OPPIMIS- JA OPPIMISVAIKEUS-
TUTKIMUKSEN PÄIVÄT

OPPIVA

4.-5.6.2024 • UEF • JOENSUU

PROGRAMME

DAY 1 • 4.6.2024

13.00–13.15	Conference opening			TBA
13.15–14.15	Keynote 1 – University teacher Lauri Räty			TBA
14.30–16.15	Paper session 1A	TBA	Paper session 1B	TBA
16.15–16.45	Coffee break			TBA
16.45–18.30	Paper session 2A	TBA	Paper session 2B	TBA

DAY 2 • 5.6.2024

09.30–11.15	Paper session 3A	TBA	Paper session 3B	TBA
11.15–11.45	Poster session			TBA
12.00–12.45	Lunch			TBA
13.00–14.00	Keynote 2 – Professor Judith Harackiewicz			TBA
14.00–14.30	Closing of the conference			TBA

PAPER AND POSTER SESSIONS

DAY 1 • 4.6.2024

Paper session 1A: 14.30–16.15	Room TBA
Chair: Henriikka Juntunen	
Meysam Abedi University of Eastern Finland	Integrating deep learning techniques in educational frameworks for enhanced learning outcomes
Cristina Obae University of Lapland	Virtual worlds real results. Learning difficulties in online environments
Mikko Salminen Finnish Defence Research Agency	Feeling of being there in a virtual reality simulator environment: An example of the role of sense of presence in psychomotor skills training
Muhammad Zaheer Asghar Universitat Oberta de Catalonia, Barcelona	Human-AI learning regulations and inclusive educational leadership development to respond disasters: An evidence from Turkey and Pakistan
Heikki Lyytinen Comprehensiongame World Learning	Dynamic assessment as a tool for solving learning problems of all

Paper session 1B: 14.30–16.15	Room TBA
Chair: Heta Tuominen	
Fiia Söderholm, Jaana Viljaranta, Riikka Hirvonen, Heta Tuominen, Kristiina Lappalainen & Leena Holopainen University of Eastern Finland	The development of exhaustion, cynicism, and inadequacy in general upper secondary education: Support, student engagement, and gender as predictors
Heta Tuominen, Emmi Kujala, Markku Niemivirta & Jaana Viljaranta University of Eastern Finland	Academic well-being, perceived learning difficulties, and special educational teacher's support in upper secondary school
Elina Sinkonen, Fiia Söderholm, Jaana Viljaranta & Kristiina Lappalainen University of Eastern Finland	The relation between behavioral and emotional strengths and school burnout among first-year general upper secondary school students
Katja Saxer[1,2], Heta Tuominen[2] & Markku Niemivirta[2] [1]University of Bern, Switzerland; [2]University of Eastern Finland	Well-being of secondary school students in Switzerland: A multidimensional, person-centered approach
Anne Karttunen[1], Airi Hakkarainen[2] & Leena Holopainen[1] [1]University of Eastern Finland; [2]University of Jyväskylä	The relationship between adolescents' school burnout, perceived learning difficulties, and delayed graduation from upper secondary education

DAY 1 • 4.6.2024

Paper session 2A: 16.45–18.30	Room TBA
Chair: Anna Rawlings	
Päivi Pihlaja University of Eastern Finland	Understanding the impact of early social-emotional screening status on primary school children's social-emotional well-being in Finland
Jaana Viljaranta[1], Eija Räikkönen[2], Sari Mullola[3] & Kaisa Aunola[2] [1]University of Eastern Finland; [2]University of Jyväskylä; [3]University of Helsinki	The relations between first-grade students' temperament and teacher-student interaction
Anna Rawlings[1] & Anna Tapola[2] [1]University of Eastern Finland; [2]Åbo Akademi University	Self-control and temperament as predictors of secondary-students' interest, strain, and effort
Anna Kuusi, Heta Tuominen & Markku Niemivirta University of Eastern Finland	Perfectionistic profiles, academic well-being, and perceived support in upper secondary education
Markku Niemivirta & Heta Tuominen University of Eastern Finland	The role of perfectionistic tendencies in predicting changes in task-specific self-efficacy and anxiety

Paper session 2B: 16.45–18.30	Room TBA
Chair: Pinja Jylänki	
Deepti Bora & Minna Torppa University of Jyväskylä	Examining associations between home literacy environment factors and children's language and literacy skills in a sample from India
Riikka Heikkilä[1], Sara Huotari[2], Pirita Korpivaara[1], Roosa Karhunen[1] [1]Niilo Mäki Institute; [2]University of Jyväskylä	The association of rapid automatized naming (RAN) with academic skills and attention in children aged 5-16
Grace Joplin Ferreira University of Helsinki	The deficit approach to autism language and communication research
Pinja Jylänki[1], Katja Sutela[1], Johan Korhonen[2] & Riikka Mononen[1] [1]University of Oulu; [2]Åbo Akademi University	Reducing math anxiety in primary school classrooms: A pilot intervention study
Lotta Uusitalo University of Helsinki	Neuromyths held by Finnish student-teachers

DAY 2 • 5.6.2024

Paper session 3A: 9.30–11.15	Room TBA
Chair: Antti-Tuomas Pulkka	
Henriikka Juntunen[1], Heta Tuominen[1], Markku Niemivirta[1], Jaana Viljaranta[1], Lars-Erik Malmberg[2], Auli Toom[3] & Eija Räikkönen[4] [1]University of Eastern Finland; [2]University of Oxford; [3]University of Helsinki; [4]University of Jyväskylä	University students' situational motivation over a statistics course and relations to anxiety
Kukka-Maaria Polso[1], Heta Tuominen[2], Petri Ihantola[3], and Markku Niemivirta[2] [1]University of Helsinki; [2]University of Eastern Finland; [3]University of Jyväskylä	Cross-domain motivational profiles predicting the choice of STEM vs. non-STEM vocational programmes
Anna Widlund[12], Markku Niemivirta[2], Heta Tuominen[2], Henriikka Juntunen[2], Rebecca Lazarides[3], Wendy Symes[3] & Johan Korhonen[1] [1]Åbo Akademi University; [2]University of Eastern Finland; [3]University of Potsdam	Developmental relations of motivational-beliefs in math across the transition from primary to lower secondary school
Antti-Tuomas Pulkka National Defence University	How are motivational orientations and perceptions of oneself as a learner related?
Hannu Ojala, Heta Tuominen & Markku Niemivirta University of Eastern Finland	Examining achievement goal profiles and learning outcomes in business studies

Paper session 3B: 9.30–11.15	Room TBA
Chair: Riikka Mononen	
Johan Korhonen[1], Ellen Sammallahti[1], Anna Widlund[1] & Bert Jonsson[2] [1]Åbo Akademi University; [2]Umeå University	Developmental relations between mathematics anxiety and arithmetic fluency in elementary school students
Riikka Mononen[1], Pinja Jylänki[1], Anna Tapola[2] & Johan Korhonen[2] [1]University of Oulu; [2]Åbo Akademi University	Longitudinal relations between math anxiety and performance: the role of self-concept and interest
Hans Lehikoinen & Markku Niemivirta University of Eastern Finland	Interrelationships between mathematics self-efficacy, test anxiety, and performance in co- and solo-taught classrooms
Pekka Räsänen & Sonja Julkunen Turku Research Institute for Learning Analytics, University of Turku	The development of multiplication skills in Finnish schools: Data from a large cross-sectional online digital assessment
Daria Khanolainen[1], Elsje van Bergen[2], Asko Tolvanen[1], Tuire Koponen[1], Jenni Salminen[1] & Minna Torppa[1] [1]University of Jyväskylä; [2]Vrije Universiteit, Amsterdam	Math ability rating questionnaire for adults: Developing the new measure

DAY 2 • 5.6.2024

Poster session: 11.15–11.45	Room TBA
Lais Oliveira Leite[1] &Francisca Geny Lustosa[2] [1]University of Eastern Finland; [2]Federal University of Ceará	The Pro-Inclusion Project at the Federal University of Ceará: Providing specialized educational assistance for students with special needs.
Timi Tervo Tampere University	The effect of gamified foreign language speech sound training on native language decoding
Joshua Kwasi Tsatror University of Lapland	Assessing the roles of self-regulated learning strategies on academic performance and satisfaction among online students in Ghana

ABSTRACTS

DAY 1 • 4.6.2024

Paper session 1A: 14.30–16.15	Room TBA

Chair: Henriikka Juntunen

1. Meysam Abedi (University of Eastern Finland). *Integrating deep learning techniques in educational frameworks for enhanced learning outcomes*

The contemporary educational landscape is increasingly recognizing the potential of integrating artificial intelligence (AI) and machine learning (ML) methodologies to revolutionize traditional learning and teaching approaches. This study explores the integration of deep learning (DL) techniques within educational frameworks to facilitate personalized learning experiences and address learning difficulties. By leveraging neural networks and deep learning algorithms, the research aims to develop a model that adapts to individual learner's needs, optimizes learning paths, and identifies potential learning difficulties at an early stage. The model utilizes a combination of supervised and unsupervised learning techniques to analyze educational data, enabling the prediction of student performance and the customization of content delivery to enhance learning outcomes. Furthermore, the study investigates the effectiveness of DL-integrated teaching tools in improving student engagement and motivation. Through a qualitative and quantitative research methodology, involving a control group and an experimental group exposed to the DL-enhanced learning environment, preliminary findings suggest a significant improvement in learning outcomes, comprehension levels, and student satisfaction. The implications of this research extend beyond academic performance, proposing a paradigm shift in educational methodologies towards more adaptive, inclusive, and efficient learning and teaching processes. This paper contributes to the field of educational technology by demonstrating the practical applications of DL in developing adaptive learning systems, thereby supporting educators in creating more engaging and effective learning environments.

2. Cristina Obae (University of Lapland). *Virtual worlds real results. Learning difficulties in online environments*

Students with learning difficulties such as dyslexia, dysgraphia or autism spectrum disorder might have a hard time learning foreign languages in online contexts of 2D platforms like Zoom or similar. A two years experiment on using virtual reality in teaching online French classes with such a profile showed that 3D learning environments can have positive effects both on motivation and knowledge or skills acquisition. Contextual elements still need to be considered, research group expanded, but results are encouraging. The current presentation will introduce the experiment methodology, illustrate its conclusions and highlight main take-aways opening towards new inquiries in the area of usage of 3D virtual spaces in language teaching to students with learning difficulties.

3. Mikko Salminen (Finnish Defence Research Agency). *Feeling of being there in a virtual reality simulator environment: An example of the role of sense of presence in psychomotor skills training*

The commercially available virtual reality (VR) devices enable rapid prototyping of virtual learning environments with novel interaction mechanisms. For example, physical objects may be represented in the virtual environment and used as controllers instead of mouse and keyboard. These novel solutions enable the training of psychomotor skills that would be difficult to train otherwise. For example, in the fields of security and military there are scenarios that would be difficult, dangerous, or expensive to train with other methods. However, these new types of interaction and control mechanisms may also hinder the learning due to human factors issues which may lead to experienced cognitive load or frustration. On the other hand, the representational fidelity of the VR environment affects the user's sense of presence, or feeling of being there, which may evoke engagement and target the attention in a way that supports learning. We present a pilot study (n=28) on the applicability of VR technology in the training of targeting and shooting of aerial moving targets with a heavy machine gun. The using of a VR simulator was compared in a between-subjects setting to an older, non-immersive simulator. Both, the trait (immersive tendencies) and state (sense of presence) measures were collected. Various differences were observed in the subjectively reported sense of presence between the two simulators, with the VR simulator evoking higher sense of presence than the old, non-immersive simulator. In addition, the immersive tendencies of the participant had also an effect to their self-reported sense of presence for the VR simulator. However, somewhat surprisingly the participants reported higher amount of distractions for the VR versus the old non-immersive simulator. The re-

sults are discussed considering the role of sense of presence in VR-based simulation training and how to foster it for better learning outcomes.

4. Muhammad Zaheer Asghar (Universitat Oberta de Catalonia, Barcelona). *Human-AI learning regulations and inclusive educational leadership development to respond disasters: An evidence from Turkey and Pakistan*

The rapid emergence of Industry 4.0 technologies, including artificial intelligence tools like ChatGPT and social media, has created new opportunities for addressing crises. In parallel, inclusive leadership development theories rooted in positive psychology have gained recognition among researchers. This study aimed to design an intervention to measure the mediating role of social media-based group level regulation between ChatGPT-based self-regulation and inclusive leadership development in responding to the aftereffects of natural disasters in Turkey and Pakistan. Participants included 30 higher education students from Turkey and 95 higher education students from Pakistan. Through ChatGPT-based self-regulated learning, cross-cultural strategies were developed in the initial phase of the research. These strategies were shared in the social media group "e-inclusion 4.0." Pre- and post-intervention surveys were conducted, and multiple group analysis was performed to compare the results. The findings demonstrated the efficacy of ChatGPT as an artificial intelligence tool in fostering self-regulation, which subsequently enhanced group-level regulation through the utilization of social media and inclusive knowledge construction. Ultimately, this intervention facilitated the development of inclusive leadership among learners in a cross-cultural context. The practical implications of this research are significant for higher education strategic planners, as it provides insights into designing innovative learning strategies for inclusive leadership development in response to climate change and natural disasters, utilizing Industry 4.0 technologies such as artificial intelligence, social media, augmented reality, virtual reality, and robotics to enhance learning regulations for inclusive knowledge construction.

5. Heikki Lyytinen (Comprehensiongame World Learning). *Dynamic assessment as a tool for solving learning problems of all*

To reach my goal of training all children to acquire full literacy - I ended up trying it in rural Zambia to show that this goal can be reached also in case the challenges are maximal. For that, I had to develop digital tools running on cheap phones and apply e.g. artificial intelligence. Now I have two tools both showing promising results. I suppose these will help not only in Zambia but everywhere because the tools are language-independent and work via an internet connection allowing providing help from my home but naturally better if I have local people distributing these and confirming that everything proceeds optimally. One can learn about the first of these tools from comprehensiongame.info and at the time of the conference also from the second one, TaleReader, from the same address. Both of these tools are based on dynamic assessment which assesses the present readiness status and continues training what is needed next for reaching the goal, full literacy. The new issue is that the goal is full literacy, which in the case of African children is sufficiently full if they can comprehend their schoolbooks which is not possible there now without our help. The main reason is that their home literacy environment is not sufficient for that. None is reading to them and they have no books to read outside school. None can learn to comprehend written language based on mere basic reading skills which are provided by digital games such as Ekapeli in Finland. One has to start reading but no interesting reading material is available in most Sub-Saharan African countries, so other means have to be invented for helping the learners. This presentation will inform how it can be made successfully so that children can enjoy in learning full literacy early.

1. Fiia Söderholm (University of Eastern Finland, UEF), Jaana Viljaranta (UEF), Riikka Hirvonen (UEF), Heta Tuominen (UEF), Kristiina Lappalainen (UEF), and Leena Holopainen (UEF) *The development of exhaustion, cynicism, and inadequacy in general upper secondary education: Support, student engagement, and gender as predictors*

This study contributes to understanding the long-term development of burnout dimensions across students in general upper secondary education and of support, engagement, and gender as factors that contribute to this development. The study followed Finnish academic track students (N = 210) over three years to examine the development of three burnout dimensions (exhaustion, cynicism, inadequacy) and the predictors of these dimensions using latent growth modeling. The findings revealed that cynicism and inadequacy increased, while exhaustion remained stable; moreover, the three dimensions were strongly interrelated. Perceived support negatively predicted initial burnout levels, affective engagement negatively affected exhaustion and inadequacy, and cognitive engagement negatively affected cynicism. Further, girls reported higher exhaustion and inadequacy than boys. The findings yielded new insight on the importance of perceived support as an antecedent of burnout—sufficient and continuous support can help to reduce and prevent burnout among these students.

2. Heta Tuominen (University of Eastern Finland, UEF), Emmi Kujala (UEF), Markku Niemivirta (UEF), and Jaana Viljaranta (UEF). *Academic well-being, perceived learning difficulties, and special educational teacher's support in upper secondary school*

School engagement has been associated with many positive educational outcomes, such as academic achievement and school completion, while school burnout has been linked with, for example, learning difficulties and dropout. Thus, it seems that students' academic well-being is related to their learning difficulties and need of support. Although engagement and burnout are negatively associated, person-oriented studies have shown that there are variegated patterns of engagement and burnout; for example, some students might be exhausted despite their engagement. In this study, we examined what kinds of school engagement and burnout (i.e., exhaustion, mental distance, cognitive impairment, emotional impairment) profiles can be identified among upper secondary school students (N = 846) and how these profiles differ with respect to perceived learning difficulties and experiences of the adequacy of special educational support received. Using latent profile analysis, five profiles were identified: engaged (high engagement, low all burnout symptoms; 27%), engaged–strained (high engagement, high exhaustion and cognitive impairment; 27%), moderate academic well-being (moderate engagement, moderate burnout; 27%), burned-out (low engagement, high all burnout symptoms; 10%), and disengaged–distant (low engagement, high mental distance and cognitive impairment; 9%). Girls were overrepresented in the burned-out profile and boys in the moderate academic well-being profile. These profiles were also meaningfully linked with students' perceived learning difficulties and received support from special educational teacher. For example, engaged students displayed the least perceived difficulties, while burned-out students reported the most difficulties. Interestingly, the engaged-strained students reported as much perceived learning difficulties as did the disengaged-distant students. Regarding support, the engaged-strained students were overrepresented among those who reported not receiving support although they would have needed it. The burned-out students seemingly needed but also received the most support from the special educational teacher. Still, they were also overrepresented among those who would have needed even more support.

3. Elina Sinkonen (University of Eastern Finland, UEF), Fiia Söderholm (UEF), Jaana Viljaranta (UEF), and Kristiina Lappalainen (UEF). *The relation between behavioral and emotional strengths and school burnout among first-year general upper secondary school students*

Transition from comprehensive school to upper secondary education is a big change. Especially students who continue their studies in general upper secondary school face many new challenges in their new academicly demanding environment. Studying in this context is more demanding and students are required to learn new, more independent ways to study, which can be risk to their well-being. Previous studies have shown that students in general upper secondary school experience higher levels of burnout (i.e., exhaustion due to school demands, a cynical attitude toward school, and feelings of inadequacy) compared to students in vocational schools (e.g. Bask & Salmela-Aro, 2013; Salmela-Aro et al., 2008). It is therefore important to try to prevent school burnout. Helping students to identify their strengths can support their confidence in their abilities and help them set achievable goals (Sointu et al., 2018), which can protect from school burnout (Salmela-Aro & Upadyaya, 2014). The aim of this study was to examine the relationship between behavioral and emotional strengths (i.e., 1) interpersonal strengths, 2) intrapersonal strengths, 3) family involvement, 4) school functioning, 5) affective strengths) and

school burnout among first-year upper secondary students (n=456) by addressing the following research questions: 1) How are high school students' ratings of their strengths related to the school burnout dimensions and overall school burnout; 2) Do burnt-out students and non-burnt-out students rate their strengths in the same way? The results showed, in general, that all five strengths were related to lower school burnout and in most cases the burnt-out students and non-burnt-out students differed in their strength ratings. The only exception was that exhausted and non-exhausted students did not differ in their rating of affective strengths. These findings indicate that helping students to identify their strengths can, indeed, support their well-being and protect them from school burnout.

4. Katja Saxer (University of Bern, Switzerland), Heta Tuominen (University of Eastern Finland, UEF), and Markku Niemivirta (UEF). *Well-being of secondary school students in Switzerland: A multidimensional, person-centered approach*

The rapid and profound changes in our world pose a great challenge to student well-being, especially at the secondary school level when age-related changes also occur. To address student well-being, it is essential to adopt a school-specific perspective that is distinct from general subjective well-being. Additionally, the multi-faceted nature of subjective well-being should be considered by applying a multidimensional construct that considers both students' subjective positive (i.e., positive attitudes toward school, enjoyment in school, positive academic self-concept) and negative (i.e., worries in school, physical complaints in school, and social problems in school) experiences in school. Our study aims to apply a person-centered approach to examine student well-being among N = 757 students (Mage = 13.12, SDage = 0.60) in Grade 7 from three German-speaking cantons in Switzerland, utilizing Latent Profile Analysis (LPA) to identify distinct student well-being profiles based on the six student well-being dimensions. Four divergent student well-being profiles were identified. Students in the thriving profile (51%) exhibited the highest level of positive experiences and the lowest levels of negative experiences. In contrast, students in the reserved profile (22%) reported the lowest level of positive experiences, accompanied by high worries in school. The highest levels of worries and physical complaints in school were observed among the stressed achiever profile (16%), yet these students exhibited positive attitudes toward school and enjoyment in school. Students in the socially stressed profile (11%) can be characterized by high levels of negative experiences, particularly in the domain of social problems in school. The results of our study indicate the existence of multiple well-being profiles among students, thereby demonstrating the considerable diversity in how students experience school. These profiles provide a crucial basis for the development of tailored interventions that address the specific needs of diverse student groups.

5. Anne Karttunen (University of Eastern Finland, UEF), Airi Hakkarainen (University of Jyväskylä), and Leena Holopainen (UEF). *The relationship between adolescents` school burnout, perceived learning difficulties, and delayed graduation from upper secondary education*

This longitudinal study investigated how adolescents' school burnout profiles relate to perceived learning difficulties, educational tracks, gender, and delayed graduation in upper secondary education. The study group consisted of adolescents (N = 485, mean age 15.7 years) residing in a mid-sized Finnish city. They completed an annual questionnaire for three years during either the academic or vocational track in upper secondary education. A person-oriented approach was used, and four latent school burnout profiles were found: (1) No risk of school burnout, (2) The average risk of school burnout, (3) The moderate high risk of school burnout, and (4) The high risk of school burnout. The results indicated that students with perceived learning difficulties were at a higher risk of school burnout compared with those who did not report learning difficulties. However, the delay in graduation by more than a year was not specifically linked to any school burnout group and students with delayed graduation were evenly distributed across different school burnout profiles. Surprisingly, among those who were in part of the high risk of school burnout profile (n = 20), only one student had delayed graduation. On the other hand, the graduation of 11 students (11.3 %) in the moderately high risk school burnout group (n = 97), had been delayed. Students in the vocational track were the most likely to belong to a group where no risk of school burnout was evident. Additionally, girls had an increased risk of belonging to one of the three school burnout profile groups. These findings suggest that perceived learning difficulties affect adolescents' lives longitudinally; thus, the better identification of these difficulties and more effective support are needed.

1. Päivi Pihlaja (University of Eastern Finland). *Understanding the impact of early social-emotional screening status on primary school children´s social-emotional well-being in Finland*

We examined associations between social, emotional, and behavioural (SEB) problems in toddlerhood and social and emotional strengths and difficulties at eight years of age. In addition, we were interested in associations between parental worry about the child´s psychosocial and language development in toddlerhood and social and emotional strengths and difficulties at age eight years. Participants were 554 children (52.7% boys) and their parents, involved in a longitudinal study with annual assessments. Parents rated children´s social-emotional competence at eighteen months, using the Brief Infant-Toddler Social and Emotional Assessment (BITSEA), and again at eight years, using the Strengths and Difficulties Questionnaire (SDQ). Parental age, education, socio-economic status and income were applied as control variables. Sex effects were also investigated. Early SEB problems predict some, but not all, aspects of later SE development. While competence delay was associated with less prosocial behaviour, SEB problems predicted only hyperactivity and conduct problems, not later peer problems or emotional symptoms. Parental worry, especially about child language development, was an important indicator of later SEB problems. Based on our study results, actions and interventions aiming to support children´s SE development throughout childhood should take into consideration its differentiated form and associations. Furthermore, parental worry about children´s language development should not be ignored when diagnosing SEB problems and competence delays.

2. Jaana Viljaranta (University of Eastern Finland), Eija Räikkönen (University of Jyväskylä, JYU), Sari Mullola (University of Helsinki), and Kaisa Aunola (JYU). *The relations between first-grade students' temperament and teacher-student interaction*

Children's individual characteristics, such as temperament, play an important role in a successful transition to school. In this study we examined whether first-grade students' temperamental characteristics (low task-orientation, negative emotionality, positive mood, and inhibition) were related to the level of and variation in daily teacher-student interaction. Altogether 153 students and their teachers participated the study where the teacher-student interaction (that is, affection, psychological control, and behavioral control teachers used with students) was measured across one school week in the Fall term one week in the Spring term of students' first school year. A random-coefficient multilevel regression modelling was used to analyse the intensive diary data. The results showed that students' temperamental characteristics were related to the different types of teacher-student interaction, but these relations were mostly found between temperament and the level of different types of interaction, not between temperament and the variation in daily interaction. The findings indicate, in general, that temperamental characteristics that could be seen as more challenging in the classroom environment, such as low task-orientation and negative emotionality, were related to teachers' reports of using psychological and behavioral control in their interaction with the students. However, the findings of this study showed somewhat different kinds of relations a) when examining the relations in the levels and in the daily variation, and b) when examining them in the Fall term and in the Spring term. This indicates that the beginning of schooling is an important phase in the formation of teacher-student interaction, but more research is needed.

3. Anna Rawlings (University of Eastern Finland, UEF) and Anna Tapola (Åbo Akademi University). *Self-control and temperament as predictors of secondary-students' interest, strain, and effort*

In this study, we examined self-control and temperamental reward and punishment sensitivities as potentially interlinked predictors of 8th-graders' (N = 268) domain-specific (mother-tongue) interest, psychological strain, and effort exertion (i.e., motivational appraisals). A model was specified in the SEM framework where temperamental tendencies were set to predict all other variables, and self-control to predict the motivational appraisals. Indirect effects from temperament on the motivational appraisals via self-control were also examined, and the effects of gender were taken into account. Self-control was found to predict interest and effort positively, and was itself negatively predicted by punishment sensitivity (i.e., temperamental inhibition; SP) and interindividual reward sensitivity (i.e., sensitivity to reward derived from others' praise or attention; SRinter). SRinter was also a direct, positive predictor of strain. Intraindividual reward sensitivity (i.e., sensitivity to reward derived from novelty, personal successes, and related inner states; SRintra) positively predicted both interest and effort. Somewhat

surprisingly, SP had both a positive direct effect and, together with SRinter, a negative indirect effect via self-control on effort. Girls reported higher SP and domain-specific effort than boys, and boys rated their domain-specific strain higher than girls. In all, the findings suggest that self-control is supportive of motivation, and is itself guided by temperament. The apparent educational importance and potential complexity of the linkages point to a need to examine these relationships further with a larger sample and in a longitudinal setting.

4. Anna Kuusi (University of Eastern Finland, UEF), Heta Tuominen (UEF), and Markku Niemivirta (UEF). *Perfectionistic profiles, academic well-being, and perceived support in upper secondary education*

Perfectionism is characterised by a combination of two individual tendencies: perfectionistic strivings and concerns. Group-based studies have identified meaningful perfectionistic profiles with differences in relation to well-being. However, studies examining perfectionistic profiles among upper secondary education students, and how they link with academic well-being and perceived support for well-being are still scarce. The first aim of this study was to investigate Finnish general upper secondary school students' (N = 664, girls = 47,3 %) perfectionistic profiles. We also investigated how profiles were linked with academic well-being (i.e., school engagement and burnout) and perceived support for well-being from school personnel and family. By using latent profile analyses (LPA), four distinct perfectionistic profiles were identified: ambitious (27,1 %), non-perfectionists (26,7 %), concerned (24,7 %), and perfectionists (21,5 %). Regarding profile differences, perfectionists and ambitious were the most engaged in their studies. Perfectionists and concerned expressed the most emotional and cognitive impairment, and exhaustion, while concerned reported the most mental distance. Interestingly, especially perfectionists reported not receiving enough support for their well-being from school personnel and family. The findings add to our understanding of the associations between students' perfectionistic tendencies, academic well-being, and perceived support, and thus provide some insight on how to best support students' well-being in schools.

5. Markku Niemivirta (University of Eastern Finland, UEF) and Heta Tuominen (UEF). *The role of perfectionistic tendencies in predicting changes in task-specific self-efficacy and anxiety*

Perfectionism is commonly defined as a multidimensional personal disposition characterised by a combination of two types of tendencies: how ambitious goals individuals set (i.e., perfectionistic strivings) and how concerned they are about achieving those goals (i.e., perfectionistic concerns). Research has shown these tendencies to be linked with students' motivation and well-being individually and jointly. High strivings are usually associated with more adaptive outcomes, whereas concerns seem to be connected with less adaptive outcomes, even when combined with high strivings. Less is known about how these tendencies contribute to situational motivation during a task. In this study, we investigated how university students' (N = 2041) self-efficacy (i.e., a facilitating motivational factor) and anxiety (i.e., a debilitating motivational factor) change and interact while they work on a demanding problem-solving task, and how perfectionistic strivings and concerns as well as their interaction predict these changes. Latent growth curve modeling within the structural equation modeling framework was used to examine change during the task over four measurement points, and latent variable interaction analysis was conducted to see how these changes were predicted by perfectionistic tendencies. Self-efficacy declined and anxiety increased significantly, and both their initial levels and changes correlated moderately. The initial level of self-efficacy was positively predicted by strivings, and negatively by concerns, whereas the initial level of anxiety was negatively predicted by strivings, and positively by concerns. As to changes during the task, only strivings predicted less steep decline in self-efficacy. Somewhat unexpectedly, the effects of the latent interaction of strivings and concerns were non-significant.

1. Deepti Bora (University of Jyväskylä, JYU) and Minna Torppa (JYU). *Examining associations between home literacy environment factors and children's language and literacy skills in a sample from India*

Home literacy environment (HLE) is a context-specific social construct that embeds dynamics between factors such as households' socio-economic status, adults' formal education and literacy level, formal and informal activities at home, and literacy-related resources. It is well established that HLE is associated with children's language and literacy skills. With most evidence stemming from developed and educated countries, there is a need to examine HLE in economically and culturally diverse contexts. Based in India, our study is in the context of children growing up in low-income families with limited formal education and learning English as a second or third language. Studying in English-medium public schools, these children face disconnect between home and school language, and lack English language-rich environment. In this study, we aim to examine the association between parental factors, literacy environment factors and students' language and literacy skills. A demographic survey was conducted with 60 parents from low-income households in India. The participants responded to questions on parental factors – father and mother's formal education and English literacy level; and literacy environment factors – book access, digital exposure, informal instruction in English and mother tongue, formal instruction in English and mother tongue, and tuition. In addition, 60 students were tested on the oral- and paper-based measures of phonological awareness, vocabulary and reading skills. Associations between the factors and outcome measures were analysed using correlations and hierarchical linear regression. According to the preliminary findings, there are statistically significant associations between HLE factors such as mothers' formal education level, formal and informal instruction at home and outcome measures English letter knowledge, phonological awareness, reading skills, and oral vocabulary skills of students. In this presentation, we will present our results, sharing association between HLE factors and students' literacy and language skills, and its potential implications on literacy interventions.

2. Riikka Heikkilä (Niilo Mäki Institute, NMI), Sara Huotari (University of Jyväskylä), Pirita Korpivaara (NMI), Roosa Karhunen (NMI). *The association of rapid automatized naming (RAN) with academic skills and attention in children aged 5-16*

Rapid automatized naming (RAN) refers to the ability to fluently retrieve familiar labels from memory, such as colors or objects. Previous research has found it to predict fluency especially in reading but also in basic arithmetic skills. The aim of this study was to examine naming speed in children from age five to ninth grade and investigate how different naming subtasks in school-aged children are associated with academic skills and attention. The study also included a new task involving the rapid naming of visually presented quantities. Data from the new standardization of Rapid Naming Test – RAN (n = 2 003) were utilized. The study analyzed naming speed for colors, objects, letters, numbers, quantities, and mixed stimuli in children and adolescents aged 5–16 years, as well as the association of naming speed with reading and arithmetic fluency and attentional skills. The study showed that naming skills develop throughout elementary school. They were strongly associated with both reading and arithmetic fluency, explaining approximately 20–40% of the variance in academic skills. A relationship was also found between RAN and attentional skills, particularly inattention, although weaker than with academic skills (explaining 5–20% of the variance). The research findings support the notion of RAN as a skill useful to assess as part of learning disability evaluations, as it is strongly associated with reading and arithmetic fluency. Rapid naming of quantities appears to be particularly associated with arithmetic fluency, making it an interesting future research subject as a predictor of arithmetic skills.

3. Grace Joplin Ferreira (University of Helsinki). *The deficit approach to autism language and communication research*

This oral presentation aims to shed light in one the most dominant theoretical approach to autism language and communication research: the deficit-based approach. The deficit-based approach is dominant in research since earlier studies on autism, since 1911 when Bleuer presented the term autism to describe schizophrenic children. How can autistic students be motivated if most of what we know about language in autism is presented with the medical paradigm based on deficits and impairments? What are the difficulties implied in adopting the deficit-based approach? Its time to rethink strategies not only for the sake of autistic students well-being but mental health too, since autistic people have little knowledge of their skills. To date, only Sweden, UK, Australia, USA are the strongest pioneers in applying a strenght-based approaches to research in autism language, its time for Fin-

land to be part of this academic landscape too. This presentation discusses trends in using a strength-based approach in many areas including education.

4. Pinja Jylänki (University of Oulu, UO), Katja Sutela (UO), Johan Korhonen (Åbo Akademi University), and Riikka Mononen (UO). *Reducing math anxiety in primary school classrooms: A pilot intervention study*

Math anxiety has been negatively related to math performance already during primary school years (Namkung et al., 2019). Two intervention approaches, cognitive and emotional support, have been recognized to be effective in reducing math anxiety and improving math performance (Sammallahti et al., 2023). However, there is still a need to develop effective intervention programs. Thus, the present study aimed to investigate the effects of two brief interventions that included either relaxation (i.e., emotional support; N = 29) or math activities (i.e., cognitive support; N = 30) on reducing math anxiety and improving math performance in 5th and 6th grade students (M = 12.3, SD = ± 0.60 years; girls 53,8%). The intervention effects are compared to an active control group that participated in body rhythm activities (N = 22). Each program included nine sessions (4 to 6 minutes), three times a week for three weeks at the beginning of math lessons. Students' math anxiety (MARS-E) and math performance (arithmetic fluency and number processing; FUNA-DB) were measured before and after the intervention. The data collection regarding the intervention post-measurement is still in process and thus, the intervention results will be presented and discussed at the OPPIVA 2024 conference.

5. Lotta Uusitalo (University of Helsinki). *Neuromyths held by Finnish student-teachers*

Neuromyths are commonly held misbeliefs about the brain believed by both the general public and educators. OECD (2002) described a neuromyth as "a misconception generated by a misunderstanding, a misreading, or a misquoting of facts scientifically established to make a case for the use of brain research in education and other contexts". The endorsement of neuromyths in educators has been widely studied (see Torrijos-Muelas et al., 2021, for a review). Despite having been repeatedly debunked, the neuromyths continue to circulate as scientifically based truths all over the world. In the current study, we examined 502 student- teachers about their beliefs in the common neuromyths. In an online survey, participants responded to 15 items concerning general myths (such as "we only use 10% of our brain") and 30 myths related to neurodevelopmental disorders (such as "all children with dyslexia see letters backward"). Based on extensive existing literature, the questionnaire was originally developed by Jo Van Herwegen and her colleagues in the UK (see Gini et al., 2021). Our current study pilots the questionnaire in Finland and gives data to international comparisons. The results show that neurodevelopmental myths seemed to be better known than the general myths. The best-known statement in the general myths was "there are sensitive periods in childhood when it is easier to learn things" while the best-known item in the neurodevelopmental myths was "autism only occurs in boys". Variability existed in responses given by different student-teacher groups special education students debunking both kinds of myths better than early childhood teacher students. Neither age nor work experience seemed to affect the results. We suggest easy-access provision of neuroeducation resources to tackle the issue of sticky harmful myths in the educational field.

1. Henriikka Juntunen (University of Eastern Finland, UEF), Heta Tuominen (UEF), Markku Niemivirta (UEF), Jaana Viljaranta (UEF), Lars-Erik Malmberg (University of Oxford), Auli Toom (University of Helsinki), and Eija Räikkönen (University of Jyväskylä). *University students' situational motivation over a statistics course and relations to anxiety*

Prior research has shown that in addition to students' individual differences, different topics and situations may also have a significant influence on how a student expects to succeed, how valuable they view the studied contents and how costly they perceive the studies. However, studies examining this kind of in-the-moment expectancy-value-cost motivation among university students are still scarce. Additionally, although research has established a connection between expectancy-value-cost motivation and emotional and psychological well-being (e.g., exhaustion), less is known about the predictions of highly domain-specific statistics anxiety, a significant issue in many higher education studies. Utilising an intensive longitudinal design and multilevel structural equation modelling approach, we investigated the variability of Finnish university students' (N = 154) situational motivation (expectancy-value-cost) and statistics anxiety during a statistics course, and how the situational motivational appraisals predict statistics anxiety on three levels: situation, topic, and individual. The results showed variability in motivation and anxiety on all levels, but the largest proportion of variability was on the individual level while the least was located on the topic level. On all three levels, we identified a positive association between costs and statistics anxiety. On the situation level, both expectancies and values were negatively associated with anxiety, and expectancies were negatively associated with anxiety also on the student level. The findings highlight the importance of examining students' in-the-moment motivation and anxiety for a more in-depth understanding of the diverse contextual, subject-specific, and individual differences that influence students' multifaceted motivation and of the relations between motivation and statistics anxiety.

2. Kukka-Maaria Polso (University of Helsinki), Heta Tuominen (University of Eastern Finland, UEF), Petri Ihantola (University of Jyväskylä), and Markku Niemivirta (UEF). *Cross-domain motivational profiles predicting the choice of STEM vs. non-STEM vocational programmes*

According to the Situated Expectancy-Value Theory, students' educational choices are predicted by the intraindividual hierarchies of their domain-specific motivational tendencies: the probability of choosing a task increases when a student anticipates success in it more likely than in the other options. While empirical person-oriented research has found evidence for such predictions among students opting for tertiary education, of practical and theoretical importance is also whether similar dynamics apply to younger students selecting vocational upper secondary programmes. Thus, the present study investigated how adolescents' cross-domain expectancy-value-cost profiles in math and language arts at the end of basic education are associated with their choices between STEM vs. non-STEM vocational programmes. A nationally representative sample of Finnish students (N = 1,590 of whom 36.5% opted for vocational programmes) were classified into motivational profiles according to their subject-specific self-concepts, task values, and perceived costs with latent profile analysis. Next, profile differences in the likelihood of choosing a STEM programme were investigated using data from national registers. We identified five motivational profiles that were characterized by overall moderate, high, and low motivation, as well as predominant math and language arts motivation. As expected, students with predominant language motivation were the least likely to choose a STEM programme, while the other profiles did not differ significantly from each other. After controlling for gender, only the difference between predominantly math- and language-motivated students remained significant. These findings highlight the major role of gender in guiding the formation of both motivational tendencies and educational choices in adolescence.

3. Anna Widlund (Åbo Akademi University), Markku Niemivirta (University of Eastern Finland, UEF), Heta Tuominen (UEF), Henriikka Juntunen (UEF), Rebecca Lazarides (University of Potsdam), Wendy Symes (University of Potsdam), and Johan Korhonen (Åbo Akademi University). *Developmental relations of motivational-beliefs in math across the transition from primary to lower secondary school*

Grounding on situated expectancy-value theory, this study investigated developmental trajectories of students' motivational beliefs in mathematics (self-concept, interest, utility value, effort- and opportunity cost) across the critical educational transition from primary to lower secondary school (i.e., from Grade 6–7 in Finland). Finnish

students from 13 primary schools (N = 277) were followed three times in 2022–2023, across the transition from primary to lower secondary school. At each time point, students completed self-report measures of self-concept, interest, utility value, effort-, and opportunity cost, and a standardized mathematics test assessing arithmetic fluency. Latent growth curve models were used to investigate the development of students' motivational beliefs. Math performance at T1 was added to the model as a covariate. Preliminary results revealed that students' positively valenced motivational beliefs declined across the transition from 6th to 7th Grade, while opportunity and effort costs increased. Students' mathematics performance predicted initial levels of self-concept and interest in math positively, and effort and opportunity cost negatively. Performance was not related to utility value or any motivational construct's developmental rates (i.e., slopes). While accounting for performance, we found that initial math self-concept was positively related to effort cost development, suggesting that students with higher competence beliefs were more likely to experience elevated costs in math across the transition. Those who experienced less costs of opportunity in 6th Grade were also more likely to experience elevated opportunity costs over time. Lastly, we found that utility value in 6th grade was negatively related to math interest development. Taken together, these findings suggest that many experience declines in motivation across the transition to 7th grade. However, students starting out with more positive motivation (i.e., higher self-concept and utility value, lower opportunity cost) seemed to experience more challenges in motivation across the transition.

4. Antti-Tuomas Pulkka (National Defence University). *How are motivational orientations and perceptions of oneself as a learner related?*

This study examined the relationship between motivational orientations (mastery-intrinsic, mastery-extrinsic, performance-approach, performance-avoidance, and work-avoidance) and student's perceptions of themselves as learners (problem solving skills, persistence, effort, meticulousness, and attitude towards errors). The participants (N=184) were first year students from the National Defence University. Four groups based distinct profiles were identified: mastery-oriented (relative focus on both mastery-orientations, 43,5%), success-performance-oriented (focus on mastery-extrinsic and performance-orientations, 12%), disengaged (no specific focus, 32%), and avoidance-oriented (focus on performance-avoidance and work-avoidance, 12,5%). The groups differed in most of their perceptions of themselves as learners. Success-performance oriented followed by mastery-oriented held most positive perceptions of themselves when compared to the avoidance oriented. The distinction was most clear regarding meticulousness and problem-solving skills, whereas the groups were similar in the attitude towards errors. The effects were further examined by forming high-positive level (45,7%) and mediocre level (54,3%) groups based on students' evaluations of themselves as learners. The self-evaluation groups were cross-tabulated with the motivational groups, and the results showed that the mastery-oriented were overrepresented in the high-positive level group, and the disengaged and avoidance-oriented were overrepresented in the mediocre level group. The success-performance oriented were evenly distributed. In sum, it seems that focus on learning itself is related to more positive self-evaluations of one as a learner. Focus on performing, and avoiding effort and failure is related to more moderate self-evaluations in this respect. The relationship between focus on success in absolute sense and perceptions of oneself as a learned are not as straightforward.

5. Hannu Ojala (University of Eastern Finland, UEF), Heta Tuominen (UEF), and Markku Niemivirta (UEF). *Examining achievement goal profiles and learning outcomes in business studies*

This study investigates the relationship between achievement goal profiles and learning outcomes among business students. Drawing upon achievement goal theory, which underscores the role of motivation in education (Senko et al., 2011), we explore how students' future-oriented cognitive representations of competence-related aims influence various educationally relevant outcomes (Hulleman et al., 2010). We examine the achievement goal profiles of first-semester business school students and assess whether membership in specific achievement goal profiles predicts both short—and long-term educationally relevant outcomes. Utilizing data from 195 business students at a Finnish business school, in accordance with TENK guidelines, our analysis proceeds in three stages, following the approach outlined by Yu & McLellan (2020). Initially, we verify the factor structure of achievement goals through confirmatory factor analysis, employing the research instrument developed by Elliot and Murayama (2008) (cf. Pulkka & Niemivirta, 2013; You, 2021). Subsequently, we employ latent profile analysis (LPA) to identify distinct subgroups of students based on their achievement goals. Finally, we employ OLS and logistic regression to investigate the extent to which membership in these latent profiles predicts learning outcomes during the first semester and throughout the bachelor program. Our findings reveal that membership in the high-performance and high-mastery profile at the onset of the bachelor program significantly predicts superior learning outcomes in both the short and long term. This study contributes to our understanding of achievement goal profiles within the context of business studies, offering valuable insights that can inform educators and policymakers in designing effective interventions and support mechanisms to enhance student motivation and success in this field.

1. Johan Korhonen (Åbo Akademi University, ÅA), Ellen Sammallahti (ÅA), Anna Widlund (ÅA), and Bert Jonsson (Umeå University). *Developmental relations between mathematics anxiety and arithmetic fluency in elementary school students*

Although the negative link between math anxiety and performance is well documented (Namkung et al., 2019), there is a lack of longitudinal studies investigating elementary school students. In the few longitudinal studies that have been conducted, the results concerning causal ordering of math anxiety and performance have been mixed (e.g., Gunderson et al., 2018; Sorvo et al., 2019). Consequently, three competing models have been proposed: (1) the debilitating anxiety model proposes that high math anxiety will contribute to poorer math performance; (2) the deficit theory proposes that poor math performance will contribute to higher math anxiety; while (3) the reciprocal model postulates that both math anxiety and math performance affect each other reciprocally over time (Carey et al., 2016). The total sample consists of students in grade 4, 5 and 6 (N=856) from two municipalities in Western Finland. Data was collected in Fall 2022, Spring 2023, and Fall 2024. Math anxiety (MA) was measured with an adaption of the MARS-E (Henschel & Roick, 2017). The scale consists of 16 items measuring math anxiety on a 4-point Likert scale. Arithmetic Fluency (AF) was measured with the calculation fluency subtest from the digital Functional Numeracy Assessment – Dyscalculia Battery (FUNA-DB) (Räsänen et al., 2021).Preliminary analyses showed that MA and AF were meaningfully related within timepoints but longitudinally only AF negatively predicted subsequent MA from T1 to T2 across grades. No significant cross-lagged effects between MA and AF were found from T2 to T3. The multigroup cross-lagged panel model fitted the data well, χ^2 (15) = 33.134, *p*< .001, CFI = .981, TLI = .946, RMSEA = .065. This study will advance our knowledge on causal ordering of MA and math performance in elementary school students across three grade levels.

2. Riikka Mononen (University of Oulu, OU), Pinja Jylänki (OU), Anna Tapola (Åbo Akademi University, ÅA), and Johan Korhonen (ÅA). *Longitudinal relations between math anxiety and performance: the role of self-concept and interest*

While a negative relation between math anxiety (MA) and performance is well-documented in the literature, we still lack research about the directionality of this relationship, and the roles of motivational factors in it. In this study, we investigated the longitudinal relations of MA and math performance from the 4th to 5th grade, and how math self-concept and interest predict MA and performance. Finnish students' (n = 345) MA (cognitive and affective dimensions) and math performance (multi-digit arithmetic fluency) were measured twice, and math self-concept and interest once in the 4th grade. Cross-lagged panel model showed that grade 4 math performance predicted grade 5 MA, both cognitive (β = –.14) and affective (β = –.19) dimensions, but not vice versa, thus supporting the theoretical Deficit Model of MA. When motivational factors were included in the model, grade 4 math performance predicted grade 5 affective MA (β = –.14). Math interest was a significant predictor of grade 5 affective MA (β = –.20), whereas math self-concept predicted only grade 5 math performance (β = .17). As our results follow the Deficit Model of the directionality between math performance and MA, in school practice, emphasis should be given in supporting students' math skills and interest, which in turn, may help in reducing MA. Lack of interest in math could also be considered as a risk factor for experiencing MA, especially the affective dimension of it.

3. Hans Lehikoinen (University of Eastern Finland, UEF) and Markku Niemivirta (UEF). *Interrelationships between mathematics self-efficacy, test anxiety, and performance in co- and solo-taught classrooms*

Math self-efficacy and test anxiety are central to student learning and motivation. Yet, they are often studied separately in relation to performance, and the influence of instructional approaches on their dynamics is often overlooked. In this study, we examined i) how math self-efficacy, test anxiety, and test performance change and are related to each other over time, and ii) whether these changes are predicted by the instructional condition (co-taught vs. solo-taught classes). Participants were 70 sixth-grade students co-taught in mathematics by three co-teacher dyads, and 76 students taught by solo teachers. Students completed measures of task-related self-efficacy and test anxiety at the beginning and at the end of the school year. The data also included pre- and post-measures of low stakes mathematics test performances. Cross-lagged panel modeling was used to analyze the data. The analyses indicated that the stability of test anxiety was higher than that of self-efficacy. No reciprocal predictions were found between self-efficacy and test anxiety. However, prior math performance predicted both the level and change in self-efficacy, and the change in self-efficacy predicted later math performance. Changes in motivation and math performance were independent of the teaching condition. In conclusion, the lack of reciprocal predictions between math test anxiety and self-efficacy suggests that their relationship may

be more nuanced and complex compared to direct relationship. The association between performance and self-efficacy demonstrated a cyclical relationship, highlighting the central role of fostering students' self-efficacy for academic success. Surprisingly, the instructional condition did not predict changes in motivation or performance. These findings underscore the need for further research to understand not only the relationship between task-related self-efficacy and test anxiety, but also how to better support students' motivation and learning in mathematics.

4. Pekka Räsänen (Turku Research Institute for Learning Analytics, University of Turku, UTU) and Sonja Julkunen (UTU). *The development of multiplication skills in Finnish schools: Data from a large cross-sectional online digital assessment*

Multiplication skills are foundational in mathematical development, serving as building blocks for advanced concepts. Mastery of multiplication tables and the ability to perform multiplicative calculations efficiently underpin many areas of mathematics, including division, fractions, algebra, and even geometry. This proficiency aids in the understanding of mathematical relationships and patterns, enabling problem-solving and critical thinking. Moreover, multiplication skills are academic tools and practical skills that enhance numerical literacy and enable quick mental calculations in various professional fields. In educational settings, strong multiplication skills boost confidence and academic performance in mathematics and inspire further exploration and achievement in STEM fields. The cognitive benefits of learning multiplication extend beyond math, encompassing memory, attention to detail, and sequential thinking, all of which contribute to overall cognitive development. Therefore, instilling effective multiplication techniques early is crucial for fostering a mathematically competent and confident individual. A very limited number of studies have analysed multiplication performance in Finland. No prior studies have described the development of multiplication skills. Here, we present the results from a dataset of cross-sectional study (the municipal FUNA assessments) from 2021 for grades 3 to 9 (N=7080). The task was a pseudo-random 2-minute digitally presented multiplication task. For the presentation, we analysed the grade-level development of multiplication fluency. Four factors contributed significantly to the multiplication skills: Grade, sex, school language and home language. We illustrate the pathways of development and how these effects and their interactions affect the pathways.

5. Daria Khanolainen (University of Jyväskylä), Elsje van Bergen (Vrije Universiteit, Amsterdam), Asko Tolvanen (University of Jyväskylä, JYU), Tuire Koponen (JYU), Jenni Salminen (JYU), and Minna Torppa (JYU). *Math ability rating questionnaire for adults: Developing the new measure*

Identifying math difficulties is the first step toward offering adequate support to those struggling. Mathematical anxiety, often manifesting itself as reluctance to complete mathematical tests, is common among those with mathematical difficulties. It complicates the identification process and may result in systematic data missingness in research when standard mathematical tests are used without oversampling those on the lower end of skill distribution. To address this issue, the development of questionnaire-based screening tools is imperative. Such measures can be used both for identifying adults who flew under the diagnostic radar at a younger age and for screening children who might be at familial risk of mathematical difficulties. The present study aimed to develop the Math Ability Rating Questionnaire, a valid and reliable self-rating scale designed for adults, available in both full and brief versions. The new measure was developed with a sample of Finnish adults unselected for their skills (N=292) who were asked 1) to complete four mathematical tests and 2) to fill out a 30-item questionnaire. The data was subjected to item response theory combined with confirmatory factor analysis allowing us to determine which combination of questionnaire items was most strongly associated with mathematical test scores. Through this analysis we identified the best items for both the full and brief MARQ versions (19 and 5 items respectively). In our conference presentation, we will share how both versions were developed, what psychometric properties they have and where each of them can be most effectively utilized.

1. Lais Oliveira Leite (University of Eastern Finland) and Francisca Geny Lustosa (Federal University of Ceará). *The Pro-Inclusion Project at the Federal University of Ceará: Providing specialized educational assistance for students with special needs.*

My doctoral research investigates the development of student teacher professional agency (STPA) during teacher education in Finland and Brazil, aiming to equip future educators with the skills for contextualized, autonomous, and continuous professional growth. Fostering STPA is crucial for preparing teachers to implement inclusive education and address students with special educational needs. To facilitate international collaboration between the involved universities in my PhD, I established a joint degree program between the University of Eastern Finland (UEF) and the Federal University of Ceará (FUC), marking a significant milestone towards promoting STPA in both universities focused on supporting student teachers to adopt inclusive education practices throughout their future careers. This poster introduces the Pro-Inclusion project at the Faculty of Education in FUC (Brazil) as a critical step to initiate discussions about potential collaborations in education and research in this field. In response to the concerning statistic that 67% of Brazilians with disabilities lack formal education, the Pro-Inclusion project was launched in 2013 at FUC. Led by Professor Geny Lustosa, the project provides specialized educational support at the Multifunctional Resource Room (MRR) for students with disabilities, including autism spectrum disorder, learning difficulties and high abilities. The MRR is equipped with various pedagogical materials, tech resources, and different accessibility equipment (machines, computers, Braille printer etc.). With these resources, the project brings social impact by conducting teaching, research, and community-driven initiatives related to specialized educational assistance from Basic to Higher Education institutions. The project is nationally acclaimed for its holistic approach, including service-learning, active study groups, informational materials, social media engagement, podcasts, and lectures aimed at enhancing the quality of education for students with disabilities in public education institutions. By addressing the systemic challenges faced by students with disabilities, Pro-Inclusion strives to create a more equitable and inclusive environment in schools and universities.

2. Timi Tervo (Tampere University). *The effect of gamified foreign language speech sound training on native language decoding*

Challenges in L1 learning are often connected to challenges in foreign languages. Previous research on game-based elements in foreign language learning have suggested benefits to speech sound and word learning. The extent to which spoken language training effects generalize to other areas of language remains unclear. This study investigated the effect of gamified foreign language speech sound training on L1 decoding. In the present study, participants were 65 Finnish children ages 6–7 (M = 7.13) studying in grade one. Children were assigned to a test group of 34 students and a control group of 31 students. The test group played the language learning game "Pop2Talk" during a four-week intervention, four days a week for around 15 minutes at a time. Children produced English vocabulary based on imitation and were given feedback by an automatic speech recognition tool. Additionally, all participants took part in standard English and Finnish education. Before and after the intervention period, the test and control groups completed the ALLU TL2 picture-word matching test to assess decoding rate. Pre and posttest decoding scores were submitted to an analysis of variance which found a significant interaction Group × Session, $F(1, 63) = 8.191$, $p = 0.006$, $\eta p2 = .12$. Test group decoding score improved significantly (39.53 vs. 46.26; $p = <0.001$) while that of the control group did not (39.55 vs. 41.73). The results indicate that training foreign language speech sounds can support children's L1 decoding. The findings are in line with previous research suggesting that targeted phonological training can produce learning effects in the short term. Language transfer and common underlying proficiencies should be considered in the assessment and support of language development. A comprehensive view of language learning can support the early detection of dyslexia and the assessment of language development of multilingual children.

3. Joshua Kwasi Tsatror (University of Lapland). *Assessing the roles of self-regulated learning strategies on academic performance and satisfaction among online students in Ghana*

Evidence from available literature on self-regulated learning posit a strong relationship between self-regulation, metacognitive, effort regulation and academic performance. This novel research aims to explore across performance, the extent of the relationship between the above mentioned variables and to discover which of the skills of self-regulated learning will be most relevant for 120 undergraduate online university students in selected public and private university students in Ghana. The study adopts a mixed method design with the purpose of unearthing the use of self-regulated learning strategies in addition to better understanding the experiences of participants in various online learning environments in Ghana. Responses gathered via qualitative interviews and

quantitative surveys, open- and closed-ended questions are compared and juxtaposed to unravel the level of corroboration between the two data sets. This study provides significant contributions towards filling the existing gab in literature on how SRL strategies impact academic performance and learning satisfaction in online environments in the African and most especially, the Ghanaian context thus providing a novel context for discussing the impacts of various SRL variables in online learning environments. The outcome of this is vital for school administrators and teachers by guiding them in designing, planning and delivering online lessons to tertiary students in Ghana and African in general thus making significant contribution to the development policies that will aim at improving online education in Ghana.