

**Daria Khanolainen**[1], Minna Torppa[1], Asko Tolvanen[1], Vilija Hiltunen[1], Noona Kiuru[1], Jenni Ruotsalainen[1], Kaisa Aunola[1], Marja-Kristiina Lerkkanen[1], Anna-Maija Poikkeus[1], Katariina Salmela-Aro[2], Ingrid Schoon[3], Kati Vasalampi[1]

[1] University of Jyväskylä
[2] University of Helsinki
[3]Social Research Institute, UCL Institute of Education, University College London

Social support has long been acknowledged as one of the key factors contributing to various aspects of child development, including both academic and psychological functioning. However, there is limited evidence on how multiple interlinked sources of support from parents, teachers, and peers develop over time and how they predict later academic and psychological outcomes. The current study draws on a sample of Finnish students ($n$ = 2,209), followed from elementary school (age 8) to young adulthood (age 21). Data on social support were collected from multiple informants (students themselves, their mothers, and classmates). Using latent profile analysis with repeated measures, we identified distinct profiles of social support and examined their associations with academic and psychological outcomes. Students who consistently received high levels of support from all sources showed the most favourable outcomes, including higher academic performance, timely graduation from secondary education, fewer depression symptoms, less frequent use of antidepressants and therapy, and fewer unhealthy habits such as drinking, smoking, and drug use. Overall, this study highlights the importance of sustained, multi-source social support in promoting successful academic and psychological functioning across development and offers recommendations on how to support different profiles of students.

## 15.3 Moderating Factors of Mother-Teacher Ratings Discrepancy Towards Preschoolers Social Emotional Development

**Shizhao Zhang**, Silja Martikainen, Tanja Linnavalli, Mirjam Kalland

University of Helsinki

This study investigated discrepancies between mother-teacher evaluations of preschoolers' social emotional development (SED) and the socio-demographic factors moderating these associations, drawing on a subsample from the Finnish national two-year preschool education experiment (N = 2,060) .Using the Strengths and Difficulties Questionnaire (SDQ), results revealed that teachers consistently reported significantly lower scores than mothers across all domains, while intraclass correlation coefficients (ICC) showed statistically significant but generally low-to-moderate agreement, with the highest alignment in externalizing behaviours. Moderation analyses demonstrated that family income and maternal native language significantly influence the strength of the mother-teacher association regarding externalizing and internalizing problems, respectively. Conversely, maternal education did not emerge as a significant moderator, likely due to the high homogeneity of educational attainment and systemic equity within the Finnish context. These findings suggest that mothers and teachers provide complementary perspectives, underscoring the necessity of a multi-informant approach and the importance of bridging linguistic and socioeconomic gaps to foster accurate assessments of children's well-being.

# Session 16: Recruitment, Labor Markets and Career Choice of Educators

21.5.2026 8.30-10.00

This session focuses on professional entry points and labor market dynamics in teaching careers. The presentations examine how institutions shape recruitment, professional choices, and working conditions.

## 16.1 School Principals' Professional Goals and Well-Being: Promoting sustainable working conditions

**Kelly Ferber**, Mailis Elomaa, Lauri Hietajärvi, Katja Upadyaya
University of Helsinki

School principals are often drawn to the profession by deeply held intrinsic aspirations, such as contributing to society, fostering student development, and cultivating a positive school climate. Intrinsic goals are beneficial for well-being because they foster direct basic psychological need satisfaction for autonomy, relatedness, and competence. This study first examined the reasons school principals entered the profession by conducting interviews with 27 Finnish school principals, from the longitudinal Principal Barometer Survey. Reflexive thematic analysis revealed that while the majority of principals advanced to the role through a teaching background and incremental career progression, intrinsic goals strongly underpinned their decision to become principals. A quantitative study of 562 Finnish school principals found that the top three reasons for entering the profession included to do interesting work, to have greater autonomy to positively impact the school, and to support student development. Of the various reasons to enter the profession, doing interesting work, having more autonomy to make a positive impact on the school, and contributing to society were found to be linked with greater basic psychological need satisfaction, and well-being. To ensure more sustainable working conditions, it is important for educational systems to actively support the fulfillment of school principals' professional goals.

## 16.2 Insights from Teacher Recruitment Research: Employers' Expectations for Teachers and Teaching

**Ville Mankki**
University of Jyväskylä

Teacher recruitment is under increasing global pressure. According to estimates by UNESCO (2025), achieving global education goals by 2030 will require an additional 44 million teachers worldwide. Despite the significant challenges—both in Finland and internationally—teacher recruitment has received relatively limited scholarly attention. One promising yet underutilized approach is the study of teacher job advertisements. This line of research provides valuable insights into trends in the education labor market and sheds light on employers' expectations regarding the competencies and professional roles of education professionals. This presentation synthesizes findings from my research on teacher job advertisements, focusing on the expectations employers articulate concerning teachers and teaching (e.g., Mankki et al., 2024; Mankki, 2025; Sirkko & Mankki, 2025). As job advertisement research offers useful tools for evaluating the aims and content of teacher education, the presentation discusses the implications of these findings for the development of teacher education programs. It also considers the broader possibilities and limitations of job advertisement research in educational inquiry, including its relevance for studying issues such as teacher segregation.

## 16.3 Monopsony Power in Early Childhood Education and Care

**Ulla Wirtanen**
University of Helsinki

This study examines the magnitude of municipal monopsony power in the labor market of Finland's early childhood education and care (ECEC). The persistent shortage of qualified teachers during recent decades and the wage increases adopted by several municipalities during 2023–2024 provide a context for exploring how municipalities set wages under teacher shortages and varying competitive pressures, as well as the elasticity of labor supply.

In a perfectly competitive labor market, an individual employer hires labor at the market wage and would lose all supply if offering a lower wage. In a monopsony, however, the employer faces an upward-sloping labor supply, meaning not all supply is lost with wages lower than the competitive wage. The resulting wage markdowns depend on how elastic labor supply is.

Using administrative data, fixed-effects models are applied to analyze municipal wage-setting and labor supply responses. In addition, a spatial difference-in-differences design is used to examine employee mobility and potential spillover effects of wage premiums on neighboring municipalities. The analysis aims to shed light on how monopsony power may shape wage setting and contribute to persistent teacher shortages.

# Session 17: Support and Student Well-Being in Longitudinal Studies

21.5.2026 8.30-10.00

This session examines how educational support, well-being, and motivational beliefs shape students' educational trajectories.

## 17.1 Intersectional Differences in Adolescent Well-Being Profile Transitions and STEM-Oriented Career Choices

**Miruna Bivol**[1], Kezia Olive[2], Milagros Sáinz Ibáñez[1], Katja Upadyaya[2]

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Adolescence is a critical period for well-being development and educational decision-making. During baccalaureate in Spain, students must specialize and make career-related choices that shape their future trajectories while potentially increasing stress. This study examines well-being profiles and their implications for STEM-oriented career choice across the first and second years of upper secondary education. Using Latent Profile and Latent Transition Analysis, we identified subgroups of students with similar patterns and estimated transition probabilities over one academic year. The sample comprised 928 first-year baccalaureate students (55.4% women; 43.1% with a migrant background; $M_{age}$ = 16.21 years, SD = 0.56); second-year data are currently being processed. Indicators included academic self-concept, school attitudes and enjoyment, school-related concerns and physical complaints, social problems, burnout, resilience, and life satisfaction. Gender, migrant background, and their interaction predicted profile membership and transitions. STEM-oriented career choice was examined as a distal outcome. Findings will shed light on the stability and change of well-being profiles, intersectional differences in developmental pathways, and their links to STEM-oriented aspirations, contributing to a person-centered and intersectional understanding of adolescent well-being and educational choices.

## 17.2 Teacher Support Profiles from Teachers' and Students' Perspective: Associations with Subsequent Socioemotional Functioning and Academic Performance

**Emmi Koukkari**[1], Katri Savolainen[2], Kati Vasalampi[3], Pilvi Peura[3], Eija Pakarinen[4], and Noona Kiuru[2]

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This study examines profiles of teacher support in the final year of primary education in Finland, using both teacher- and student-reported perceptions of autonomy support, teacher–student closeness, and instructional support. Using data from 312 students (51.6% girls), the study also investigates how these support-profiles relate to subsequent socioemotional functioning and academic performance in reading and arithmetic fluency one year later. Preliminary latent profile analyses showed that a four-profile solution provided the best fit. The profiles were characterized as follows: (1) Low teacher reported student support, (2) Low student perceived teacher support, (3) Shared views of moderate teacher support, and (4) Shared views of high teacher support. Students in the shared views of high teacher support demonstrated the most adaptive subsequent socioemotional functioning and academic performance. In contrast, students in the Low teacher reported student support showed lower academic performance and more maladaptive socioemotional functioning than those in the other profiles. These results highlight the importance of considering both teachers' and students' perspectives on educational support and suggest that future interventions should address discrepancies between these perspectives.

## 17.3 The Longitudinal Interplay of Mathematics Self-concept, Interest, Cost, and Performance – a Random Intercept Cross-lagged Panel Model

**Mathilda Sandman**[1], Anna Widlund[1], Jaana Viljaranta[2], Johan Korhonen[1]
[1] Åbo Akademi University
[2] University of Eastern Finland

Prior studies have extensively studied the relations of motivational beliefs and performance, however, most work is grounded on analyses combining within- and between-student variances. In our study, we utilized a random intercept cross-lagged panel model (RI-CLPM), which separates these variances, thus providing a more nuanced view of the relations. Specifically, this study explores the longitudinal relations between self-concept, interest, emotional cost, and math performance across Grades 4 to 6 (10-12-year-olds, N = 584).

Between-person results showed that the positive motivational beliefs (self-concept and interest) were positively related to each other and math performance, while emotional cost was negatively related to the positive motivational beliefs and math performance. The within-person results revealed that higher-than-usual interest predicted higher-than-usual self-concept and lower-than-usual emotional cost at the next time point. Higher-than-usual self-concept predicted later lower-than-usual emotional cost, and vice versa. No cross-lagged relations were found between motivational beliefs and math performance. However, within-student correlations indicated a concurrent relation between these constructs, rather than a longitudinal one.

In conclusion, math interest was linked to later positive (self-concept) and negative (emotional cost) motivation. Emotional cost seems to harm self-concept already in 4th grade, highlighting the importance of preventing negative emotions related to math among young students.