

Conference Annotations:

- The workshop by Leen Catrysse, originally planned for Monday 18th of July, has been moved to Friday 22nd of July at 09:00 due to unexpected circumstances.
- The workshops by Charalambos Charalambous on Monday 18th and Tuesday 19th of July will be streamed online, both in room 252.

Keynote I 1

18 July 2022 10:30 - 11:30
Auditorium 2A
JURE 2022 Keynote

Fostering early career researchers' wellbeing – a review of the evidence and manifesto

Keywords: Action Research, COVID-19, Emotion and Affect, Motivation and Emotion

Interest group:

Chairperson: Judith Loopers, University of Groningen, Netherlands

Researchers have more risks to suffer from mental health than the general population. This is especially true for doctoral students, with pre-COVID figures showing that 50% experiencing psychological distress over the time of their PhD. This can lead to drop out and decreased quality of life for students themselves. With this in mind, the Researcher Mental Health Observatory (ReMO) set out to gather the existing evidence on the causes and prevalence of the issue, as well as best practices to counter it. In the first part of this talk, I will offer a review of this evidence, showing that the issue stems from systemic issues more than from individual, personal, ones. This insight forces us to look for ways in which the academic system can help individual researchers, who cannot take the blame and responsibility of mental health alone. It also calls for new (action-)research. In the second part of this talk, I will outline key actions the community can undertake to initiate change at the individual, institutional, or political level.

Fostering early career researchers' wellbeing – a review of the evidence and manifesto

Presenting Author:Stéphanie Gauttier, Grenoble Ecole de Management, France

Researchers have more risks to suffer from mental health than the general population. This is especially true for doctoral students, with pre-COVID figures showing that 50% experiencing psychological distress over the time of their PhD. This can lead to drop out and decreased quality of life for students themselves. With this in mind, the Researcher Mental Health Observatory (ReMO) set out to gather the existing evidence on the causes and prevalence of the issue, as well as best practices to counter it. In the first part of this talk, I will offer a review of this evidence, showing that the issue stems from systemic issues more than from individual, personal, ones. This insight forces us to look for ways in which the academic system can help individual researchers, who cannot take the blame and responsibility of mental health alone. It also calls for new (action-)research. In the second part of this talk, I will outline key actions the community can undertake to initiate change at the individual, institutional, or political level.

Session A 1

18 July 2022 11:30 - 13:00
Room 256
Single Paper
Learning and Special Education

Content Analysis in Special Education

Keywords: At-risk Students, Conceptual Change, Content Analysis, Educational Challenges, Interdisciplinarity, Science Education, Special Education

Interest group: SIG 15 - Special Educational Needs

Chairperson: Ijtihadi Kamilia Amalina, University of Szeged, Doctoral School of Education, Hungary

Learning conditions of German street youths in science lessons at street schools

Keywords: At-risk Students, Content Analysis, Educational Challenges, Science Education

Presenting Author:Matthias Fischer, University of Education Heidelberg, Germany; **Co-Author:**Manuela Welzel, University of Education Heidelberg, Germany

In Germany, there are about 37,000 street youths. Many of them face various challenges in mainstream schools, which leads to a decline in school performance. Consequently, a great number of street youths obtains low school-leaving qualifications. In addition, an above-average number of street youths drop out of school early. One reason for their difficulties in mainstream schools is that due to their life on the street and their past, they have special learning conditions that are not (or cannot be) catered to in the regular school system. Consequently, there is a need for alternative school projects that offer formal education to street youths while considering their circumstances and needs. In Germany, there are several street schools that try to offer quality education to street youths. They also teach science subjects, which are and must be an integral part of any educational canon. However, there are still no scientifically validated findings on these special learning conditions of street youths in science education. In this research project, data on these special learning conditions is collected through guided expert interviews with science teachers and those responsible for the street schools found in Germany.

Disability as Distinguishing Factor – A Review of the Current Literature on Inclusive Education

Keywords: Conceptual Change, Content Analysis, Interdisciplinarity, Special Education

Presenting Author:Tom Jannick Selisko, Universität des Saarlandes, Germany; **Co-Author:**Christine Eckert, Saarland University, Germany; **Co-Author:**Franziska Perels, Saarland University, Germany

Although the inclusion of children with disabilities into general educational settings can look back on decades of discourse, it is still contested what is considered as inclusive education. The presented literature review focusses on the definition of inclusive education in peer-reviewed publications since the UN-Convention on the Rights of Persons with Disabilities (2006). Based on the theoretical distinction between three concepts of education (*exclusion*, *functional inclusion* and *full inclusion*) for children with special educational needs, a total of 685 reports were coded by application of structuring content analysis (Mayring, 2015). Categories were based on coherent triads of model of disability, general learning theory, and placement of children ascribed with a disability. Analysis reproduced the existing conflict between functional- and full inclusive concepts (e.g. Operti, 2015). Furthermore, in the period of observation an increase in reports containing a full inclusive concept was observed, while the number of reports with functional and exclusive concepts appear to be stable. Predominantly, reports portray qualitative research methods, especially those representing a full inclusive concept.

Session A 2

18 July 2022 11:30 - 13:00
Courtyard (Ground Floor)
Poster Presentation
Motivational, Social and Affective Processes, Teaching and Teacher Education

Teaching and Teacher Education

Keywords: At-risk Students, Attitudes and Beliefs, Collaborative Learning, Competencies, Cooperative/Collaborative Learning, COVID-19, Emotion and Affect, Mixed-methods Research, Motivation and Emotion, Pre-service Teacher Education, Qualitative Methods, Social Interaction, Special Education, Synergies between Learning; Teaching and Research, Teacher Effectiveness, Teacher Professional Development, Teaching/Instruction, Video Analysis

Interest group: SIG 08 - Motivation and Emotion, SIG 11 - Teaching and Teacher Education

Chairperson: Erdem Onan, Maastricht University, Netherlands

Leadership & Stress in Crisis Teams Taking Stock After Two Years of Crises

Keywords: Collaborative Learning, COVID-19, Motivation and Emotion, Social Interaction

Presenting Author: Corinna Rott, Universiteit Maastricht, Germany

The current covid-19 crisis has been present for over two years, influencing almost every country worldwide. As of December 16, 2021, the outbreak of respiratory coronavirus disease (COVID-19) caused the death of 5.3 million people. New York, which used to be the landmark of innovation, architecture, and westernized success, was reported as one of the deadliest places on earth, burdened by 598 deaths per day in March 2020 (Statistika, 2021). While there are substantial discussions about the decisions made, the coronavirus crisis has also been referred to as a crisis of leadership (Tousih, 2020). Crisis leaders faced a tremendous pressure to perform while being the center of the public's forced-to-say-home attention. Unsurprisingly, crisis leaders reported struggling to detach as the pandemic was and still is an omnipresent topic. Blurring the boundaries between work life and their private life. To unravel the stress process of crisis leaders, the investigative team conducted an exploratory interview study. This research aimed to explore stressors of crisis leaders and investigate alterations in team leader behaviours due to an elevated stress level.

Investigating the existing stereotypes towards students with special educational needs

Keywords: At-risk Students, Attitudes and Beliefs, Special Education, Teaching/Instruction

Presenting Author: Charlotte Sophie Schell, German Institute for International Educational Research (DIPF); IDeA-Research Center, Germany

This study is part of a project investigating the significance of stereotypes for the quality of special needs assessment and diagnostics in an inclusive school context. Practice and research show that stereotypes about learners with special educational needs (SEN) are widespread and also present among student teachers. Such stereotypes could be barriers to professional diagnosis if they lead to overlooking or overestimating certain information. In this study, we aim to describe the stereotype content about children with special educational needs (SEN) of student teachers; focussing on children with Down Syndrome, Autism Spectrum Disorder (ASD) and learning difficulties. To do so, we plan to interview a small sample ($N = 10$) of student teachers (study 1a). We will then use their answers to construct a questionnaire to measure and verify those explicit stereotypes using bigger samples ($N = 200$) (study 1b). We also plan on measuring implicit stereotypes at a later point in time.

Exploring the role of educational stakeholders in designing a learning network for DBDM

Keywords: Collaborative Learning, Qualitative Methods, Synergies between Learning; Teaching and Research, Teacher Professional Development

Presenting Author: Ariadne Warmoes, Vrije Universiteit Brussel (VUB), Belgium; **Co-Author:** Iris Decabooter, Hasselt University, Belgium; **Co-Author:** Els Consuegra, Vrije Universiteit Brussel, Belgium; **Co-Author:** Katrien Struyven, Hasselt University / Vrije Universiteit Brussel, Belgium; **Co-Author:** Roos Van Gasse, University of Antwerp, Belgium

The use of data or "data-based decision-making" (DBDM) in education has been an important research topic as research shows it can contribute to school improvement (e.g. Schildkamp, 2019). Mandinach and Gummer (2016) indicate that data literacy is a key competence of DBDM. However, data literacy is generally poorly developed in schools (e.g. Verhaeghe et al., 2010). Rincon-Gallardo and Fullan (2016) suggest collaborations with external parties to gain expertise that is needed but lacking in schools. The implementation of a professional learning network (PLN) with different educators, stakeholders and experts is put forward as a strategy to increase educators' data literacy. A needs-analysis of Flemish educators and educational stakeholders is set up to determine their professionalisation needs with regards to DBDM and inventarise their expectations and ideas for the design of a PLN. Focusgroups ($n=6$) are conducted between January and March 2022. Based on the results of the focus groups and previously conducted systematic literature review and expert interviews, blueprints for professional learning networks will be designed. The results and blueprints for the learning network will be presented at JURE 2022.

Competence and Practices of Teachers in Germany providing Cooperative Learning Opportunities

Keywords: Competencies, Cooperative/Collaborative Learning, Mixed-methods Research, Teaching/Instruction

Presenting Author: Nora Ries, German Institute for International Educational Research / DIPF, Germany

Numerous studies show that cooperative learning methods offer a particularly high potential for motivation and the possibility of stimulating students to engage with learning content in a deeper, cognitively activated manner through interaction between peers. However, research also shows that learning in small groups is not automatically good, not equally effective for all students and not equally suitable for all task formats and learning goals. It also seems to be quite challenging for teachers to use cooperative learning as a teaching method, since cooperative learning requires both, high professional competence and supporting contextual conditions.

Our study investigates German teachers' knowledge, motivation, and beliefs about cooperative learning and what challenges and opportunities they experience when offering group work at school. In doing so, we examine which contextual conditions and teacher-related characteristics (e.g., knowledge, motivation and beliefs concerning cooperative learning) favor or inhibit the use of high-quality cooperative learning opportunities in the classroom. Results promise to provide important implications for promoting the high-quality use of cooperative learning in schools.

The Interplay of Student Teachers' Emotions and Their Evaluation of Classroom Management in Videos

Keywords: Emotion and Affect, Pre-service Teacher Education, Teacher Effectiveness, Video Analysis

Presenting Author: Isabell Tuscholka, University of Erfurt, Germany

Although classroom videos are integrated into teacher education more and more often, emotional processes during video observation – especially in relation to the presented teaching quality – remain underexplored. Therefore, the present correlational study aimed to investigate student teachers' video-related joy and anger with regard to the (perceived) effectiveness of classroom management in classroom videos. 617 student teachers observed four short video clips of primary school lessons, two of which represented examples of effective and two of improvable classroom management. After each clip, they rated their levels of video-related joy and anger and, subsequently, evaluated the perceived effectiveness of different classroom management aspects using rating items. A repeated measures MANOVA revealed that the participants felt significantly more joy and less anger when observing effective as opposed to improvable classroom management, indicating that the observed classroom management quality is a decisive factor regarding video-related emotional reactions of student teachers. Additionally, the students' own evaluation of classroom management effectiveness was associated positively with joy and negatively with anger, with mostly moderate to high correlations. These results imply that observer emotions regarding classroom management should be addressed both in teacher education and in research contexts to raise awareness of the topic and counteract evaluation bias.

Session A 3

18 July 2022 11:30 - 13:00

Room 250

Single Paper

Higher Education, Teaching and Teacher Education

Best of JURE - Paper Session

Keywords: Competencies, Conceptual Change, COVID-19, E-learning/Online Learning, Experimental Studies, Higher Education, Misconceptions, Multimedia Learning, Phenomenography, Pre-service Teacher Education

Interest group: SIG 03 - Conceptual Change, SIG 09 - Phenomenography and Variation Theory, SIG 11 - Teaching and Teacher Education

Chairperson: Rui Alexandre Alves, University of Porto, Portugal

Conceptual change using podcasts - Dispelling the learning styles myth among pre-service teachers

Keywords: Conceptual Change, Misconceptions, Multimedia Learning, Pre-service Teacher Education

Presenting Author: Julia Götzfried, University of Kassel, Institute of Educational Science, Germany; **Co-Author:** Victoria Bleck, University of Kassel, Institute of Educational Science, Germany; **Co-Author:** Lea Nemeth, University of Kassel, Institute of Educational Science, Germany; **Co-Author:** Frank Lipowsky, University of Kassel, Germany

The learning styles myth is prevalent among (pre-service) teachers. Current research findings emphasise the effectiveness of conceptual change texts in dissolving misconceptions. This benefit is explained by cognitive conflict evoked by contrasting misconceptions and facts, encouraging the reflection of one's own beliefs. In addition, a language appropriate to the addressee can positively influence the persuasiveness of the arguments presented. It is still an unanswered question if and under which conditions podcasts can influence conceptual change among pre-service teachers. Accordingly, this study investigates whether podcasts can induce conceptual change among pre-service teachers regarding their beliefs about the learning styles myth ($N = 185$). The experimental study is based on a 2 (conceptual change podcast vs. factual podcast) \times 2 (everyday vs. academic language)-design. Thus, four different podcasts represent the intervention. Students' beliefs about the learning styles myth were measured immediately before and after the intervention as well as 4 weeks later. The results demonstrate that conceptual change podcasts foster a stronger decrease in beliefs about learning styles compared to factual podcasts ($p < .001$, $\eta^2 = .08$). In addition, everyday language compared to academic language promotes a stronger decrease in beliefs ($p < .01$, $\eta^2 = .03$).

What can we learn from adult students' online learning experience to adapt to the COVID19 pandemic?

Keywords: COVID-19, E-learning/Online Learning, Higher Education, Phenomenography

Presenting Author: Olga Rotar, Higher School of Economics, Russian Federation

Adult students used to present the largest online student population before the COVID-19 pandemic. Thus, turning to their learning experiences can provide valuable insights on how to enhance online learning for other student groups. This article reports the results of the phenomenographic research on qualitative differences in ways of experiencing online learning by fifteen adult students enrolled in online programmes in a UK university and its partner institution in Russia. The analysis demonstrated that online learning is conceptualised in three ways: as an investment, as a process that brings structure, and as a process that enables and empowers learners, with distinctive features within each category. These findings are discussed in relation to the recent research on students' experience of online learning during the COVID-19 pandemic. Insights on how the results of the current research can enhance online learning of students who are required to study online due to the pandemic emergency are summarised.

Investigating the testing effect in a digital simulation for pre-service teachers

Keywords: Competencies, E-learning/Online Learning, Experimental Studies, Pre-service Teacher Education

Presenting Author: Lea Grotegut, Universität Paderborn, Germany; **Co-Author:** Katrin B. Klingsieck, Universität Paderborn, Germany

Digital simulations can train professional competence in a safe environment while avoiding severe consequences that might occur when practicing skills in the real world. The effects regarding knowledge acquisition as an important aspect of professional competence in digital simulations are, however, inconsistent. The present study set out to investigate how knowledge acquisition can be promoted in a digital simulation for pre-service teachers. To this means it took advantage of the so-called testing effect which refers to "the finding that retrieving information from memory can, under many circumstances, strengthen one's memory of the retrieved information" (Rowland, 2014). The aim of this study is to investigate whether a quiz implemented in a digital simulation for teacher education can promote knowledge acquisition when compared to a mind mapping control condition. To answer this question, we plan to conduct an experiment in January 2022 with $N = 140$ pre-service teachers who are randomly assigned to either a testing or mind mapping condition. We hypothesize that students in the testing condition achieve higher scores on the final knowledge test compared to students in the mind mapping condition. Results are discussed regarding the use of digital simulations to promote professional competence in pre-service teacher education.

Session A 4

18 July 2022 11:30 - 13:00

Room 252

Single Paper

Instructional Design, Motivational, Social and Affective Processes

Inquiry Learning

Keywords: Experimental Studies, Inquiry Learning, Learning Approaches, Mathematics, Metacognition, Mixed-methods Research, Motivation, Out-of-school Learning, Science Education

Interest group: SIG 06 - Instructional Design, SIG 08 - Motivation and Emotion, SIG 20 - Inquiry Learning

Chairperson: Natalie Santos, ISPA-Instituto Universitário, Portugal

What effects does Citizen Science have on the motivation of participating students?

Keywords: Inquiry Learning, Motivation, Out-of-school Learning, Science Education

Presenting Author: Lena Finger, Ruhr-University Bochum, Germany; **Co-Author:** Vanessa van den Bogaert, Ruhr-University Bochum, Germany; **Co-Author:** Jens Fleischer, Ruhr-University Bochum, Germany; **Co-Author:** Katrin Sommer, Ruhr-University Bochum, Germany; **Co-Author:** Joachim Wirth, Ruhr-University Bochum, Germany

Citizen Science (CS) is a modern means of science communication and pursues both scientific and educational goals. A central educational goal is to promote participants' motivation, however, empirical evidence is limited to date. Using a 1x2 between-subject design, a quasi-experimental field study was carried out with $N=142$ students to investigate whether participation in CS leads to increased motivation. Before the students participated in a CS project, they received either information about CS and their contribution to a real scientific study (CS condition) or no such information (control condition). Students who knowingly participated in CS had/showed significantly higher motivation than students in the control condition who performed the same activities without knowing about contribution to a real scientific study. Further, the perception of authenticity differed significantly in the two conditions and was shown to partially mediate the effect of knowing participation on motivation. Since authenticity is seen as an important condition for the development of motivation, CS seems to be a suitable tool for authentic science teaching in traditional classes.

Experimenting in Out-of-School-Labs - Effects on Concept Development and Metacognitive Judgments

Keywords: Inquiry Learning, Metacognition, Mixed-methods Research, Out-of-school Learning

Presenting Author: Sarah Hohrath, Ruhr-University Bochum, Germany; **Co-Author:** Sandra Aßmann, Ruhr-University Bochum, Germany; **Co-Author:** Heiko Krabbe, Ruhr-University Bochum, Germany; **Co-Author:** Maria Opfermann, University of Wuppertal, Germany

The acquisition of physical concepts through experimenting is part of school curriculums for physics. For conducting experiments on their own, students need to use metacognitive strategies, such as planning, monitoring and evaluating, and be able to judge their own learning and performance. Using these strategies may be challenging for some students and therefore, support by teachers, for example through varying the level of instruction during the experimentation process, is needed. The present study investigated how students acquire physical concepts through experimentation in a non-formal learning setting. We divided students among two interventions (guided vs. self-determined experimentation) and collected learning outcomes, judgments of learning, judgments of performance, cognitive load, flow and perceived authenticity. Further, we filmed some students during the experimentation process and interviewed them afterwards. Due to the current circumstances, the data collection took longer than planned and therefore, our current data analysis is preliminary. The final findings will be presented at the conference.

Learning by Observing Models Performing a Mathematical Hands-on Experiment

Keywords: Experimental Studies, Inquiry Learning, Learning Approaches, Mathematics

Presenting Author: Ramona Hagenkötter, Ruhr-University Bochum, Germany; **Co-Author:** Valentina Nachtigall, Ruhr University Bochum, Germany; **Co-**

Author:Katrin Rolka, Ruhr-University Bochum, Germany; **Co-Author:**Nikol Rummel, Ruhr University Bochum, Germany

Mathematical hands-on experimentation is intended to provide students authentic experiences with mathematics as a scientific endeavor by simulating typical mathematical activities, such as assuming or validating. However, mathematical hands-on experimentation in class is very time consuming, and the (meta-)cognitive demands during experimentation may overwhelm students and consequently can lead to lower learning outcomes. One potentially promising approach to using mathematical hands-on experiments in a less time-consuming and also less material-intensive way in the classroom and to reducing the (meta-)cognitive demands on students is the video-mediated observation of models performing experiments. The effectiveness of modeling examples can be affected by different model characteristics. Therefore, we investigated whether model characteristics, such as age or similarity, play a role when observing models performing a mathematical hands-on experiment with regard to students' perceived authenticity, their judgment of one's own level of knowledge and their knowledge acquisition. For this purpose, we conducted an experimental study with 116 10th graders who observed either peer models or scientists performing a hands-on experiment in a video recording. Preliminary descriptive results show that students who observed scientists performing the experiment perceived higher authenticity than those who observed peer models. Further results will be presented at the conference.

Session A 5

18 July 2022 11:30 - 13:00

Room 247

Single Paper

Assessment and Evaluation

Rasch Model and Rater Assessment

Keywords: Assessment Methods and Tools, Conceptual Change, Higher Education, Interdisciplinarity, Misconceptions, Quantitative Methods, Science Education

Interest group: SIG 01 - Assessment and Evaluation, SIG 03 - Conceptual Change

Chairperson: Ana Rodrigues de Lemos, Faculty of Psychology and Educational Sciences of the University of Porto, Portugal

Investigating Indonesian student misconceptions in science concepts and across gender and grades

Keywords: Assessment Methods and Tools, Conceptual Change, Misconceptions, Quantitative Methods

Presenting Author:Soeharto Soeharto, University of Szeged, Doctoral School of Education, Hungary; **Co-Author:**Benő Csapó, University of Szeged, Hungary

This study investigates students' misconceptions in science and explores the development of student misconceptions based on gender and grade school. The participants were collected via a stratified random sample of 856 students (52.3% females and 47.7% males) from the 10th grade, 11th grade, 12th grade, and undergraduate students in Indonesia. The paper-based test was administered. The research instruments in this study comprised a background questionnaire and a two-tier multiple-choice test. Rasch analysis was performed using WINSTEPS Software. 102 misfitting students were detected from the dataset using Rasch modeling. The results shows that the infit and outfit MNSQ value achieves acceptable fit (0.96 to 1) with good item reliability (.99) and person reliability (.80). All items had positive PTMA. The most difficult item to answer correctly is item 32 (redox reaction) in the chemistry task, whereas the easiest item to answer correctly is item 1 (kinetic energy) in the physics task. Student misconceptions had significant differences in terms of grade and gender. This study also confirmed that student understanding of science concepts is different based on specific concepts in science. Student misconceptions tend to be resistant to change across the grade, whereby boys' understanding of science concepts are higher than girls.

Examining the content validity of two-tier diagnostic test using rater assessment with Rasch model

Keywords: Assessment Methods and Tools, Misconceptions, Quantitative Methods, Science Education

Presenting Author:Soeharto Soeharto, University of Szeged, Doctoral School of Education, Hungary; **Co-Author:**Benő Csapó, University of Szeged, Hungary; **Co-Author:**Irwandani Irwandani, Universitas Islam Negeri Raden Intan Lampung, Indonesia

Content validity is one of the validity techniques for testing the suitability of an instrument. The content validity was measured by testing the instrument feasibility based on expert judgment or rater assessment. This study aims to examine the content validity of the two-tier diagnostic test to assess misconceptions in science and to check rater severity and bias interaction. The data were collected by distributing the test to experts in the science education field to be assessed for eight weeks. Seven raters were chosen to rate 32 tasks in the two-tier diagnostic test using the many facet rasch measurement (MFRM) with FACETS Software for data analysis. An evaluation sheet with 12 item categories was created to examine the content of the test based on three aspects, construction, material, and language. The result confirmed that all tasks are valid and reliable, with the infit and outfit MNSQ ranging from 0.68 logits to 1.56 logits and 0.7 for reliability (the acceptable values ranging from 0.67 to 1). Raters have different severity levels ranging from 1.56 logits to 4.39 logits with a wide dispersion (6.76 separations) in examining the test. Bias interaction has been detected between raters' major and task.

Rater assessment in evaluation student presentation performance using many facet rasch measurement

Keywords: Assessment Methods and Tools, Higher Education, Interdisciplinarity, Quantitative Methods

Presenting Author:Fitria Rifiyanti, University of Szeged, Doctoral School of Education, Hungary; **Co-Author:**Soeharto Soeharto, University of Szeged, Doctoral School of Education, Hungary; **Co-Author:**STEPHEN AMUKUNE, University of Szeged, Hungary; **Co-Author:**Son Nguyen Van, University of Szeged, Doctoral School of Education, Viet Nam; **Co-Author:**Khalil Aburezeq, University of Szeged, Doctoral School of Education, Hungary

Educators and academics have questioned the fairness of rater assessment in evaluating examinees' performance, especially in assessing presentation skills. Specific interest and the various examinee background are the common factors affecting the rater bias causing unfair and imperfect ratings in performance evaluation. The data were collected in a 13-week research seminar course in English. Six raters were chosen to rate 33 examinees using 18 item criteria. A training session is conducted to converge raters' perception in evaluating examinee performances. The MFRM was utilized to analyze rater-examinee interaction and bias factors. The results have confirmed that the instrument used is reliable and valid. The interaction between raters and other facets have been depicted using a variable map whereby the raters have different severity level in scoring student presentation in a research seminar course. The gender and academic major have been confirmed contaminating the rater assessment. Rater 6 scores female students higher than male students (Bias Size = 2.05). The academic major biases have also been identified among raters with linguistics and psychology major. Overall, The gender and academic major can contaminate the fairness and precision of rater assessment where the identified biased rater can be excluded to get reliable results.

Session A 6

18 July 2022 11:30 - 13:00

Room 254

Roundtable

Culture, Morality, Religion and Education, Learning and Social Interaction

Citizenship Education and COVID-19

Keywords: Action Research, At-risk Students, Citizenship Education, Climate Change, COVID-19, Qualitative Methods, School Effectiveness, Secondary Education, Social and Educational Injustice

Interest group: SIG 13 - Moral and Democratic Education, SIG 18 - Educational Effectiveness and Improvement

Chairperson: Mette Mari Wold Johnsen, Norwegian University of Science and Technology (NTNU), Norway

Global Citizenship Education and a Flourishing Earth

Keywords: Action Research, Citizenship Education, Climate Change, Secondary Education

Presenting Author:Maayke de Vries, Institute of Education, University of London, Netherlands

In a democracy, citizenship education is crucial, since this form of governance depends on active participation of its citizens and their ability to access and evaluate information, while overcoming inevitable disagreements. In a rapidly changing world, there is a need for active citizens who together aim to tackle major global issues such as climate emergency and the clustering of wealth. The concept of global citizenship gained popularity due to the interconnectedness of our daily lives and interdependency of our actions. The interdependency of our lives became even more clear through the ongoing global health pandemic Covid-19. The UNESCO (2015) framework for Global Citizenship Education (GCE) is a guideline that encourages transformative learning to nurture global citizens who understand the injustice in current-day global power structures and aim to take action. My own Action Research (AR) focusses on implementing such a pedagogy in secondary education. During the implementation, I realised the difficulty in recognising and capturing transformative learning experiences. Therefore, in this round table, I would like to converse with others about the conceptualisation of transformative learning and ways to acknowledge the occurrence of this in secondary education.

Challenges for School Development during COVID-19 – Coping with Heterogeneity

Keywords: At-risk Students, COVID-19, School Effectiveness, Social and Educational Injustice

Presenting Author:Fatmana Selcik, University Heidelberg, Institute of Educational Science, Germany; **Co-Author:**Nina Jude, University Heidelberg, Germany

The COVID-19 pandemic and the associated school closures posed a variety of challenges for the stakeholders involved, including pupils, parents, teachers, and school principals. School principals had to adapt teaching and learning to ever-changing, unpredictable conditions while considering the heterogeneous prerequisites of staff and students. The aim of this paper is to examine contextual factors of schools in Austria, Germany and Switzerland and to relate them to heterogeneity on school level. The paper investigates the challenges school principals faced during the 2020/2021 school year and analyse how they develop over time. This paper draws on findings from the longitudinal tri-national study that used online-questionnaires to assess school principals from Germany, Austria and Switzerland. Latent profile analyses are used to divide the schools into groups that reflect differences in the schools' perceived challenges. Four profiles are highlighted in this paper and composition effects are considered in terms of heterogeneity. Overall, schools with a heterogeneous student body are more likely to report major challenges during the pandemic than schools with a less heterogeneous student body. The results show that highly challenged schools in particular increased their focus on professionalization as the school year progressed.

Teaching practices for the promotion of citizenship in distance learning contexts

Keywords: Citizenship Education, COVID-19, Qualitative Methods, Secondary Education

Presenting Author:Rodrigo Mayorga, Pontificia Universidad Católica de Chile, Chile; **Presenting Author:**Paula Neira, Pontificia Universidad Católica de Chile, Chile; **Co-Author:**Patricia Ojeda Millahueque, Pontificia Universidad Católica de Chile, Chile

How did the COVID-19 pandemic impact schools, and particularly, citizenship education? Online teaching and distance learning processes are one of the main challenges schools have endured since 2020. Teachers had a more difficult time including in their classes instructional practices such as debating controversial issues, collective discussions and teamwork activities which impacted citizenship education processes. In this context, our study seeks to identify and analyze how teachers adapted citizenship instructional practices during the COVID19 pandemic in Chilean secondary schools and how new citizenship education practices emerged in this scenario, in order to evaluate their potential to provide adequate citizenship education to secondary students. Our project does this through in-depth monitoring of 6 Chilean teachers during the year 2021, analyzing their instructional practices and their students' distance learning experiences through qualitative ethnographic methods. In doing this we expect to contribute to the reformulation and adaptation of educational public policy as well as to rethink teacher training in educational contexts that include online teaching practices and/or distance learning processes.

Workshops I 1

18 July 2022 14:00 - 16:00

Room 250

JURE 2022 Workshop

Thinking differently about data for educational research: Our story

Keywords: Design-based Research, Mixed-methods Research, Quasi-experimental Research, Researcher Education

Interest group:

When we design research, think about research questions and analysis, there are a million different ways we can generate data to answer our questions. In this workshop, we will explore a range of ways we can work with data, some well known, some currently being tested in the field and others that are emerging. The aim of the workshop is to consider the flexibility of data generated in different ways, how it can be used and different questions we can ask using new approaches and mixed designs. To do this, we tell you the story of one specific questionnaire data set about teacher training which has been used for a range of analyses and in several different types of studies. We will look at the different analytic approaches, such as multilevel modeling and association rules analysis, and critically engage with the decision making around choosing these approaches, what different approaches afford and how they can be combined to provide new answers and generate new research questions.

Thinking differently about data for educational research: Our story

Presenting Author:Jo Tondeur, Vrije Universiteit Brussel, Belgium; **Presenting Author:**Sarah Howard, University of Wollongong, Australia

When we design research, think about research questions and analysis, there are a million different ways we can generate data to answer our questions. In this workshop, we will explore a range of ways we can work with data, some well known, some currently being tested in the field and others that are emerging. The aim of the workshop is to consider the flexibility of data generated in different ways, how it can be used and different questions we can ask using new approaches and mixed designs. To do this, we tell you the story of one specific questionnaire data set about teacher training which has been used for a range of analyses and in several different types of studies. We will look at the different analytic approaches, such as multilevel modeling and association rules analysis, and critically engage with the decision making around choosing these approaches, what different approaches afford and how they can be combined to provide new answers and generate new research questions.

Workshops I 2

18 July 2022 14:00 - 16:00

Room 252

JURE 2022 Workshop

Dispelling the Myth about the Looseness of the Methods Chapter in Qualitative Research

Keywords: Design-based Research, Mixed-methods Research, Qualitative Methods, Researcher Education

Interest group:

Content, Organization, and Other Writing Tips The Methods chapter is often thought as one of the easiest chapters to write both in quantitative and qualitative research. But what should this chapter include and how should it be organized? Dispelling the myth about its looseness when it comes to qualitative research, this workshop is intended to address this question by also providing useful writing tips. Discussed during the workshop will be issues such as the research design of a study; the context of the study and the author's autobiographical note; the sample and the sampling procedure; the data collection methods; the data organization and management; the data analysis procedures; as well as issues pertaining to the trustworthiness of the study and the measures need to be taken to promote different aspects thereof. Attention will also be given to ethical considerations when conducting and presenting a qualitative study.

Dispelling the Myth about the Looseness of the Methods Chapter in Qualitative Research

Presenting Author:Charalambos Charalambous, University of Cyprus, Cyprus

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Workshops I 3

18 July 2022 14:00 - 16:00

Room 256

JURE 2022 Workshop

Tackling social and educational disadvantages in educational settings: Methodological challenges

Keywords: Educational Challenges, Educational Policy, Social and Educational Injustice, Social Aspects of Learning and Teaching

Interest group:

Social Inequalities in general, and educational inequalities in particular, are consensually regarded as important problems that today's societies need to address and confront. Scientific research has been called upon to provide insights and help to tackle social and educational disadvantages in educational settings. How can researchers take up this giant but crucial task of conducting sound research that can be useful for meaningful policy building? In this workshop we will present and discuss the main methodological and conceptual challenges while developing research attempting to tackle educational inequalities. We will discuss the scope of studies and their methodologies, main drawbacks, possible alternatives and their feasibility. Key investigations will be used as concrete examples to inform and guide the discussion, including several research projects in which the authors have been involved, in particular the ISOTIS H2020 project.

Tackling social and educational disadvantages in educational settings: Methodological challenges

Presenting Author:Gil Nata, University of Porto, Portugal; **Presenting Author:**Sofia Guichard, University of Porto - Faculty of Psychology and Educational Sciences, Portugal; **Presenting Author:**Joana Cadima, University of Porto, Portugal

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Workshops II 1

19 July 2022 09:00 - 11:00

Room 256

JURE 2022 Workshop

Introduction to Systematic Literature Review

Keywords: Doctoral Education, Meta-Analysis, Researcher Education, Secondary Data Analysis

Interest group:

A literature review is a part of every doctoral thesis to embed the research problem to the wider context of the study field. However, if this review has been done systematically then it could be also published as an article itself. In this case there is a need to identify a research problem that could be solved by a synthesis of previously published studies. The problem should be innovative and relevant in a particular field of studies. In addition, there should be strictly followed methods for systematic search and systematic analysis of published studies and their outcomes to ensure validity and reliability of the review. Therefore, every PhD student would benefit from knowledge of conducting a systematic literature review. The workshop will be conducted by an associated editor of Educational Research Review, a journal that is specifically focusing on publishing literature reviews and is currently in the field of education one of the journals with highest impact factor in the world. The editor have also published several articles in the journal and will tell his story at the beginning of the workshop. Later on, the seminar will focus on learning how to conduct systematic literature review. In the seminar will be introduced the main phases of a systematic literature review according to the PRISMA model: formulating research questions, choosing search terms, search sources, conducting search, screening data sources, evaluation, selection based on inclusion criteria, matrix for data analysis. A very short introduction to the meta-analytic approaches will be also made.

Introduction to Systematic Literature Review

Presenting Author:Margus Pedaste, University of Tartu, Estonia

A literature review is a part of every doctoral thesis to embed the research problem to the wider context of the study field. However, if this review has been done systematically then it could be also published as an article itself. In this case there is a need to identify a research problem that could be solved by a synthesis of previously published studies. The problem should be innovative and relevant in a particular field of studies. In addition, there should be strictly followed methods for systematic search and systematic analysis of published studies and their outcomes to ensure validity and reliability of the review. Therefore, every PhD student would benefit from knowledge of conducting a systematic literature review. The workshop will be conducted by an associated editor of Educational Research Review, a journal that is specifically focusing on publishing literature reviews and is currently in the field of education one of the journals with highest impact factor in the world. The editor have also published several articles in the journal and will tell his story at the beginning of the workshop. Later on, the seminar will focus on learning how to conduct systematic literature review. In the seminar will be introduced the main phases of a systematic literature review according to the PRISMA model: formulating research questions, choosing search terms, search sources, conducting search, screening data sources, evaluation, selection based on inclusion criteria, matrix for data analysis. A very short introduction to the meta-analytic approaches will be also made.

Workshops II 2

19 July 2022 09:00 - 11:00

Room 254

JURE 2022 Workshop

The basics of structural equation modeling

Keywords: Meta-Analysis, Quantitative Methods, Researcher Education, Secondary Data Analysis

Interest group:

Structural equation modelling (SEM) is a very general statistical technique, as it has regression analysis, path analysis, and factor analysis as special cases. It is also possible to combine the advantages of these techniques, which makes SEM one of the most general and most flexible techniques available to researchers. As a result, SEM presently is one the most widely used techniques in the social and behavioural sciences. In this workshop you will be introduced to SEM and its applications, which can be useful in analysing your own data as well as in reading and understanding scientific articles in your field in which SEM is applied. The workshop does not require any prior knowledge about SEM.

The basics of structural equation modeling

Presenting Author: Suzanne Jak, University of Amsterdam, Netherlands

Structural equation modelling (SEM) is a very general statistical technique, as it has regression analysis, path analysis, and factor analysis as special cases. It is also possible to combine the advantages of these techniques, which makes SEM one of the most general and most flexible techniques available to researchers. As a result, SEM presently is one of the most widely used techniques in the social and behavioural sciences. In this workshop you will be introduced to SEM and its applications, which can be useful in analysing your own data as well as in reading and understanding scientific articles in your field in which SEM is applied. The workshop does not require any prior knowledge about SEM.

Workshops II 3

19 July 2022 09:00 - 11:00

Room 250

JURE 2022 Workshop

Mental Health & Wellbeing for Early Career Researchers (ECR)

Keywords: Educational Policy, Educational Psychology, Emotion and Affect, Researcher Education

Interest group:

Linking What We Know About Science and Policy to Your Everyday Life This workshop will provide a practical interactive space to engage with both the evidence base of researcher mental health and practical transversal skills to use in your everyday researcher life. Using the latest research from psychology alongside professional experiences from the ReMO COST Action network, this workshop will provide the following: A critical overview of the literature on PhD/ECR mental health and wellbeing - how can you apply this to your day-to-day? A sharing of best practices for building a local and regional research network that focuses on ECR mental health and wellbeing - lessons from the ReMO story? Take part in a practical networking exercise on the topic of researcher mental health and wellbeing. Utilising psychology to address imposter syndrome, mental health first aid, stress and productivity, and overall wellbeing.

Mental Health & Wellbeing for Early Career Researchers (ECR)

Presenting Author: Darragh McCashin, Dublin City University, Ireland; **Presenting Author:** Stéphanie Gauttier, Grenoble Ecole de Management, France

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Workshops II 4

19 July 2022 09:00 - 11:00

Room 252

JURE 2022 Workshop

Fitting an Enormous Volume of Data in the Results Chapter

Keywords: Mixed-methods Research, Qualitative Methods, Researcher Education, Writing/Literacy

Interest group:

Tips for Writing the Results Chapter in a Qualitative Study "Now that you have analyzed your data, start writing the Results chapter!" Easier said than done! Writing the Results chapter in a qualitative study can be particularly demanding for several reasons, including the authors' attempt to fit in an enormous volume of data. This workshop is intended to address this and other challenges by offering useful tips for writing this chapter. Discussed in this workshop will be issues including "the agony of omitting"; the selection and organization of findings in ways that tell a coherent story; the selection, presentation and discussion of excerpts; the "weighting" of different data; the importance of entertaining alternative explanations; and the need of presenting both convergent and divergent evidence.

Fitting an Enormous Volume of Data in the Results Chapter

Presenting Author: Charalambos Charalambous, University of Cyprus, Cyprus

Tips for Writing the Results Chapter in a Qualitative Study "Now that you have analyzed your data, start writing the Results chapter!" Easier said than done! Writing the Results chapter in a qualitative study can be particularly demanding for several reasons, including the authors' attempt to fit in an enormous volume of data. This workshop is intended to address this and other challenges by offering useful tips for writing this chapter. Discussed in this workshop will be issues including "the agony of omitting"; the selection and organization of findings in ways that tell a coherent story; the selection, presentation and discussion of excerpts; the "weighting" of different data; the importance of entertaining alternative explanations; and the need of presenting both convergent and divergent evidence.

Session B 1

19 July 2022 11:30 - 13:00

Room 254

Single Paper

Culture, Morality, Religion and Education, Educational Policy and Systems, Instructional Design

Citizenship Education

Keywords: At-risk Students, Attitudes and Beliefs, Citizenship Education, Cultural Diversity in Schools, Educational Policy, History, Instructional Design, Interdisciplinarity, Quantitative Methods, Social Sciences

Interest group: SIG 13 - Moral and Democratic Education, SIG 26 - Argumentation, Dialogue and Reasoning

Chairperson: Laura N. Peters, Carl von Ossietzky Universität Oldenburg, Germany

A multilevel analysis of factors contributing to teenagers' identification with Europe

Keywords: Citizenship Education, Cultural Diversity in Schools, Quantitative Methods, Social Sciences

Presenting Author: Beatriz Matafora, University Duisburg-Essen, Germany; **Co-Author:** Johanna Fee Ziemes, University of Duisburg-Essen, Germany; **Co-Author:** Hermann J. Abs, University of Duisburg-Essen, Germany

The European Union faces challenges which affect its collective identity. Some of the challenges are the Brexit (Ammaturo, 2019) and the revival of populism and extremism in many EU member states (Chopin, 2018). Therefore, the question of fostering a stronger European identity gains relevance in the long term. Education can be an important tool to foster such identities. It is important to identify what aspects of schooling can contribute to the development of a strong sense of European identity. Drawing on data from the German sample of the International Civic and Citizenship Study 2016, the aim of this paper is to increase the understanding of relevant school and schooling related variables that are relevant for the formation of an European identity. To achieve this, multilevel analyses on individual and classroom level introducing different independent variables were conducted. Results show that apart from having an European

background and being Christian or Atheist, learning about Europe at school is a positive predictor for a higher identification with Europe. This is positive as, in contrast to the other two factors, learning about Europe at school is something that can be easily changed for example by implementation of new curriculum guidelines.

Promotion of citizenship skills at school from the teaching of history

Keywords: Citizenship Education, History, Instructional Design, Interdisciplinarity

Presenting Author: Paula Neira, Pontificia Universidad Católica de Chile, Chile; **Co-Author:** Patricia Ojeda Millahueque, Pontificia Universidad Católica de Chile, Chile; **Co-Author:** Rodrigo Mayorga, Pontificia Universidad Católica de Chile, Chile

Promotion of citizenship skills at school from the teaching of history
Author: Paula Neira
Co-authors: Rodrigo Mayorga and Patricia Ojeda
Abstract: Citizenship education is understood as a transversal objective of education and must be promoted in all school subjects. However, history presents unique opportunities to promote the development of citizenship skills in students from the teaching of the discipline skills. Citizenship education should be promoted. Based on an extensive literature review, in this paper we present the proposal of a didactic sequence for the development of citizenship skills from the teaching of history. The sequence consists of five parts: contextualization, small group source work, whole class discussion, individual argumentative writing, and authentic final assessment. The purpose of the sequence is to promote in students the awareness of being agents of change and to develop the ability to take a stand against controversial issues arguing based on evidence. To illustrate with examples, the experiences of various schools of Santiago de Chile, where the sequence was implemented, will be used.
Keywords: Citizenship education, Historical thinking, citizen skills, agency.

Handling terror fear in school. The potential and promise of democratic citizenship

Keywords: At-risk Students, Attitudes and Beliefs, Citizenship Education, Educational Policy

Presenting Author: Martin Sjøen, Department of Teacher Education, Norway

Education for citizenship has been the subject of growing attention in policy and research over the past two decades. Yet alongside conventional assumptions that school can help young learners develop socio-political attitudes that support democratic attitudes and behaviours, there are growing political expectations on educators to actively prevent terrorism. These expectations have had implications for educational policy in Norway, as the objective of preventing terrorism was 'securitised' into the national curriculum in 2020. In this theoretical study, we scrutinise security governance in educational policy based on how precautionary counterterrorism logic can cause harmful and exclusionary pedagogical practices. We believe that a more promising and overlooked preventive potential in schools is the prevention of terror fear through democratic education. Here is where the empirical literature can be of great help as a number of studies reveal that constructive discussions in school can mobilise students to democratic engagement and thereby resist some of the social negative consequences of terror fear

Session B 2

19 July 2022 11:30 - 13:00

Room 249

Single Paper

Assessment and Evaluation, Instructional Design

Metacognition and Self-regulation

Keywords: Experimental Studies, Instructional Design, Metacognition, Primary Education, Secondary Education, Self-regulation, Student Learning, Writing/Literacy

Interest group: SIG 01 - Assessment and Evaluation, SIG 16 - Metacognition and Self-Regulated Learning

Chairperson: Liyuan E, University of Helsinki, Finland

Prepared for Lifelong Learning - Self-regulated Learning (SRL) of German Primary School Students

Keywords: Metacognition, Primary Education, Self-regulation, Student Learning

Presenting Author: Bernadette van Berk, German Institute for International Educational Research (DIPF); IDeA-Research Center, Germany; **Co-Author:** Charlotte Dignath, DIPF Leibniz Institute for Education Research Frankfurt, Germany

Distance learning and increased use of online learning environments demonstrate the particular relevance of self-regulation of learning (SRL) even for young students' learning progress. (Berger et al., 2021) Even in school environment - and as a basis for lifelong learning - students must plan and structure their own learning and motivate themselves to learn. (Weinstein et al., 2011) Since self-regulation is considered a strong predictor of future academic success (Robson et al., 2020) there is a growing debate about how to effectively promote this capacity. However, to design needs-based SRL trainings, it is essential to understand how students use SRL strategies and the challenges they may face. In the present study, we use a combination of various instruments to investigate the when, why, and how of SRL use by primary school students. Our focus is on the potential of an interview to comprehensively assess SRL with young students. For this purpose, we adapted the Self-Regulated Learning Interview Schedule SRLIS (German version: Spörer, 2003; original version: Zimmerman & Martinez-Pons, 1986), which was originally developed for secondary school students, to the context of primary school students (2nd to 5th grade).

Do standards enhance learners' accuracy in judging self-generated examples?

Keywords: Experimental Studies, Instructional Design, Metacognition, Self-regulation

Presenting Author: Linda Froese, Ruhr University Bochum, Germany; **Co-Author:** Julian Roelle, Ruhr University Bochum, Germany

In a variety of learning scenarios, generating own examples is a common and beneficial learning activity. When evaluating the quality of their self-generated examples, however, learners tend to make inaccurate judgments. This can lead to detrimental regulation decisions such as stopping learning when actually further effort is needed. One promising means that has shown to enhance learners' judgment accuracy in judging self-generated examples is the comparison with external standards in form of expert examples. Unfortunately, previous research indicates that expert example standards mainly reduce overconfidence when learners evaluate examples of low quality but do not reduce underconfidence when learners judge examples of high quality. Against this background, the present study investigated whether also providing negative example standards that illustrate low quality examples would remedy this suboptimality. We varied whether $N = 131$ university students were provided with expert example standards (with vs. without) and negative example standards (with vs. without) during the judgment of self-generated examples. The learners who received negative example standards showed lower bias, whereas the learners who received expert example standards showed higher absolute accuracy. We conclude that both positive and negative standards can complement each other in enhancing learners' judgment accuracy.

Improving Writing Through Feedback: Does Self-Assessment Relate to Writing Performance?

Keywords: Metacognition, Secondary Education, Self-regulation, Writing/Literacy

Presenting Author: Lucas Liebenow, Leibniz Institute for Science and Mathematics Education (IPN), Germany; **Co-Author:** Johanna Fleckenstein, Leibniz Institute for Science and Mathematics Education (IPN), Germany; **Co-Author:** Jennifer Meyer, Leibniz Institute for Science and Mathematics Education (IPN), Germany

Writing is a complex and demanding task that requires a high degree of active, aware self-regulation. Accurate self-assessment is central for effective self-regulation. Feedback has the potential to promote both, but empirical evidence is inconsistent and studies, which investigate the correlation between writing performance and self-assessment are rare. The current study investigates associations between feedback, self-assessment and writing performance, addressing two research questions: 1) does elaborated feedback improve writing performance and self-assessment and 2) does self-assessment relate to writing performance. A total of $N=175$ secondary school students were randomly assigned to a control and experimental condition. In the experimental group they received elaborated feedback after each writing task (fictitious e-mails). In the control condition they got traditional learning material, (e.g. information about task requirements). Results showed that feedback had a positive effect on writing performance and self-assessment, but no significant differences were found

between the two conditions. Regression analysis indicated, that students with more accurate initial self-assessments performed better in the subsequent writing task when controlling for prior performance. Findings and implications are discussed.

Session B 3

19 July 2022 11:30 - 13:00

Room 248

Single Paper

Assessment and Evaluation, Learning and Social Interaction

Social Interaction in Collaborative Learning

Keywords: Assessment Methods and Tools, Collaborative Learning, Computer-supported Collaborative Learning, Knowledge Creation, Mixed-methods Research, Peer Interaction, Self-regulation, Social Interaction, Video Analysis

Interest group: SIG 01 - Assessment and Evaluation, SIG 16 - Metacognition and Self-Regulated Learning

Chairperson: Jenni Kunnari, University of Oulu, Finland

The interplay of knowledge construction and group-level regulation in 8th graders' CSCL interactions

Keywords: Computer-supported Collaborative Learning, Knowledge Creation, Social Interaction, Video Analysis

Presenting Author: Kateryna Zabolotna, University of Oulu, Finland, Finland; **Co-Author:** Jonna Malmberg, University of Oulu, Finland; **Co-Author:** Hanna Jarvenoja, University of Oulu, Finland; **Co-Author:** Sanna Järvelä, University of Oulu, Finland

Despite decades of research on knowledge construction and regulated learning in the context of computer-supported collaborative learning (CSCL), there is a lack of studies investigating how these processes intertwine and (co-)occur together. The present study addresses this gap by examining the occurring knowledge co-construction (KC) events simultaneously with group-level regulation, namely co-regulation (CoRL) and socially shared regulation (SSRL) events. Participants were 34 secondary school pupils in a CSCL science class. The students created a poster about "center of gravity" collaboratively using an interactive tabletop in groups of three to four. Their working was videotaped with a 360° camera. The resulting video data were analyzed first for five KC phases based on Gunawardena et al.'s (1997) Interaction Analysis model. Then types (CoRL and SSRL) and processes of regulation (task understanding, planning, evaluation and strategy use) were identified. Process mining technique was used to identify and illustrate the most typical associations between knowledge construction and regulation. The results showed that learners engaged in regulated planning while sharing or comparing their ideas and regulated their task understanding while negotiating a shared meaning or co-constructing new knowledge. The findings imply that regulation provides possibilities for learners to engage in interactions and collective knowledge construction.

A Systematic Review on the Social and Human Variables in Peer Assessment

Keywords: Assessment Methods and Tools, Collaborative Learning, Peer Interaction, Social Interaction

Presenting Author: Jose Carlos Ocampo, University of Deusto, Spain; **Co-Author:** Maryam Alqassab, Universidad de Las Palmas de Gran Canaria, Spain; **Co-Author:** Javier Fernandez Ruiz, Universidad Autónoma de Madrid, Spain; **Co-Author:** Ernesto Panadero, Universidad Deusto, Spain

Empirical evidence examining the effects of interpersonal variables related with peer assessment (PA) has increased since van Gennip et al. (2009) proposed that PA is fundamentally a social process, and when Panadero (2016) identified 10 variables related with PA which were further categorised to three factors. Given that there is a growing body of research adopting this view of PA, it is important to conduct a follow-up systematic review since PA has now been applied in wide array approaches for different purposes in different academic programs. The aim of this study is to systematically review intrapersonal and interpersonal variables that affect PA. Four different search strategies used identified 511 articles, and a total of 77 articles were included in this review after applying the inclusion criteria. Preliminary descriptive findings suggest that the majority of the reviewed PA studies are implemented at the university level (63 of 77 studies), there is an increased use of PA for formative purposes (62 of 77 studies), and most studies appear to investigate intrapersonal factors' influence on PA (or vice versa; 64 of 77 studies).

Temporal patterns of collaborative learning: interconnection of social interaction and regulation

Keywords: Collaborative Learning, Mixed-methods Research, Self-regulation, Social Interaction

Presenting Author: Eija Vuorenmaa, University of Oulu, Finland, Finland; **Co-Author:** Andy Nguyen, University of Oulu, Finland; **Co-Author:** Sanna Järvelä, University of Oulu, Finland

In committed collaborative learning, learners share responsibility and regulate their learning process on a group-level through co-regulated learning and socially shared regulation of learning. Learners engage in social interaction to activate regulatory processes. Previous research has shown that unfavorable participation in social interaction, such as social loafing, challenges collaborative learning. Still, it is unclear, what type of participation and social interaction patterns are interconnected with group-level regulation and collaborative learning success in terms of how well the students have learned during collaboration. This study investigates, how patterns of social interaction and participation are sequenced with regulation of learning and interconnected with collaborative learning success. The participants were secondary school students (N=92), who worked collaboratively in physics course over eight weeks in small groups. The groups' interaction was videotaped for five 90 minutes sessions by using Insta360 Pro 360-degree cameras. Situated self-reports and student grades were collected to determine collaborative learning success. The analysis consisted of video data analysis, descriptive statistics, and time-related process model analyses. The results highlight the role of joint social interaction for group-level regulation in collaborative settings. Investigating these interrelations can help in understanding how social interaction can promote group-level regulation and advance successful collaborative learning.

Session B 4

19 July 2022 11:30 - 13:00

Room 250

Single Paper

Teaching and Teacher Education

Teacher Professional Development

Keywords: Attitudes and Beliefs, Knowledge Creation, Meta-Analysis, Qualitative Methods, Synergies between Learning; Teaching and Research, Teacher Professional Development, Teaching/Instruction

Interest group: SIG 11 - Teaching and Teacher Education, SIG 14 - Learning and Professional Development

Chairperson: Teresa Jacques, Faculty of Psychology and Educational Sciences of the University of Porto, Portugal

The impact of professional development addressing inclusive education - A systematic meta-analysis

Keywords: Attitudes and Beliefs, Knowledge Creation, Meta-Analysis, Teacher Professional Development

Presenting Author: Johanna Donath, University of Vienna, Austria; **Co-Author:** Elisabeth Graf, University of Vienna, Austria; **Co-Author:** Thomas Götz, University of Vienna, Austria

Inclusive education is a teaching approach aimed at educating all students in general classrooms independent of diversity features such as special educational needs, giftedness, or migration. To successfully implement inclusive education, teachers need to be equipped with positive beliefs towards inclusive education (e.g., attitude, self-efficacy), knowledge about diverse needs of their students and skills to address these needs. Usually teachers are supported through receiving professional development, where teachers come together to receive training, but are left alone with the implementation. Are these professional development opportunities effective in supporting teachers to develop the necessary knowledge, beliefs and skills? In order to address this question a

systematic meta-analysis was conducted. The screening of the 12,050 search results revealed 685 eligible studies. Preliminary analyses with a small sample of 16 publications revealed a significant positive effect of professional development participation on teachers' attitude towards inclusion ($d=0.468$, $p<0.001$). Additional moderation analyses on the effects of program design characteristics are planned. The planned study will be able to provide an insight into the impact of professional development participation of teachers on the implementation of inclusive education and the design of effective programs.

The development of the role of a data coach: a needs assessment of different stakeholders

Keywords: Qualitative Methods, Synergies between Learning; Teaching and Research, Teacher Professional Development, Teaching/Instruction

Presenting Author: Iris Decabooter, Hasselt University, Belgium; **Co-Author:** Katrien Struyven, Hasselt University / Vrije Universiteit Brussel, Belgium; **Co-Author:** Els Consuegra, Vrije Universiteit Brussel, Belgium; **Co-Author:** Roos Van Gasse, University of Antwerp, Belgium; **Co-Author:** Ariadne Warmoes, Vrije Universiteit Brussel (VUB), Belgium

Despite the availability of a lot of data in education, school teams struggle to use data in an effective way to adjust classroom- and school practices. Human support in the form of a data coach can support school teams with data-based decision-making (DBDM). Data coaches collaborate closely with school teams to support and guide them in DBDM. Although school teams and data coaches work closely together it is unclear what teachers, school leaders and data coaches themselves find necessary tasks, knowledge or skills for a data coach to guide and support professional learning on DBDM. Therefore, in this study a needs assessment will be conducted by means of multiple interviews with teachers, school leaders and data coaches in primary and secondary schools in Flanders (Belgium). Following research questions are included: What are the needs of school teams regarding the appointment, tasks, knowledge and skills of a data coach who supports DBDM? How do school leaders perceive their collaboration with a data coach? What are the needs of data coaches working in school regarding professional development? Based on the results of these interviews different data coach profiles will be set out. The preliminary results will be presented at JURE 2022.

Session B 5

19 July 2022 11:30 - 13:00

Courtyard (Ground Floor)

Poster Presentation

Assessment and Evaluation, Higher Education, Teaching and Teacher Education

Best of JURE - Poster Session

Keywords: At-risk Students, Competencies, Higher Education, Inquiry Learning, Pre-service Teacher Education, Primary Education, Problem Solving, Qualitative Methods, Student Learning, Teaching Approaches, Vocational Education

Interest group: SIG 04 - Higher Education, SIG 11 - Teaching and Teacher Education, SIG 20 - Inquiry Learning

Chairperson: Olga Rotar, Higher School of Economics, Russian Federation

The role of students' prior job experiences in VET teacher education

Keywords: At-risk Students, Pre-service Teacher Education, Qualitative Methods, Vocational Education

Presenting Author: Theo Döppers, Justus-Liebig-Universität Giessen, Germany

Many students aspiring to become a VET teacher in Germany switch from the vocational training to the university. They belong to the group of non-traditional students, which is often discussed in the context of support mechanisms. However, researchers rarely pay attention to existing knowledge and skills of this group. Therefore, this research explores the role of the prior job experiences of students in VET teacher education. The carried out qualitative design consists of 10 single interviews and 6 group discussions. The Data is analysed using the Documentary method. The results show that the students can apply their job knowledge in the university context in different forms. 1) The students transfer learning content directly from VET into university. 2) For some it is possible to create new knowledge by combining vocational and academic knowledge. 3) Through the personal development, the job experiences affect indirectly the learning process at HEI. 4) The students can apply their vocational knowledge in the practical phase at vocational schools. In general, the first results of the research show that the prior job experiences have a significant meaning for the students. In the field of VET teacher education, the students' vocational and academic knowledge are closely intertwined.

Differentiation practices during inquiry-based learning: Support for reading and reasoning

Keywords: Inquiry Learning, Primary Education, Student Learning, Teaching Approaches

Presenting Author: Tessa Slim, Hogeschool IPABO Amsterdam/Alkmaar / Vrije Universiteit Amsterdam, Netherlands; **Co-Author:** Johanna van Schaik, Radboud University, Netherlands; **Co-Author:** Anna Hotze, Hogeschool IPABO Amsterdam/Alkmaar, Netherlands; **Co-Author:** Maartje Raijmakers, University of Amsterdam, Netherlands

Attending to individual differences (i.e., differentiation practices) within inquiry-based learning is needed to optimize the learning potential of all students, but research on this topic is still lacking. The current study examined the effects of two teacher differentiation practices, aimed at supporting students during inquiry-based learning, on students' knowledge, skills, and attitude. The sample consisted of 187 students (94 boys) from 13 Dutch 5th grade classrooms. Classrooms were assigned to one of four conditions in a quasi-experimental pretest-posttest design. Varying between conditions were the type of students targeted for differentiation practices (based on measures of individual differences) as well as whether differentiation was provided in a small group or plenary. In all conditions, students received the same lesson in which they experimented hands-on with a marble ramp. Measures of individual differences included reading comprehension, math skills, executive functions, science curiosity, and attitude towards science and technology. Pretest-posttest measures included an assessment of knowledge regarding the marble ramp, control-of-variables (CVS) skills, and an interest measure. Multilevel analysis will show what type of students benefit most from what type of differentiation practices, which can be used to improve the inquiry-based learning approach.

Evaluating university students' self-perceived generic skills learning in a problem-solving course.

Keywords: Competencies, Higher Education, Problem Solving, Student Learning

Presenting Author: Heleen van Ravenswaaij, UMC Utrecht, Netherlands

Solving complex problems calls for skills commonly referred to as, among others, generic skills, transferable skills, personal skills, professional skills, or soft skills (e.g., Andrews & Higgs 2008, Bennett, Dunne, & Carré, 1999; Jääskelä, Nykänen, & Tynjälä, 2018; Touloumakos, 2020). We use the term generic skills. Universities can let students themselves select the relevant generic skills to learn when following problem-solving courses. However, evaluating such variety of skills is difficult and assessment often focus on student performance which is argued to be too narrow for generic skills development (Bakkenes, Vermunt, & Wubbels, 2010). The current research therefore describes an instrument for educators to evaluate students' self-perceived generic skills learning and provides insight in students learning outcomes after following a problem-solving course with self-set goals. There are five learning categories found: 1) improvement in performance (*progress*), 2) formulating intentions to change (*intention*), and 3) changes in beliefs (*value*), 4) knowledge of the skill (*understanding*), and 5) knowledge about the own performance (*self-level*). Students also learned on a vast array of generic skills, indicating the broadness of their learning. Educators might therefore want to broaden their perspective on generic skills education, for instance by formulating learning objectives which incorporate multiple learning categories.

Session B 6

19 July 2022 11:30 - 13:00

Room 256

Single Paper

Cognitive Science, Instructional Design, Motivational, Social and Affective Processes

Stress, Anxiety and Motivation during COVID-19

Keywords: COVID-19, E-learning/Online Learning, Early Childhood Education, Emotion and Affect, Instructional Design, Mathematics, Motivation, Self-efficacy, Student Learning

Interest group: SIG 08 - Motivation and Emotion

Chairperson: Soeharto Soeharto, University of Szeged, Doctoral School of Education, Hungary

Distressed to Distracted: Examining Undergraduate Learning and Stress Regulation During COVID-19

Keywords: COVID-19, E-learning/Online Learning, Emotion and Affect, Student Learning

Presenting Author:Almaz Mesghina, Northwestern University, United States; **Co-Author:**Joseph Wong, University of California, Irvine, United States; **Co-Author:**Elizabeth Davis, University of California, Riverside, United States; **Co-Author:**Bella Lerner, University of California, Irvine, United States; **Co-Author:**Bryant Jackson-Green, University of California, Irvine, United States; **Co-Author:**Lindsey Richland, University of California, Irvine, United States

Undergraduates' distress has increased dramatically since the COVID-19 pandemic's onset, raising concerns for academic achievement. Yet little is known about the mechanisms by which pandemic-related distress may affect students' learning and performance, and consequently, how we might intervene to promote student achievement despite the continuing crisis. Across two studies with nearly 700 undergraduates, we highlight the mediating role of distraction: undergraduates higher in COVID-19 distress saw lower learning gains from an asynchronous neuroscience lesson due to increased mind wandering during the lesson. We replicate and extend this finding in Study 2: probing what pandemic-related stressors worried students and revealing systematic differences among students of marginalized identities, with largest impacts on first-generation, Latinx women. We also examined whether stress reappraisal or mindfulness practices may mitigate the observed distress-to-distraction pathway. Only mindfulness reduced mind wandering, though this did not translate to learning. We conclude with implications for practice and future research.

Worked Examples Moderate the Effect of Math Anxiety on Math Learning During the COVID-19 Pandemic

Keywords: COVID-19, Instructional Design, Mathematics, Student Learning

Presenting Author:Elayne Vollman, Lake Forest College, United States; **Co-Author:**Almaz Mesghina, Northwestern University, United States; **Co-Author:**Kelly Trezise, University of Chicago, United States; **Co-Author:**Lindsey Richland, University of California Irvine, United States

The use of worked examples during instruction has been shown to promote children's mathematics learning by reducing strain on cognitive load. Worries during learning can consume limited cognitive resources thereby compromising performance and learning potential, suggesting that worked examples may be a viable pedagogical intervention to promote learning for worried students. We tested this hypothesis during a conceptual mathematics lesson on ratio with 280 fifth grade students' during remote learning in the Covid-19 pandemic. Half of the students reviewed worked examples at key learning opportunities during instruction. Two sources of students' worry were measured—math anxiety and worries about learning during the pandemic. We explored the effects of worry and worked examples on learning and students' attentional, affective, and motivational states. In line with cognitive load theories, math anxiety, but not pandemic learning worries, negatively predicted procedural and conceptual learning from the lesson. Math anxiety also predicted greater mind wandering and reduced situational interest during the lesson. The intervention of worked examples during learning mitigated these effects. Pandemic-related learning worries were unrelated to learning outcomes, but did predict affective and motivational outcomes. Findings from this study suggest worked examples are a viable tool to reduce mathematics anxiety and improve learning.

Examining student motivation during the start and continuation of the COVID-19 pandemic.

Keywords: Early Childhood Education, Mathematics, Motivation, Self-efficacy

Presenting Author:Kerry Duck, University of Delaware, United States; **Co-Author:**Teomara Rutherford, University of Delaware, United States

The purpose of this investigation was to follow student motivation across the transition to remote instruction due to COVID-19 to preliminary returns to the classroom. This is an important topic to compare given existing declines in motivation and preliminary evidence of motivation changes at the beginning of the pandemic (Rutherford et al., 2021). Two cohorts of students were compared on measures of mathematics motivation across two years. Mathematics motivation. Mathematics motivation was measured three times per year using three items for expectancies for success and two items each for utility value (usefulness) and attainment value (importance). Participants responded on a 1-5 rating scale using visual based emojis for response. Overall, there were preliminary evidence of time and gender differences, but not at differing rates due to the pandemic. Limitations include limiting participants to who completed all survey waves given noted drops in responses during spring semesters. Future directions include examining comparing those with fewer than six time points on motivation compared to those who completed all survey points.

Keynote II 1

19 July 2022 14:00 - 15:00

Auditorium 2A

JURE 2022 Keynote

The ambiguity of blended learning in education: Is something new happening?

Keywords: COVID-19, E-learning/Online Learning, Educational Challenges, Teacher Professional Development

Interest group:

Chairperson: Mathias Dehne, Germany

In response to COVID-19 education has undergone a rapid shift from face-to-face teaching to fully online remote teaching. When looking towards a post-pandemic time, educators are considering how new remote practices may be integrated into a blended approach to teaching and learning. However, this is not an easy process. Teachers have to decide what is being taught face-to-face and what can be learned in a digital space, and how these spaces can be mixed in different ways. They would be expected to redesign their programs to support learning in a blended environment. But what exactly is the aim of blended learning? In this keynote, we will first present teachers' perceptions and practices about blended learning, based on the results of a large-scale international study. Drawing on their input, we will then discuss if something new is happening? Is something different learned through blended learning, where teachers design learning experiences making use of both digital and face to face spaces? During the keynote we will discuss the ambiguity of blended learning and what it means for educational research, the lack of models of blended learning, what it affords learning and where it might take the field.

The ambiguity of blended learning in education: Is something new happening?

Presenting Author:Jo Tondeur, Vrije Universiteit Brussel, Belgium; **Presenting Author:**Sarah Howard, University of Wollongong, Australia

In response to COVID-19 education has undergone a rapid shift from face-to-face teaching to fully online remote teaching. When looking towards a post-pandemic time, educators are considering how new remote practices may be integrated into a blended approach to teaching and learning. However, this is not an easy process. Teachers have to decide what is being taught face-to-face and what can be learned in a digital space, and how these spaces can be mixed in different ways. They would be expected to redesign their programs to support learning in a blended environment. But what exactly is the aim of blended learning? In this keynote, we will first present teachers' perceptions and practices about blended learning, based on the results of a large-scale international study. Drawing on their input, we will then discuss if something new is happening? Is something different learned through blended learning, where teachers design learning experiences making use of both digital and face to face spaces? During the keynote we will discuss the ambiguity of blended learning and what it means for educational research, the lack of models of blended learning, what it affords learning and where it might take the field.

Session C 1

19 July 2022 15:30 - 17:00

Room 250

Single Paper
Higher Education, Teaching and Teacher Education

Teaching Approaches

Keywords: Collaborative Learning, Content Analysis, Early Childhood Education, Higher Education, Instructional Design, Interdisciplinarity, Mixed-methods Research, Second Language Acquisition, Social Aspects of Learning and Teaching, Teaching Approaches

Interest group: SIG 04 - Higher Education, SIG 11 - Teaching and Teacher Education

Chairperson: Charleen Brand, Ruhr University Bochum, Institute of Educational Research, Germany

A study of students' collaboration skill development in an interdisciplinary project course.

Keywords: Collaborative Learning, Higher Education, Interdisciplinarity, Social Aspects of Learning and Teaching

Presenting Author: Mette Mari Wold Johnsen, Norwegian University of Science and Technology (NTNU), Norway

Collaboration skills are essential to solve the global challenges ahead. This calls on universities to teach and students to learn such skills. Investigating a context where students collaborate in interdisciplinary teams over the course of one semester and exercises and curricula are designed to promote the development of such skills, this study makes an important contribution to the field. Collecting data from individual and group interviews, it explores how students develop collaboration skills in an interdisciplinary project course, and what enables and constrains this development. Findings indicate differences in students' development processes, in that not all students develop skills throughout the course even though PjBL approaches are applied systematically. Intrapersonal, interpersonal and contextual factors are part of these processes. Enablers and constraints vary but mainly include group factors and student factors. The setting is new to most students which proved to be both an enabler and a constraint. Implications for policy makers, course designers, instructors and students are discussed.

Bringing home languages into the classroom: an exploratory study on digital dual language storybooks

Keywords: Early Childhood Education, Mixed-methods Research, Second Language Acquisition, Teaching Approaches

Presenting Author: Hanneke Leeuwestein, University of Groningen, Netherlands; **Co-Author:** Elisa Kupers, University of Groningen, Netherlands; **Co-Author:** Marieke Boelhouwer, Molendrift, Netherlands; **Co-Author:** Marijn Van Dijk, University of Groningen, Netherlands

Many children speak a language at home that is different than the language of schooling. Research has shown that valuing and embedding students' home language has considerable benefits for the language and overall development of bilingual students. As classrooms are increasingly linguistically diverse nowadays, digital dual-language storybooks are potentially promising. In the Dutch context, many students speak Arabic at home. Therefore, in this study, an Arabic translation button was incorporated in four Dutch digital storybooks. Participants were 29 four- to seven-year-old Arabic native speakers attending newcomer education in the Netherlands. They participated in a four-week intervention study, aiming to explore their use of and responses to Dutch storybooks with an Arabic translation button to re-watch and re-listen the story in their home language. Preliminary findings showed that eight students chose to use the Arabic button, whereas the other participants chose to watch the books in Dutch only. Besides demonstrating more on-task behavior, older students – with relatively high vocabulary knowledge of Dutch and Arabic target words – used the Arabic translation button, whereas the younger participants did not use the button at all. This study provides insights for further development of digital dual-language storybooks to incorporate home languages in the classroom.

Pedagogical infrastructures in multidisciplinary technology education

Keywords: Content Analysis, Instructional Design, Interdisciplinarity, Teaching Approaches

Presenting Author: Hanna Aarnio, Aalto University, Finland; **Co-Author:** Maria Clavert, Aalto University, Finland; **Co-Author:** Auli Toom, University of Helsinki, Finland; **Co-Author:** Kaiju Kangas, University of Helsinki, Finland

Successful implementation of multidisciplinary technology education is dependent on the degree to which teachers from different disciplines are able to support pupils' learning in creative problem-solving processes. This study explores how multidisciplinary teaching teams can leverage pedagogical infrastructures to support pupils' learning in technology projects. The data consists of 11 semi-structured team interviews of experienced primary, secondary, and general upper secondary school teachers ($n = 21$). The data were analysed with qualitative content analysis based on the pedagogical infrastructure framework (Lakkala et al., 2008). The study identifies 19 forms of support related to scaffolding, epistemological, material-technological, and social infrastructures. The findings reveal how the use of different pedagogical infrastructures varies in different phases of the collaboration process: material-technological infrastructure was emphasized in the planning and epistemological infrastructure was highlighted in the implementation. While scaffolding was present in both phases, social infrastructure was not highlighted in either of them. The findings provide foundation for multidisciplinary teaching teams to develop more effective support for learning in creative problem-solving processes.

Session C 2

19 July 2022 15:30 - 17:00

Room 248

Roundtable

Assessment and Evaluation, Learning and Instructional Technology, Motivational, Social and Affective Processes

Best of JURE - Roundtable Session

Keywords: Achievement, Assessment Methods and Tools, Cognitive Skills, Comprehension of Text and Graphics, Educational Attainment, Educational Psychology, Higher Education, Metacognition, Morality, Peer Interaction, Secondary Education, Self-regulation

Interest group: SIG 04 - Higher Education, SIG 13 - Moral and Democratic Education, SIG 16 - Metacognition and Self-Regulated Learning

Chairperson: Theo Döppers, Justus-Liebig-Universität Giessen, Germany

Once the Best Student Always the Best Student? Predicting (Graduate) Study Success

Keywords: Achievement, Assessment Methods and Tools, Educational Attainment, Higher Education

Presenting Author: Anastasia Kurysheva, University Medical Center Utrecht, Netherlands; **Co-Author:** Nivard Koning, University Medical Center Utrecht, Netherlands; **Co-Author:** Christine Fox, University Medical Center Utrecht, Netherlands; **Co-Author:** Harold van Rijen, University Medical Center Utrecht, Netherlands; **Co-Author:** Gönül Dilaver, University Medical Center Utrecht, Netherlands

In the face of increasing and diversifying graduate application numbers, evidence-based selective admissions has become a pressing issue. By conducting multilevel regression analysis on institutional admissions data from a Dutch university, this study aims to determine the predictive value of undergraduate academic indicators for graduate study success on research masters' programs in the life sciences. The results imply that in addition to undergraduate grade point average (UGPA), undergraduate thesis grade is a valid predictor of graduate grade point average (GGPA). To a small extent, the examined undergraduate academic indicators also predict graduate degree completion and time to degree. The results from this study can be used by admissions committees for evaluating and improving their current practices of graduate selective admissions. Although our study is conducted on a graduate level, the round table can perhaps be dedicated to discussion of determinants of study success at both educational levels. During the discussion, I would like also to raise a question on how well different admissions systems and process reacted to the pandemic of Covid-19. Were the established selection methods effective? Were they feasible to implement? How did the reliance on prior grades in making admissions decisions change due to the pandemic?

The role of moral norms in the prediction of adolescents' bystander intentions

Keywords: Educational Psychology, Morality, Peer Interaction, Secondary Education

Presenting Author: Mareike Brehmer, University of Agder, Norway; **Co-Author:** Jennifer Meyer, Leibniz Institute for Science and Mathematics Education (IPN), Germany

Derogatory speech among pupils puts negative impacts on children's and adolescents' health worldwide. Research has paid increasing attention to participant roles in antisocial situations. Young bystanders can find themselves in a dilemma between doing what is morally right and the potential risks of standing up for somebody else. However, some assertive pupils choose to intervene in antisocial situations – often successfully. The present study examines whether the Theory of Planned Behaviour can be applied in the context of adolescents' bystander behaviour to understand pupils' behavioural decision-processes. It suggests that intentions are predicted by attitude, subjective norms, and perceived behavioural control towards the behaviour. Considering bystanders' moral dilemma between what they perceive as the morally right thing to do to avoid harm or distress in others, and ensuring their own well-being, moral norms could be an important additional predictor. Thus, we extended the Theory of Planned Behaviour's model by moral norms. We collect data from pupils at upper secondary schools. Using structural equation modelling, we will conduct multiple regression analyses to examine whether the Theory of Planned Behaviour offers an appropriate model to predict behavioural intentions in our context and whether moral norms add to the explained variance in bystander intentions.

Self-scoring during causal diagramming to improve student's cue utilization and monitoring

Keywords: Cognitive Skills, Comprehension of Text and Graphics, Metacognition, Self-regulation

Presenting Author: Sophia Braumann, University Utrecht, Netherlands; **Co-Author:** Janneke van de Pol, Utrecht University, Netherlands; **Co-Author:** Héctor J. Pijera-Díaz, Maastricht University, Netherlands; **Co-Author:** Anique de Bruin, Maastricht University, Netherlands; **Co-Author:** Tamara Van Gog, Utrecht University, Netherlands

Accurate self-monitoring of text comprehension is critical for effective self-regulated learning from texts. Unfortunately, students' monitoring of their own text comprehension is often inaccurate which can lead to suboptimal restudy decisions. Completing causal diagrams after text reading (diagramming) can improve students' monitoring of text comprehension. However, even after diagramming, there is still room for improvement. We, therefore, aim to test whether providing feedback in the form of a performance standard (i.e., a correctly completed diagram) with and without instructions for self-scoring one's own diagrams further increases students' monitoring accuracy and text comprehension. Additionally, we aim to test whether the effect of self-scoring on monitoring accuracy transfers to later trials without self-scoring instruction. Furthermore, delayed and immediate diagramming (i.e., diagramming with and without a delay after text reading) will be compared as immediate diagramming resembles more closely regulation decisions in classrooms (where decisions for restudy are often done immediately after text reading). We expect that students with self-scoring instructions perform higher on monitoring accuracy and text comprehension (during and after receiving self-scoring instructions) compared to students without self-scoring instruction whatsoever and that monitoring accuracy during immediate and delayed diagramming does not differ while text comprehension is higher after immediate diagramming.

Session C 3

19 July 2022 15:30 - 17:00

Courtyard (Ground Floor)

Poster Presentation

Assessment and Evaluation, Cognitive Science, Instructional Design, Learning and Social Interaction, Motivational, Social and Affective Processes

Self-Regulation

Keywords: Case Studies, Collaborative Learning, Educational Psychology, Experimental Studies, Higher Education, Instructional Design, Metacognition, Motivation, Quantitative Methods, Secondary Education, Self-regulation, Social Aspects of Learning and Teaching, Student Learning, Workplace Learning

Interest group: SIG 01 - Assessment and Evaluation, SIG 06 - Instructional Design, SIG 08 - Motivation and Emotion, SIG 16 - Metacognition and Self-Regulated Learning

Chairperson: Christian Thurn, ETH Zurich, Switzerland

Socially shared regulation of learning in authentic team meetings of professionals

Keywords: Case Studies, Collaborative Learning, Self-regulation, Workplace Learning

Presenting Author: Niina Palmu, University of Oulu, Finland; **Co-Author:** Sanna Järvelä, University of Oulu, Finland; **Co-Author:** Hanna Jarvenoja, University of Oulu, Finland

This study explores how socially shared regulation of learning (SSRL) is manifested in the authentic team meetings of professionals. The study aims to understand the regulation of learning as part of professionals' work processes. SSRL provides a theoretical framework to explore the collaboration and the participants' actions to manage the changes and adapt to challenges as part of team meetings. This study is a mixed method study aimed at exploring SSRL in the workplace setting. The data have been collected from teams of professionals from small to medium-sized companies (N= 150 team members, 20 teams). The companies are mainly in creative and ICT-industry. Data is formed from the video recordings of authentic team meetings and consultative discussions. Also, pre- and post-tests and quick surveys from individual team members are used. The significance of this study is highly related to the skills needed to manage successful teamwork. The study is anticipated to provide novel information that supports professionals in their skills and thus enables workplace teams to develop their collaboration.

Examining university students' overarching instructional knowledge

Keywords: Higher Education, Instructional Design, Metacognition, Self-regulation

Presenting Author: Morane Stevens, KU Leuven - University of Leuven, Belgium; **Co-Author:** Jan Elen, KU Leuven, Belgium

A substantial body of research indicates that students generally lack knowledge on the functionality of (components of) learning environments. Moreover, the nature of students' so-called "instructional knowledge" can hinder their use of instructional interventions that support their learning, which in turn negatively affects learning outcomes. However, findings regarding these effects on learning behaviors and outcomes are mixed, leaving the role of instructional knowledge within the learning process highly contested. This contribution argues that these findings are most likely distorted due to some fundamental issues within current studies on instructional knowledge. In addition, there are many indications that students' instructional knowledge is – at least to a certain degree – stable across educational settings and learning environments and rather fossilized. Nevertheless, to date there is no research examining students' overarching beliefs regarding instruction. Furthermore, this study aims to address these shortcomings by re-examining instructional knowledge and its precursors, using a series of instructional design tasks and a subsequent interview in which students reflect on their choices.

Group work: studying the self-regulated learning and formative assessment processes.

Keywords: Educational Psychology, Self-regulation, Social Aspects of Learning and Teaching, Student Learning

Presenting Author: David Zamorano, Universidad de Deusto, Spain; **Co-Author:** Juan Fraile, Universidad Francisco de Vitoria, Spain; **Co-Author:** maria gillizquierdo, Univerity AUtonoma de Madrid, Spain; **Co-Author:** Iván Sánchez-Iglesias, Universidad Complutense de Madrid, Spain

This study aimed to design and implement a formative assessment context for a group assignment. This setting is based on self-regulated learning, the beneficial practices exposed in the literature and the challenges for the next decade. We carried out quantitative research using two questionnaires to measure self-regulated learning skills and the way of working as a group. The participants were 88 students getting a degree in Sports Sciences. The instruments used were group work grade, ad hoc questionnaire and the Emotion and Motivation Self-regulation Questionnaire (EMSR-Q) which includes two second-order factors: (1) learning self-regulation style and (2) avoidance self-regulation style. Results showed that the reported way of working in groups has no impact on performance. Furthermore, higher self-regulation in their learning style and higher use of assessment criteria led to higher performance. We did not find any differences regarding avoidance self-regulation style. We discuss theoretical, educational implications and future lines of research.

Improving the use of interleaved practice: The effect of refutation texts and metacognitive prompts

Keywords: Experimental Studies, Instructional Design, Metacognition, Self-regulation

Presenting Author: Erdem Onan, Maastricht University, Netherlands; **Co-Author:** Wisnu Wiradhany, Binus University, Indonesia; **Co-Author:** Felicitas Biber, Maastricht University, Netherlands; **Co-Author:** Anique de Bruin, Maastricht University, Netherlands

Deciding *how to study* is a challenging decision for many undergraduates: Students often use ineffective strategies, such as highlighting, and thus limit their performance. Improving strategy decisions, however, is not an easy task. Often, students have erroneous beliefs about the effectiveness of study strategies. Furthermore, they can be fooled by their on-task experiences: Effective strategies cost students higher effort and often slow the rate of initial learning. When students misinterpret their experiences, they avoid effective strategies. The present study will examine how students can be supported to make effective strategy decisions in category learning. Students will implement two strategies: blocked practice (i.e., grouping the exemplars of the same category together) and interleaved practice (i.e., switching between the exemplars of different categories). They will also monitor their effort and learning across time. To improve strategy decisions, we will test the effectiveness of a refutation text and a metacognitive prompt. The refutation text will debunk false beliefs about learning strategies and warn students about misleading on-task experiences. The visual metacognitive prompt will help students to zoom out of their immediate on-task experiences and focus on learning improvements. The findings of this study will contribute to the development of time-effective strategy interventions.

Effects of Rubrics on Self-Assessment Accuracy and Regulation

Keywords: Instructional Design, Metacognition, Quantitative Methods, Self-regulation

Presenting Author:Rebecca Krebs, Ruhr-University Bochum, Germany; **Co-Author:**Julian Roelle, Ruhr University Bochum, Germany; **Co-Author:**Björn Rothstein, Ruhr University Bochum, Germany

A frequently implemented tool to guide self-assessment is providing learners with rubrics. Rubrics inform learners about assessment criteria for a respective task assignment as well as illustrate different quality levels of task performance. Previous research indicates that rubrics can enhance task performance. This beneficial effect of rubrics is often attributed to a rubrics-driven increase in self-assessment accuracy, which, in turn, would pave the way for effective regulation. Surprisingly, however, to date this theoretical assumed mechanism has scarcely been tested. In the present study, we aim at contributing to closing this research gap. After writing an abstract for a scientific text and before deciding concerning which aspect of abstract writing they would like to receive further instruction and revising their abstracts, learners are to self-evaluate the quality of their abstracts either with or without a rubric. We assume that the rubric would increase not only self-assessment accuracy (Hypothesis 1) but also the degree to which learners subsequently choose to study content that relates to the assessment criteria they have met the least beforehand (Hypothesis 2). This, in turn, should finally result in greater task performance (Hypothesis 3). The data collection currently takes place and results will be available at the conference.

Adolescents' Academic Possible Selves and Self-Regulation in uncertain times: A preliminary study

Keywords: Educational Psychology, Motivation, Secondary Education, Self-regulation

Presenting Author:Evropi Efthymiadou, Aristotle University of Thessaloniki, Greece; **Co-Author:**Elertheria Gonida, Aristotle University of Thessaloniki, Greece

Academic Possible Selves (PS) (i.e., future representations of one's self about education and academic outcomes) have been acknowledged as having high motivational power, especially in challenging situations. The study aimed to investigate the link between adolescents' academic PS and academic self-regulation (AcSR) in uncertain times and their association with personal and perceived contextual variables. A sample of 122 secondary school students (grades 9-11) were asked (i) to report their two most important hoped-for and feared PS as well as their strategies to achieve the desired and avoid the feared ones, and (ii) to respond to a number of self-report scales measuring AcSR (learning and behavior), seeing-school-as-the-path to succeed their PS, academic efficacy, and perceived current unpredictability. As expected, the results indicated that the academic domain was central to adolescents' PS. Regression analyses showed that academic PS when coupled with strategies to achieve them predicted AcSR and the effect of PS on AcSR was fully mediated by the perception of school-as-the-path to PS. Moreover, AcSR was predicted by gender, academic self-efficacy, and perceived unpredictability. The results are discussed in light of current theory and evidence and implications for practice are pointed out especially in relation to the pandemic-related challenges for adolescents.

Session C 4

19 July 2022 15:30 - 17:00

Room 252

Single Paper

Assessment and Evaluation

Assessment in Secondary Education

Keywords: Assessment Methods and Tools, Attitudes and Beliefs, Bilingual Education, Higher Education, Primary Education, Reading Comprehension, Secondary Education, Self-efficacy, Technology

Interest group: SIG 01 - Assessment and Evaluation

Chairperson: Barbara Moschner, Carl von Ossietzky Universität Oldenburg, Germany

Links between reading attitude and reading achievement of young learners

Keywords: Attitudes and Beliefs, Bilingual Education, Reading Comprehension, Secondary Education

Presenting Author:Aigul Akhmetova, University of Szeged, Doctoral School of Education, Hungary; **Co-Author:**Gaysha Imambayeva, Innovative Eurasian University, Kazakhstan; **Co-Author:**Benő Csapó, University of Szeged, Hungary

The aim of this study was to examine the links between reading attitude and reading achievement of young learners in Kazakhstan. Participants were randomly chosen from seven secondary schools of Pavlodar (N=1,505), their first language was Kazakh or Russian. A reading attitude questionnaire and reading tests in English, Kazakh, and Russian languages were administered via the eDia online platform. Findings indicated that (85%) in Grade 6, and (79%) in Grad 8 enjoyed reading. Correlations among English, Kazakh, and Russian reading achievement ranged from $r=.55$ to $r=.61$ (p

Test for assessing primary and lower secondary school students' digital competence

Keywords: Assessment Methods and Tools, Primary Education, Secondary Education, Technology

Presenting Author:Küllü Kallas, University of Tartu, Estonia; **Co-Author:**Margus Pedaste, University of Tartu, Estonia

Digital competence is one of the key competencies in our society, and schools often focus on developing students' digital competency. Nevertheless, at the moment, there is no empirically proven method to assess students' digital knowledge, skills and attitudes in a way that we get information about all the different aspects of digital competence and its development. Trying to solve this issue, we created a test that assesses digital competence. 426 3rd-8th grade students from Estonian schools completed the test, which according to the confirmatory factor analysis, is suitable for distinguishing ten dimensions describing attitudes, skills and behaviours in the digital world and, therefore will give information to educators of areas where students need further guidance. The test also has the potential to provide us with a tool to track students' digital competence development throughout the school years; however, the currently limited data was showing no invariance across grades, and further research on that matter is needed.

Self-assessment uses and practices of Secondary and Higher Education students

Keywords: Assessment Methods and Tools, Higher Education, Secondary Education, Self-efficacy

Presenting Author:Leire Pinedo, Universidad de Deusto, Spain; **Co-Author:**Javier Fernández, Universidad Autónoma de Madrid, Spain; **Co-Author:**Ernesto Panadero, Universidad Deusto, Spain; **Co-Author:**Carlos Rodríguez-Hernández, Institute for the Future of Education, Mexico

Self-assessment is a powerful skill that can develop self-regulation and increase metacognition and motivation. It has a positive effect on students' performance, learning autonomy and self-efficacy. The accuracy of self-assessment in comparison with teachers' grades as well as the effects of it on academic achievement has been fully investigated. However, there is little research focusing on students' self-assessment practices and in particular, the strategies employed for self-assessing one's work. The aim of this study is to identify and describe the self-assessment training and practices among Secondary (N=65) and Higher Education students (N=122). Data was drawn from semi-structured interviews and validated questionnaires. Results indicated a high use of self-assessment but the scarce educational training on it. Besides, participants reported a variety of self-assessment criteria and strategies. Differences were found between educational stages in the type of feedback sources employed for the self-assessment. This study contributes to the literature by providing a more

comprehensive understanding on the strategies, criteria and feedback use for self-assessment and it opens new avenues for future research.

Session C 5

19 July 2022 15:30 - 17:00

Room 249

Single Paper

Higher Education, Teaching and Teacher Education

Educational Psychology

Keywords: Attitudes and Beliefs, COVID-19, Educational Psychology, Emotion and Affect, Experimental Studies, Higher Education, Mixed-methods Research, Quasi-experimental Research, Self-efficacy

Interest group: SIG 04 - Higher Education, SIG 11 - Teaching and Teacher Education

Chairperson: Giannina Bustamante Oliva, Pontificia Universidad Católica del Perú, Peru

Teachers navigating distance learning during COVID-19 without feeling emotionally exhausted

Keywords: COVID-19, Educational Psychology, Mixed-methods Research, Self-efficacy

Presenting Author: Annalisa Soncini, University of Bologna, Italy; **Co-Author:** Emanuele Politi, KU LEUVEN, Belgium; **Co-Author:** Maria Cristina Matteucci, University of Bologna, Italy

During the first wave of COVID-19 spread, teachers faced unprecedented challenges while implementing distance learning. This situation represented a threat for many teachers favouring the insurgence of emotional exhaustion. In this context, teachers' self-efficacy may have become a protective factor by guiding teachers' perceptions of environmental features. Accordingly, the aim of our study was threefold: to explore teachers' threat appraisals, to investigate the relation between teachers' threat appraisals and their emotional exhaustion, and to examine whether self-efficacy may have driven teachers' perceptions of distance learning as an opportunity (i.e., distance learning strengths), rather than an impediment (i.e., distance learning weakness) to teaching. Italian teachers engaged in distance learning ($N = 1036$) were asked to fill in an online survey comprising both qualitative (an open-ended question) and quantitative (psychometrics scales) measures. Findings indicated that teachers who reported worries, fears, and concerns related to their job (i.e., job-related threats) experienced greater emotional exhaustion. Teachers' self-efficacy was related to lower emotional exhaustion both directly and indirectly via decreased teachers' perceptions of distance learning weaknesses. Our findings provided suggestions about teachers' training and psychological support, which are essential to reduce teachers' job-related threats, prevent emotional exhaustion and help them navigate distance learning effectively.

Promoting student well-being and resilience. Testing a basic psychological need intervention

Keywords: Educational Psychology, Emotion and Affect, Higher Education, Quasi-experimental Research

Presenting Author: Lisa Kiltz, University of Groningen, Netherlands; **Co-Author:** Marjon Fokkens-Bruinsma, University of Groningen, Netherlands; **Co-Author:** Ellen Jansen, University of Groningen, Netherlands

The past years have proven that student well-being remains a particularly relevant topic. The COVID-19 pandemic revealed various problematic issues within higher education regarding students' well-being. We propose that these issues do not only root in the students themselves as individuals, but also in the academic system surrounding them. Following this approach, satisfying the basic psychological needs of autonomy, competence, and relatedness within the learning environment has proven promising for enhancing academic well-being. That is why we decided to implement an intervention to promote students' need satisfaction. The intervention entails raising awareness concerning need satisfaction using a game approach, adjusting the course set-up accordingly, and evaluating these adjustments. Three courses from different faculties participate in the intervention study during spring 2022. At three times surrounding the intervention, students rate their need satisfaction, well-being and resilience. To control for potential third variables, one comparable course serves as a control group for each participating course. Additionally, students and teachers can choose to participate in follow-up interviews to elaborate on their experiences. The study's findings may help evaluate a more systemic approach to promoting students' well-being and resilience to create a new practical tool for universities.

Gender stereotypes in higher education students: An experimental study with vignettes

Keywords: Attitudes and Beliefs, Educational Psychology, Experimental Studies, Higher Education

Presenting Author: Ana María Espinoza Catalán, Universidad de O'Higgins, Chile; **Co-Author:** Natalia Albornoz, Universidad de O'Higgins, Chile

Moving towards education with equity is an objective of education systems worldwide. However, in Chile, as in other countries, there are multiple manifestations of sexism in education, which undermine the learning and development of all students. Gender stereotypes is one of the most relevant psychosocial factors that explains gender gaps in education. Current study aims to assess gender stereotypes in education among undergraduate students. A 2x2x2 between-subjects experimental design with randomised vignettes was implemented. A sample of 297 students from different background degrees at a Chilean public university participated. Participants were randomly assigned to questionnaires that presented vignettes of fictional characters, in which they varied by: (1) character's sex (male/female); (2) the career which he/she studies (masculinised/feminised); and (3) their level of academic achievement (high/low). Results shows some effects of character's sex on attributions of academic performance. In addition, participants attribute higher expectations of future work and academic performance to women than to men. These findings show the presence of gender stereotypes in higher education and their influence on biases towards men and women. The importance of designing and implementing policies to reduce sexism in education, especially in critical groups such as women and men in counter-stereotypical careers, is discussed.

Session C 6

19 July 2022 15:30 - 17:00

Room 256

Single Paper

Developmental Aspects of Instruction, Learning and Social Interaction

Social Interaction

Keywords: Case Studies, Climate Change, Communities of Practice, Developmental Processes, Environmental Education, Informal Learning, Parental Involvement in Learning, Secondary Data Analysis, Social Development, Social Interaction

Interest group: SIG 05 - Learning and Development in Early Childhood, SIG 28 - Play, Learning and Development

Chairperson: Tapio Rasa, University of Helsinki, Finland

School Readiness and Interpersonal Coordination: A Multiple Case Study

Keywords: Case Studies, Developmental Processes, Parental Involvement in Learning, Social Interaction

Presenting Author: Erica Kamphorst, University of Groningen, Netherlands; **Co-Author:** Ralf Cox, University of Groningen, Netherlands; **Co-Author:** Marja Cantell, University Groningen, Netherlands; **Co-Author:** Alexander Minnaert, University of Groningen, Netherlands; **Co-Author:** Kaavyaa Stalin, University of Groningen, Netherlands; **Co-Author:** Suzanne Houwen, University of Groningen, Netherlands

School readiness skills have been found to be pivotal for school success. Theoretical perspectives, such as the bioecological model of development of Bronfenbrenner (2007), endorse the notion that proximal processes, such as mother-child interaction, contribute to individual differences in school readiness. We adopted a Complex Dynamic Systems (CDS) perspective to study the moment-to-moment behaviors that make up mother-child interaction, and the way that both mother and child contribute to this interpersonal coordination. Based upon previous work [BLINDED] we selected seven children ($M_{age} = 43$ months, all girls) from four school readiness profiles, to be able to carry out an in-depth multiple case-study into similarities and differences in terms of interpersonal

coordination between school readiness profiles. Time-series data from multiple modalities was subjected to Cross-Recurrence Quantification Analysis. One main finding of this study was that similarities between school readiness profiles, were observed more frequently than differences. Some similarities between profiles (and between all dyads for that matter) indicated the presence of developmental trends in interpersonal coordination, which will be discussed in more detail during the conference. In addition, variation in measures of interpersonal coordination within profiles was often comparable to (or even larger than) variation between profiles.

The social dimension of pro-environmental commitment

Keywords: Climate Change, Communities of Practice, Environmental Education, Social Interaction

Presenting Author:Barbara Hrabetz, Universität Regensburg, Germany

Pro-environmental commitment has long been associated with personal cost-benefit considerations. This ignores the fact that pro-environmental commitment has a social character. Only if many people stand up for environmental protection together, private and public pro-environmental activities will have the necessary impact. Building on these considerations, the first scientific studies have recently taken place that linked Social Identity Theory to pro-environmental commitment. Central element of Social Identity Theory is the assumption that the social identity of individuals guides their actions. The study presented here is intended to contribute to expanding the knowledge on the significance of social identity with regard to different forms of pro-environmental commitment. To this end, 985 people who were engaged in environmental protection to varying levels were surveyed. On the basis of an online self-report questionnaire the participants were asked about their social identification, their private pro-environmental behaviour and two different forms of public pro-environmental commitment. The data obtained will be analysed using structural equation modeling to assess the influence of social identity on different forms of pro-environmental commitment.

The influence of the sibling relationship on social-emotional competences

Keywords: Informal Learning, Secondary Data Analysis, Social Development, Social Interaction

Presenting Author:Elena Wittmann, Leibniz Institute for Educational Trajectories, Germany

The family forms the central developmental context of children's social and emotional development. Whereas the focus is on parent-child interactions, research on siblings and their impact on social-emotional competencies lags behind. However, the sibling relationship is the longest kinship relationship and offers an intense space of experience (Brock, 2010). Sisters and brothers influence the social and emotional context in which they grow up and develop. A significant feature of sibling relationships is that both positive and negative feelings for the sibling(s) can be present at the same time. This paper aims to examine the influence of the perceived sibling relationship on social-emotional competencies. Using the German Family Panel, the question will be addressed by conducting structural equation models. Results show that, after controlling for structural variables, the sibling relationship has an impact on several indicators of social-emotional competencies. Given the importance of social-emotional competencies, the view of the family environment and their influence should therefore be broadened by taking siblings into account.

Session D 1

20 July 2022 09:00 - 10:30

Courtyard (Ground Floor)

Poster Presentation

Cognitive Science, Higher Education, Instructional Design, Motivational, Social and Affective Processes

Learning Approaches

Keywords: Argumentation, Assessment Methods and Tools, Attitudes and Beliefs, Cognitive Skills, Comprehension of Text and Graphics, Emotion and Affect, Higher Education, Instructional Design, Interdisciplinarity, Literacy, Motivation and Emotion, Neuroscience, Problem Solving, Problem-based Learning, Psychometrics, Reading Comprehension, Science Education, Self-regulation, Student Learning

Interest group: SIG 02 - Comprehension of Text and Graphics, SIG 03 - Conceptual Change, SIG 04 - Higher Education, SIG 08 - Motivation and Emotion

Chairperson: Lianne Hoek, University of Amsterdam, Netherlands

The Physiological and Neural Mechanisms of Learning through Productive Failure

Keywords: Cognitive Skills, Neuroscience, Problem Solving, Student Learning

Presenting Author:Cléa Formaz, ETH Zurich, Switzerland

Productive Failure (PF) is a learning design wherein learners generate solutions for novel problems prior to formal instruction. Research has demonstrated the effectiveness of PF, indicating cognitive mechanisms for why students learn better after encountering difficulties. However, neurocognitive and neurophysiological mechanisms underpinning "learning from failure" have yet to be explored, despite robust evidence connecting neural activity, heartbeats, and cognitive processes. Empirically supported theories in neuroscience suggest a connection between neural activity, heartbeats and cognitive processes. The present study is designed to explore physiological mechanisms underlying the process of learning from productive failure. In this EEG research study, we explore the neural and physiological mechanisms underlying PF, employing neural signature and heartrate variability measurements. In particular, we build a deeper explanatory basis of the productive failure learning design by exploring the underlying neural basis and the impact of different heartbeat measurements on learning through PF. Preliminary results will be presented and discussed at the conference.

Network models of conceptual understanding in magnetism

Keywords: Assessment Methods and Tools, Psychometrics, Science Education, Student Learning

Presenting Author:Christian Thurn, ETH Zurich, Switzerland; **Co-Author:**Brigitte Hänger, Fachhochschule Nordwestschweiz, Switzerland; **Co-Author:**Peter Edelsbrunner, ETH Zurich, Switzerland; **Co-Author:**Anne Deiglmayr, University of Leipzig, Germany; **Co-Author:**Ralph Schumacher, ETH Zurich, Switzerland; **Co-Author:**Elsbeth Stern, ETH Zurich, Switzerland

Conceptual knowledge is often investigated using sum scores on a test. Yet, conceptual knowledge is characterized by relations (Goldwater & Schalk, 2016), wherefore network analysis is suitable to model the relations of students' answers. We investigated answers on a concept inventory on magnetism from 2714 students from different school levels before and after instruction. Our aim was to compare the insights from sum score models to network models. Besides sum scores, we used network analysis based on partial correlations between the items to model student's understanding. The sum score increased from pre- to posttest by 3.6 points on average (Cohen's $d = 2.18$). The network analysis showed that the items were solved more coherently at the posttest, as the number of edges increased. Some items that related negatively to other items at pretest were understood better at posttest, as all relations were positive. Furthermore, the network foreshadowed that one item measured terminology rather than conceptual knowledge. Using network analysis we could show properties of the items and their relations that would remain hidden by using sum scores, solution rates or correlation matrices. We discuss how network analysis can be a supportive measure and a proxy for assessing students' knowledge structures.

Combining a Direct and Indirect Training Approach for Cross-Domain Competences: A Case Study

Keywords: Argumentation, Higher Education, Instructional Design, Reading Comprehension

Presenting Author:Nina Udvardi-Lakos, University of Freiburg, Germany; **Co-Author:**Marlene Weirich, University of Freiburg, Germany; **Co-Author:**Kim Lützenburger, University of Freiburg, Germany; **Co-Author:**Julia Asbrand, Humboldt Universität zu Berlin, Germany; **Co-Author:**Alexander Renkl, University of Freiburg, Germany

In psychology programs, students should acquire both domain-specific knowledge and cross-domain competences important for later practice. Typically, such competences are either trained *directly* in courses explicitly devoted to them or *indirectly* in courses on psychological topics that require them without systematically teaching them. To exploit the advantages of both direct and indirect training approaches, we combined them in a new psychology course in which students were taught domain-specific knowledge on pedagogy and psychotherapy, and trained in the competences of epistemic beliefs, multiple document

literacy, and argumentative thinking. The direct training took a tried-and-tested example-based learning approach. A central element of the indirect training consisted of course assessments requiring the application of these three competences to the contents about pedagogy and psychotherapy. The combined training approach led to significant increases in declarative knowledge, advanced epistemic beliefs, and greater self-efficacy in implementing strategies relating to multiple document literacy and argumentative thinking. This approach can be adapted to accommodate different psychological content areas or different cross-domain competences.

How does self-compassion support feedback literacy after negative feedback? A systematic review

Keywords: Attitudes and Beliefs, Emotion and Affect, Motivation and Emotion, Self-regulation

Presenting Author:Helena Laudel, Dresden Technical University, Germany; **Co-Author:**Susanne Narciss, TU Dresden, Germany

Feedback literacy describes the competence to make meaning of feedback and to actively use it for the learning process (Carless & Boud, 2018). This is particularly challenging with negative feedback that contains information about mistakes or failures, as it can be self-threatening and thus hinder learning. (Eskreis-Winkler & Fishbach, 2019). Self-compassion could support learners to overcome this threat of negative feedback and thereby strengthen feedback literacy: it is to maintain a non-judgmental, understanding and caring attitude towards oneself in situations of failure or stress (Neff, 2003). This work aims at providing an initial overview of empirical research that links self-compassion and feedback literacy regarding negative feedback. The systematic literature search was structured according to PICOS and yielded seven studies that met all inclusion criteria. Categorizing the results within the four facets of feedback literacy revealed mainly positive effects of self-compassion on (1) "managing affect" and (2) "appreciating feedback" and a research gap regarding the relationship of self-compassion and (3) "making judgements" and (4) "taking action". Accordingly, promoting self-compassion could be a strategy to strengthen feedback literacy but further research is needed, particularly to investigate the effects of self-compassion on motivation and learning activities after negative feedback.

Interdisciplinarity in project-based academic education: A two-step co-creation approach

Keywords: Higher Education, Instructional Design, Interdisciplinarity, Problem-based Learning

Presenting Author:Xin Ming, ELAN Department of Teacher Development, Department of Philosophy, University of Twente, Netherlands

Interdisciplinarity is increasingly valued in academic education. A dominant way of weaving interdisciplinarity in academic curricula is by means of project-based courses. To what extent and how such courses bring about interdisciplinary experiences and promote interdisciplinary competencies, however, is largely unknown. This paper describes two studies aiming to shed light on interdisciplinarity in project-based academic education. In the context of a Liberal Arts and Science course, a first study based on observation and interviews analyzed how interdisciplinarity is enacted in project work. The results showed that interdisciplinary experiences are constructed in complex dynamics between students' disciplinary identity formation and the interdisciplinary and collaborative course configuration. Such dynamics may result in positive learning experiences (engagement and interdisciplinary enrichment) as well as negative ones (disengagement and frustration). A second study uses co-creation to make sense of the findings regarding interdisciplinarity and invent potential course improvements. In the co-creation session (scheduled in February 2022), the program director, the two teachers, and two students participate. The analysis focuses on course design features that may promote interdisciplinarity, their merits and restrictions according to the different stakeholders, and the stakeholders' underlying views on interdisciplinarity.

Reading online unique and multiple texts in different conditions of availability

Keywords: Comprehension of Text and Graphics, Literacy, Problem Solving, Reading Comprehension

Presenting Author:Giannina Bustamante Oliva, Pontificia Universidad Católica del Perú, Peru

In two pilot studies preparatory towards the final experiment, we evaluated the reading competence of adolescents in three different age groups corresponding to sixth grade, eleventh grade and first year of university. The assessment was made virtually using a platform specially designed to assess reading in digital environments and monitored through Zoom platform. The test consists of presenting each student with two different reading scenarios, combining single and multiple texts, in situations of availability or non-availability. The influence of these conditions on the performance of the reading tasks in the three tested groups was analyzed. The results confirm several of the hypothesis, especially those referring to the positive influence of the educational level of the readers, to better performances when working with a single text in conditions of availability; however, questions arise about factors that influence the execution of tasks based on multiple texts in conditions of non-availability. This research points out new didactic routes for schoolteachers and university professors, spaces where it is required to work with students in the reading of multiple sources in conditions of virtuality.

Session D 2

20 July 2022 09:00 - 10:30

Room 248

Roundtable

Learning and Special Education, Teaching and Teacher Education

Teacher Education and Professional Development

Keywords: Attitudes and Beliefs, Competencies, Metacognition, Mixed-methods Research, Motivation, Pre-service Teacher Education, Self-efficacy, Self-regulation, Special Education, Teacher Professional Development

Interest group: SIG 08 - Motivation and Emotion, SIG 14 - Learning and Professional Development, SIG 16 - Metacognition and Self-Regulated Learning

Chairperson: Addisu Bailie, Simon Fraser University, Canada

Developing a resource-oriented measure to foster self-determined motivation in learning processes

Keywords: Competencies, Motivation, Pre-service Teacher Education, Self-regulation

Presenting Author:Mara Kaemper, Paderborn University, Germany; **Co-Author:**Katrin B. Klingsieck, University of Paderborn, Germany

Students in teacher education programs seem to lack the self-determined motivation to work on key competencies such as social skills and self-organization that are important to the teacher profession. Since self-determined motivation has also been shown to be associated with less procrastination, decreased drop-out intentions, better academic integration and increased self-efficacy, we are developing a coaching program which is to foster students' self-determined motivation. The coaching program consists of three main aspects. First, participants complete an Online Self-Assessment which provides individual feedback on several key competencies. Second, participants formulate personal goals for their studies in a resource-oriented way in a workshop based on the Zurich Resource Model. Third, participants gather regularly in moderated groups over an extended period to promote academic integration and self-efficacy. The coaching program will be evaluated several times over the course of multiple semesters. We aim to establish the motivation coaching program as long-term program at the University to support students in the teacher education program during their studies and in their profession.

The relevance of teachers' metacognitive competencies in promoting metacognitive competencies.

Keywords: Metacognition, Mixed-methods Research, Self-regulation, Teacher Professional Development

Presenting Author:Amina Rosenthal, University of Applied Sciences Northwestern Switzerland, Switzerland

Abstract: Self-regulated learners possess cognitive, motivational, and metacognitive competencies. These self-regulated learning (SRL) competencies correlate with academic achievement, mastery of diverse challenges, and lifelong learning (Dent & Koenka, 2016). However, students often demonstrate low SRL competencies, particularly in metacognition, making it essential to promote them (de Boer et al., 2018). Teachers play a crucial role in promoting metacognitive competencies (Karlen et al., 2020) but rarely promote them (Dignath & Büttner, 2018). The reasons for this have hardly been investigated so far. In this Ph.D. project, we are interested in the extent to which teachers' metacognitive competencies influence their teaching behavior and, mediated by this, influence students' metacognitive competencies. These questions are part of a longitudinal research project on teachers' professional SRL competencies. The first measurement point's multi-method data (questionnaire, knowledge tests, videography) are available, and the results will be presented in the roundtable session. They serve as a basis for further discussion.

Teachers' attitudes and self-efficacy towards gifted students: effects of a training program.

Keywords: Attitudes and Beliefs, Self-efficacy, Special Education, Teacher Professional Development

Presenting Author: Lucia Barrenetxea-Mínguez, University of Deusto, Spain; **Co-Author:** Ernesto Panadero, Universidad Deusto, Spain

Background: Teachers' attitudes towards gifted and talented education impact the quality of teaching to meet the needs of these students. Therefore, it is essential to study teachers' beliefs about these students. Research on teachers' attitudes towards the educational response to gifted and talented students contributes to the design of training to promote quality educational responses. In order to achieve progress and sustainability in gifted education, there is a strong need to create and improve teacher-training courses in the area of gifted education. Aim: This study aims to investigate whether teacher attitudes toward gifted and talented education change after receiving training on it. Sample: Potential participants are 56 teachers in one public school, and the sample will be comprised of pre-school, primary and secondary school teachers. Methods: The study will employ a pre-post training design. Variables like professional experience with gifted and talented students, previous training and self-efficacy will be studied. Results and conclusions: This is ongoing research. It is expected that teachers will change their attitudes toward gifted and talented gifted education. Questions for debate with the audience: We will seek feedback from the attendees about the design of the study.

Session D 3

20 July 2022 09:00 - 10:30

Room 249

Sponsored Session

Investigating Educational Practices in Order to Improve and Develop Quality Education

Keywords: Communities of Practice, Interdisciplinarity, Researcher Education, Secondary Data Analysis

Interest group:

Given the complexity of education, the question legitimately arises: what components can be a target to be investigated and presented in the JES_MDPI? The answer is short and seemingly simple: all! In general, the scientific research supported by the promoted journal is a structured activity of obtaining by specific methods of concrete data in order to solve theoretical or practical problems specific to the educational field. The publication of research results in the journal is an important point for the evolution of the reflective practitioner who wants to become useful through the conclusions presented to other practitioners and researchers. The study presents a fact-finding analysis on the topics addressed in the articles published in the JES. Educational research, due to the complexity of the object of investigation, involves interdisciplinary approaches, so when we talk about the community of specialists in educational sciences, in addition to specialists in pedagogy, we also consider specialists in other fields who have relevant research for education. The conclusions of the study summarize the current concerns of researchers in the field of education in line with the challenges of the contemporary world.

Investigating Educational Practices in Order to Improve and Develop Quality Education

Presenting Author: Nemoiu Mihai-Alexandru, University of Craiova, Romania; **Presenting Author:** Alexandrina Mihaela Popescu, University of Craiova, Romania

Given the complexity of education, the question legitimately arises: what components can be a target to be investigated and presented in the JES_MDPI? The answer is short and seemingly simple: all! In general, the scientific research supported by the promoted journal is a structured activity of obtaining by specific methods of concrete data in order to solve theoretical or practical problems specific to the educational field. The publication of research results in the journal is an important point for the evolution of the reflective practitioner who wants to become useful through the conclusions presented to other practitioners and researchers. The study presents a fact-finding analysis on the topics addressed in the articles published in the JES. Educational research, due to the complexity of the object of investigation, involves interdisciplinary approaches, so when we talk about the community of specialists in educational sciences, in addition to specialists in pedagogy, we also consider specialists in other fields who have relevant research for education. The conclusions of the study summarize the current concerns of researchers in the field of education in line with the challenges of the contemporary world.

Session D 4

20 July 2022 09:00 - 10:30

Room 250

Single Paper

Motivational, Social and Affective Processes, Teaching and Teacher Education

Video Analysis in Pre-Service Teacher Education

Keywords: Content Analysis, Educational Psychology, Instructional Design, Motivation, Multimedia Learning, Pre-service Teacher Education, Quasi-experimental Research, Video Analysis

Interest group: SIG 08 - Motivation and Emotion, SIG 11 - Teaching and Teacher Education

Chairperson: Diego Posada, University of Padova, Italy

An expert model to support teacher students' video analyses of classroom situations

Keywords: Instructional Design, Pre-service Teacher Education, Quasi-experimental Research, Video Analysis

Presenting Author: Jasmin Lilian Bauersfeld, TU Dortmund, Germany; **Co-Author:** Bernadette Gold, University of Erfurt, Germany

Noticing relevant classroom situations and their knowledge-based interpretation, or professional vision, is necessary for classroom management. Professional vision is fostered through guided analysis of classroom videos. Because teacher students lack prior knowledge to analyze classroom situations, novices benefit from instructional support in their video analysis of classroom situations. The study investigated whether an expert model as a worked example for a video-based analysis of classroom situations can enhance teacher students' acquisition of professional knowledge and professional vision. In an eight-week course, 292 teacher students conducted video analyses on classroom management: 214 teacher students were given an expert model, while 78 teacher students did not receive one. In pre-post-tests, teacher students' professional knowledge and professional vision were surveyed. For data analyses using repeated-measures ANOVAs, 78 case-control matched pairs were selected. Both groups increased their professional vision and professional knowledge. The control group showed higher increases than the experimental group in professional knowledge. The groups did not differ in their development of professional vision. The mere presentation of an expert model of video analysis did not enhance the acquisition of professional vision and it even seems to be hindering for the acquisition of professional knowledge. Possible interpretations of the results are discussed.

Exploring Preservice Teachers' Professional Vision of Small-Group Tutoring from Video Analysis

Keywords: Content Analysis, Multimedia Learning, Pre-service Teacher Education, Video Analysis

Presenting Author: Meg Farrell, Technische Universität München, Germany; **Co-Author:** Monika Martin, Albert-Ludwigs-Universität Freiburg, Germany; **Co-Author:** Alexander Renkl, University of Freiburg, Germany; **Co-Author:** Werner Rieß, Freiburg University of Education, Germany; **Co-Author:** Tina Seidel, Technische Universität München, Germany

Tutoring is an effective teaching method, offering more opportunities for student-centered instruction. However, to master this instructional context, teachers need knowledge and practice within teacher education. Accordingly, video-based training of *professional vision* (PV) shows promise by helping (future) teachers improve in *noticing* and describing important teaching and learning components, and using professional knowledge to *reason* and interpret them. In the following study, we developed a video analysis training for preservice teachers to build PV skills (i.e., describing and interpreting) in tutoring. Our investigation aims to uncover the gaps in tutoring-specific PV skills by exploring the video analysis performance of 42 preservice teachers in Germany. With qualitative (scaled)

content analysis, we assess the components and quality of their descriptions and interpretations of noticed tutoring events. We found that most descriptions had limited information specificity and focused on general pedagogical tutoring strategies rather than content-specific techniques. Most preservice teachers' interpretations, however, contained knowledge-based components (i.e., explaining, predicting), with only some uninformed arguments. Still, argumentation quality was low. A first look into the typical range of tutoring PV skills for preservice teachers provides a baseline for further support, investigations, and applications of this new stimulus to PV teacher education.

Utility-Value Change in a Video-Based Intervention: A Matter of Preservice Teachers' Experiences?

Keywords: Educational Psychology, Motivation, Pre-service Teacher Education, Quasi-experimental Research

Presenting Author: Mathias Dehne, Friedrich Schiller University Jena; Leipzig University, Germany; **Co-Author:** Alexander Groeschner, Friedrich Schiller University Jena, Germany

According to situated expectancy-value theory, expectancies and values are situative in nature, and the social and experiential background contributes to the long-term ontogeny of differences within and between persons in the cognitive, affective, and behavioral parts of the model. This claim deserves attention not just regarding situational fluctuations in expectancies and values but also regarding interventions targeting students' interpretations of experiences. By situating preservice teachers' learning experiences and addressing their experiential backgrounds in an easy-to-implement intervention, we aimed to bridge this gap in the research. Drawing on video feedback in teacher education, where this type of situated intervention is used to enhance preservice teachers' noticing in teaching and learning, we further targeted students' utility values and investigated utility-value change during a teaching practicum in a group noticing their own teaching with video ($nIG = 55$) compared to a group noticing without video ($nCG = 74$). Video, singularly, was not effective for utility values. By harnessing an intervention addressing students' interpretation of experiences, the IG differed by about .50 *SD* in their latent mean scores. The findings are reflected by taking into account multigroup comparisons of the effects of emotional cost.

Session D 5

20 July 2022 09:00 - 10:30

Room 256

Single Paper

Lifelong Learning, Motivational, Social and Affective Processes

Motivation and Self-Regulated Learning

Keywords: Competencies, Comprehension of Text and Graphics, Educational Challenges, Emotion and Affect, Higher Education, Lifelong Learning, Meta-Analysis, Motivation, Quantitative Methods, Secondary Education, Self-efficacy, Self-regulation

Interest group: SIG 03 - Conceptual Change, SIG 08 - Motivation and Emotion

Chairperson: Tun Zaw Oo, Hungary

Motivational regulation and academic satisfaction: A four-wave panel study

Keywords: Higher Education, Motivation, Self-efficacy, Self-regulation

Presenting Author: Olena Kryshko, Universität Duisburg-Essen, Germany; **Co-Author:** Jens Fleischer, Ruhr-University Bochum, Germany; **Co-Author:** Carola Grunschel, University of Muenster, Germany; **Co-Author:** Detlev Leutner, University of Duisburg-Essen, Germany

Although research on motivational regulation, as an important component of self-regulated learning, has increased considerably in the past two decades, previous findings stem mainly from cross-sectional data. This four-wave panel study explores the longitudinal associations between two aspects of motivational regulation (self-efficacy for motivational regulation and use of motivational regulation strategies) as well as their respective associations with two dimensions of academic satisfaction (satisfaction with study content and satisfaction with coping with study-related stress) in university students (N=574). Using random intercept cross-lagged panel models (RI-CLPMs), associations regarding stable interindividual differences (at the between-person level) could be distinguished from associations regarding intraindividual processes over time (at the within-person level). At the between-person level, the two motivational regulation constructs were positively associated with each other as well as with satisfaction with study content and satisfaction with coping with study-related stress. At the within-person level, changes in self-efficacy beliefs negatively predicted subsequent changes in the frequency of strategy use and positively predicted subsequent changes in both satisfaction dimensions, while other cross-lagged effects were not statistically significant. These findings accentuate the importance of longitudinal research that disentangles between-person from within-person associations, providing more nuanced insights into the complex process of self-regulated learning.

Creating sketchnotes with 5th-grade students: Impacts on achievement emotions

Keywords: Comprehension of Text and Graphics, Emotion and Affect, Quantitative Methods, Secondary Education

Presenting Author: Laura Ohmes, Carl von Ossietzky University Oldenburg, Germany; **Co-Author:** Juliane Schlesier, University of Oldenburg, Germany; **Co-Author:** Stefan Schneider, Gymnasium Melle, Germany; **Co-Author:** Barbara Moschner, Carl von Ossietzky Universität Oldenburg, Germany

Sketchnoting is a note-taking strategy that builds on creating notes with words and pictorial representations such as drawings (Perry et al., 2018). To date, there has been little research on sketchnoting as a teaching-learning method, although there are indications that it can lead to enjoyment and help students understand and remember information (Perry et al., 2018; Treptow, 2020). Therefore, this study investigates how sketchnoting influences achievement emotions (pride, curiosity, enjoyment, shame, boredom, confusion, anxiety, frustration) of 5th-grade students (55.91 % female, 44.09 % male) who are confronted with new learning content in a German grammar lesson. Data were collected in a pre-post-test design with both an intervention group and a control group. First results suggest that the intervention group (sketchnoting group) had significantly higher values of positive emotions (enjoyment, pride, curiosity) than the control group after the intervention ($p < 0.01$). Moreover, values of boredom were significantly lower in the sketchnoting group ($p = 0.04$). Accordingly, sketchnoting should be used in schools to promote positive emotions and thus children's academic well-being. Further investigations should analyse the conditions under which sketchnoting boosts positive emotions and whether sketchnoting fosters other aspects, such as motivation, that are relevant to the teaching-learning process.

The role of SDL while supporting NEETs: theoretical model based on systematic literature review.

Keywords: Competencies, Educational Challenges, Lifelong Learning, Meta-Analysis

Presenting Author: Kerli Kõiv, University of Tartu, Institute of Educational Science, Estonia; **Co-Author:** Katrin Saks, University of Tartu, Estonia

Self-directed learning (SDL) as a key component of life-long learning has become increasingly important in a rapidly changing society. SDL competencies support continuous personal development and coping with change. At the same time, there is a significant number of young people in the society who do not participate in working life, education or training (NEETs) and are characterized by low levels of motivation and skills. Therefore, the question arises as to how to operationalize the concept of SDL for the people not in education and employment, and how to measure their competencies in it. This literature review is based on the analysis of 28 articles. The concept, dimensions, and assessment methods of SDL were analyzed. The results were synthesized considering the specifics of NEETs. As a result, a theoretical model was developed that describes the construct of SDL considering the characteristics and needs of NEETs. Such kind of theoretical modelling is important for developing appropriate assessment and intervention tools related to the SDL competencies for the target group.

Session D 6

20 July 2022 09:00 - 10:30

Room 254

Single Paper

Educational Effectiveness and Improvement

Keywords: Assessment Methods and Tools, Content Analysis, Higher Education, Learning Technologies, Meta-Analysis, Qualitative Methods, School Effectiveness, Student Learning

Interest group: SIG 18 - Educational Effectiveness and Improvement

Chairperson: Yagmur Cisem Yilmaz, Tallinn University, Estonia

Assessment Methods and Simulation-Based Learning Outcomes: A Meta-analysis

Keywords: Assessment Methods and Tools, Higher Education, Learning Technologies, Meta-Analysis

Presenting Author:Alvaro Darcourt, Ludwig Maximilian University, Germany; **Co-Author:**Olga Chernikova, Ludwig Maximilian University, Germany

Simulation-based learning is an effective means of developing complex skills. Previous studies have focused on identifying instructional aspects that would explain the effectiveness of simulation-based learning, such as cognitive load and feedback (Cook et al., 2013). However, the possible influence of the assessment format used to measure learning outcomes is not explored systematically. The present meta-analytic study of 78 research papers aimed at evaluating the moderating role of assessment methods (i.e., type of measure, test's delivery format, performance task's assessment time point and scoring method, as well as test situation) on the impact of simulation-based learning (SBL) environments in higher education. Random-effect models with RVE correction were used. We found a high amount of heterogeneity across studies. Although results corroborated that SBL interventions facilitate complex skills, we did not find sufficient evidence that assessment formats can explain the differences in outcome scores. However, simulations produced higher scores when experts scored task performance than when automatic scoring was used.

What can school give? Towards opening the black box of school engagement

Keywords: Content Analysis, Qualitative Methods, School Effectiveness, Student Learning

Presenting Author:Pauliina Rantavuori, Tampere University, Finland; **Co-Author:**Yrjö Engeström, University of Helsinki, Finland

Currently, at least 4000 students do not go to school at all in Finland, 40 % of adolescents do not like to go to school, and adolescents experience school exhaustion more than before. This study explores the views of adolescent students, school staff, and school partners in interviews about the school, peers, and personal interests. For data gathering, we used semi-structured theme interviews, and thematic analysis was applied as the analytical method. The data consists of 29 interviews with adolescent students, school staff, and school partners. For all the three groups, the findings show a limited emphasis on the contents of the school subjects compared to the greater emphasis given to peer relations. Although involvement and participation are crucial to engagement, students were not involved in the planning of teaching and learning. What is taught and why in schools is contained as if in a black box that seems to be difficult to touch and that is not discussed. The essential point we would like to bring to the discussion is how to develop teaching and learning in school so that it can become meaningful for adolescent students.

SIG Invited Symposia 1

20 July 2022 11:00 - 12:30

Room 254

JURE 2022 SIG Invited Symposium

Lifelong Learning

Tackling challenges at the workplace – identification, approaches and concepts

Keywords: Collaborative Learning, Computer-assisted Learning, Developmental Processes, Ethnography, Informal Learning, Learning Approaches, Lifelong Learning, Professions and Applied Sciences, Qualitative Methods, Quantitative Methods, Workplace Learning

Interest group: SIG 14 - Learning and Professional Development

Chairperson: Sebastian Anselmann, University of Education Schwäbisch Gmünd, Germany

Organiser: Sebastian Anselmann, University of Education Schwäbisch Gmünd, Germany

Discussant: Aitana González Ortiz de Zárate, Spain

These are changing times. In fact, they always have been, but these times seem special in multiple ways. Research on workplace learning is shaped by constant changes and the persistent aim for identifying the current needs, finding new approaches and structuring the concepts. Apart from this digitalization used to be a massive catalysator for thinking out of the box. Not to mention the Covid-19 pandemic. This, truly makes it into *unpredictable challenges in a rapidly changing world*. These changes influence research on workplace learning which aims on identifying current needs and affordance from employees and employers throughout the domains and find new approaches and ways to cope with challenges. This symposium aims to set a broader perspective on the challenges at the workplace and on learning at the workplace in exemplary domains. It focuses on the healthcare sector, the retailing and, the consultancy domain. In the four papers of this symposium challenges and new approaches will be addressed. The first papers takes a look on professional learning in immersive virtual reality simulation (IVRS) training in healthcare. The second paper investigates new challenges for health professionals, such as constructing and negotiating categories when designing a patient information system for multiple contexts of use. The third paper addresses the role of leadership, in companies related to retailing, medicine and consulting. The forth paper reflects on barriers to learning at the workplace. It explores what hinders learning or may affect the accomplishment of learning activities in the field of consultancy.

Professional learning in immersive virtual reality simulation (IVRS) training in healthcare

Presenting Author:Emilia Lampi, University of Jyväskylä, Finland; **Co-Author:**Katja Vähäsantanen, University of Jyväskylä, Finland; **Co-Author:**Raija Hämäläinen, University of Jyväskylä, Finland

The unpredictable, fast-paced and safety critical field of healthcare requires not only a wide range of competencies, but continuous professional learning from novice and experts alike. In order to provide valuable learning experiences and overcome the barriers of learning, including limited time resources, solutions have been sought from immersive virtual reality simulations (IVRS), that provides stable, safe and resource-wise learning environments. Although an increasing number of IVRS target teaching healthcare related topics, more empirical evidence is needed to understand how IVRS affects professional learning, and whether IVRS can help tackle global challenges (e.g. possibility to practice safely) in healthcare and education.

In order to advance the understanding of IVRS in education and professional learning in healthcare, we conducted a clinical IVRS for seven teams consisting of 2-3 doctors and nurses. A video recording was taken from each simulation, and the participants' heart rate variability (HRV) was measured. Afterwards, the teams were interviewed regarding their experiences, perceived professional learning and emotions. The results of this study indicate that healthcare experts see a great potential in the educational use of IVRS, although their own perceived learning gains remained low. They also identified a variety of factors enhancing and hindering their learning, as well as diverse emotions evoked in IVRS. The results of this study illustrate the constraints and affordances of the use of IVRS in professional learning, and contribute to the wider framework of IVRS learning and remote learning tools and practices.

New challenges for health professionals

Presenting Author:Christopher Sadorge, University of Oslo, Faculty of Education, Norway; **Co-Author:**Monika Børøe Nerland, University of Oslo, Norway; **Co-Author:**Asa Makitalo, University of Gothenburg, Sweden

Extensive research has focused on the implications of digitalisation for professional work and learning using technologies, especially in the health sector. This study aims at exploring the less investigated topic of how health professionals take part in the design of work technologies and how this design work also implies efforts to reconfigure practices, tasks and responsibilities in multiple service contexts. We employed an ethnographic approach and followed a design team of health professionals and IT developers over a year. The team was mandated to develop a digital technology for the registration and sharing of patient information across units of health care in a larger Norwegian city. Furthermore, the city administrations' investments in the design project were part of a larger

initiative to develop structured patient data in ways that are suitable for analytics and meet the needs of service workers. Data from meeting observations were analysed to explore how categories were worked upon as objects of design. Our analysis shows how tensions arise when routines and practices in different service contexts are accounted for in the design process. These tensions are sought resolved through testing and trying out categories for different contexts of use. We discuss how participation in design processes brings extended responsibilities to professionals who become involved in the reorganisation of work, not only in their local service context but also for other users and contexts.

Leading and learning: the role of leadership in social informal learning

Presenting Author:Samantha Crans, Maastricht University, Netherlands; **Co-Author:**Simon Beusaert, Maastricht University, Netherlands

Lifelong learning is crucial for professionals to continuously develop and update their knowledge and skills, and for organizations to create and sustain competitive advantage. In this regard, the current study investigates how learning leadership as an organizational factor can contribute to social informal learning (i.e., feedback, help and information seeking). Structural equation modelling was performed to investigate the relation between learning leadership and social informal learning. 228 employees working in a Dutch food retailer, a German firm operating in the medical technology industry and a German consulting firm contributed to the survey study. The results revealed direct effects of learning leadership to all three social informal learning activities. The largest effect was found for the use of seeking feedback. Our findings advance informal learning literature by exploring the role of learning leadership as a pivotal factor for social informal learning. Our research provides implications for future research and practice.

Barriers to learning at the workplace

Presenting Author:Sebastian Anselmann, University of Education Schwäbisch Gmünd, Germany

Barriers to learning represent a critical, yet understudied, issue in workplace learning. Barriers to learning at the workplace are factors that hinders the initiation of successful learning, interrupt learning possibilities, delay the proceedings, or end the learning activities much earlier than intended. In order to investigate on barriers to learning three steps have been taken. An exploratory interview study was conducted to assess potential learning barriers of counselors ($N= 26$; Anselmann, under review). From this, and based on Belling et al. (2004) and Crouse et al. (2011), a measurement instrument to capture barriers to learning was developed and validated ($N= 112$; Anselmann, under review). A newly designed measurement instrument includes five subscales (Structural and Domination Relationships; Individual Conditions; Constraints; Technology; Team / Interpersonal Constraints) has been used in a cross-sectional questionnaire study ($N=230$). In the online-questionnaire validated scales on barriers to learning (Anselmann, sub.), informal workplace component (Decius et al., 2019) and hiding knowledge (Peng, 2013) were used. The data were analyzed using descriptive statistics, correlation analysis, and SEM. The SEM-model shows an acceptable fit (CFI .91 SRMR .06 RMSEA .04). Results indicate that structural learning barriers are related to team-related learning barriers ($\beta= .68$, p

SIG Invited Symposia 2

20 July 2022 11:00 - 12:30

Room 252

JURE 2022 SIG Invited Symposium

Learning and Instructional Technology, Learning and Special Education

Implementing digital tools to support learning across different populations

Keywords: Cognitive Skills, E-learning/Online Learning, Game-based Learning, Higher Education, Learning and Developmental Difficulties, Learning Technologies, Literacy, Mathematics, Numeracy, Special Education, Student Learning

Interest group: SIG 15 - Special Educational Needs

Chairperson: Erica Ranzato, UCL, United Kingdom

Organiser: Nadina Gómez-Merino, University of Valencia / Interdisciplinary Research Structure for Reading Research (ERI Lectura), Spain

Organiser: Erica Ranzato, UCL, United Kingdom

Discussant: Erica Ranzato, UCL, United Kingdom

Although digital tools have always been considered an attractive way to supplement students' learning, the ongoing pandemic has made them essential for education. In fact, COVID-19 has pushed teachers to incorporate these tools in the classroom and to use them with different populations of students. Many challenges may raise with the adoption of these tools, and therefore, they merit discussion. This symposium aims at investigating the efficacy of digital tools and whether they can support learning of different populations. The first presentation investigates the effect of the use of an app (the SWAN game) to support basic mathematical skills of individuals with developmental language disorders. The second presentation reviews a number of studies that use tablet technology equipped with the "onecourse" software to support foundational numeracy and literacy skills in populations with different learning difficulties and levels of Socioeconomic Status, such as learners at risk of underachieving, students with Down syndrome, and children living in remote villages. The final presentation focuses on university students and compares face to face and online learning methodologies and their influence on cognitive load and attention. Together, these studies provide evidence that some digital learning tools are effective with specific populations. However, they also highlight that there are some challenges that need to be addressed. Also, these studies contribute to a wider discussion about the recommendations that need to be followed to maximise the impact of interventions when implementing digital tools in education.

The SWAN game-based approach to building basic number knowledge

Presenting Author:Chris Donlan, University College London, United Kingdom; **Co-Author:**Carolyn Bruce, University College London, United Kingdom; **Co-Author:**Caroline Newton, University College London, United Kingdom; **Co-Author:**Vanessa Meitanis, University College London, United Kingdom

The SWAN game is designed to support the development of basic number knowledge in children with developmental language disorders (DL) (Bishop et al. 2017; Donlan et al. 2007). SWAN engages the player in identification of number sequences of increasing range and complexity. Numbers are randomly arranged and presented in visual matrix form, on a tablet or phone. As the player selects each consecutive Arabic numeral, the spoken form is played aloud. Gaming technology supports sequence selection and encourages mass practice through high motivation. The game comprises 140 levels graded according to developmental stage with variation in number range, matrix size and sequence type. A series of single case studies explored use the SWAN app as an intervention to support number knowledge in young children with DL. Significant improvement in transcoding and/or counting skills was found for some but not all individuals. Motivation to play was generally very high. Gameplay data were analysed according to breakdown and breakthrough events (Iacovides et al. 2015). Some participants were able to break through obstacles independently. Others made little progress, despite maintaining high motivation. Evidence that item-specific gains in number knowledge were matched to breakthrough gameplay was compelling. Parents and school staff suggested that the game would be beneficial to children and teachers working in UK Year 1 (age 6-7), especially for those with low levels of numeracy.

Insights into how tablet technology can support children with SEND to acquire foundational skills

Presenting Author:Bethany Huntington, University of Nottingham, United Kingdom; **Co-Author:**Nicola Pitchford, University of Nottingham, United Kingdom

Tablet technology equipped with interactive apps is becoming increasingly common in primary schools to support the acquisition of foundational skills (numeracy and literacy) by mainstream early grade learners. Yet, to address Sustainable Development Goal 4 - Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all – this technology also needs to be effective for children with Special Educational Needs and Disabilities (SEND). Here, we draw insights from five studies conducted by our research team that have utilised tablet technology equipped with the award-winning 'onecourse' software, developed by onebillion, to examine how this technology might support learning of foundational skills by children with varying levels of SEND. The studies were conducted in the UK, Malawi, Sierra Leone, and Tanzania, with children in mainstream primary schools at risk of underachievement, children with SEND attending special units within state primary schools, children with Down's Syndrome in special schools, and out-of-school children living in remote villages where access to primary education is extremely limited. This cross-cultural comparison revealed that tablet technology can effectively support learning of basic numeracy and literacy skills by children with SEND in high- and low-income countries. The interactive onecourse software promotes high levels of engagement with the learning task by children with SEND, fosters child-paced learning that is adaptive to individual needs, and engenders an inclusive learning environment.

However, for children with profound difficulties, additional assistive aids might be needed to enhance usability and learning.

Face-to-face vs video-recorded lectures: attention and short-term retention in university students

Presenting Author:Costanza Ruffini, University of Florence, Italy; **Co-Author:**Christian Tarchi, University of Florence, Italy; **Co-Author:**Lucia Bigozzi, Università di Firenze, Italy; **Co-Author:**Chiara Pecini, University of Florence, Italy; **Co-Author:**Noemi Russo, University of Florence, Italy; **Co-Author:**Irene Del Pistoia, University of Florence, Italy

Remote Learning (RL) has become a way of learning that is increasingly used in universities following the emergency from Covid-19. Most studies on RL investigate students' perception. The present study aimed to understand the cognitive processes underlying RL in university students in comparison to classical face-to-face learning (FtFL). Specifically, sustained attention before (simple sustained attention task) and during a lesson (dual sustained attention task) and learning performances were measured on 91 Psychology students in three conditions: FtFL, video-recorded lecture alone and video-recorded lecture in pair. Results showed that groups did not differ in the learning test even if video-recorded group needed more time to complete it. Moreover, an effect of the learning setting on the attentional processes was recorded, as both in the simple and dual attention tasks, the video-recorded group was slower than the face-to-face group and made more errors during the dual sustained attention task.

SIG Invited Symposia 3

20 July 2022 11:00 - 12:30

Room 256

JURE 2022 SIG Invited Symposium

Motivational, Social and Affective Processes

The Role of Motivation and Emotion in Education in Challenging Times

Keywords: Achievement, Collaborative Learning, COVID-19, Cultural Diversity in Schools, Emotion and Affect, Higher Education, Mathematics, Motivation, Motivation and Emotion, Quantitative Methods, Secondary Education

Interest group: SIG 08 - Motivation and Emotion

Chairperson: Julia Morinaj, University of Bern, Switzerland

Organiser: Juliane Schlesier, University of Oldenburg, Germany

Organiser: Julia Morinaj, University of Bern, Switzerland

Discussant: Laura Ohmes, Carl von Ossietzky University Oldenburg, Germany

Abstract

Students' motivation, emotions, well-being and interest in learning are crucial for learning processes within education, and as such, are meaningful for the development of our societies. However, especially the period of adolescence (Gnamb & Hanfstingl, 2016) as well as a plethora of wide-ranging old and new global challenges, such as social and economic inequality or the COVID-19 pandemic, strongly affect students' lives and their well-being (Cowie & Myers, 2021; Kraus et al., 2017). Thus, the objectives of this symposium are to (a) share findings of research investigating motivation and emotion in education in challenging times and (b) highlight their impact for successful education and sustainable development. In particular, the studies examine: how motivation and stress levels of secondary school students in Austria change before and during the COVID-19 pandemic and how these changes are affected by their socioeconomic background (presentation 1); how secondary school students in Finland perceive face-to-face group work during the Covid-19 pandemic and how these perceptions are associated with their situational interest (presentation 2); how secondary school students' motivational trajectories in German schools differ between groups with different achievement levels and how instructional quality influences different motivational trajectories (presentation 3); and how emotion regulation and personal optimism of secondary school students in Switzerland is associated with their well-being in school (presentation 4). Taken together, the findings of the four studies conducted in four differential country settings (Austria, Finland, Germany, Switzerland) shed further light on the impact of motivation and emotion for learning in challenging times.

Secondary school students' stress and motivation during the COVID-19 pandemic

Presenting Author:Alexandra Postlbauer, Johannes Kepler University Linz, Austria; **Presenting Author:**Andrea Wisenöcker, Johannes Kepler University Linz, Austria; **Co-Author:**Ramona Obermeier, Johannes Kepler Universität Linz, Austria

The COVID-19 pandemic led to school closures across the world and contributed to massive changes in students' learning motivation and stress experience. Existing studies have focused on descriptive analysis of those aspects. Only few longitudinal findings address changes in various learning-related aspects before and during the pandemic. Existing differences in students' socioeconomic status have also been addressed only sporadically. Motivation during and stress before and during school lockdowns was captured using single items on a 5-point Likert-scale (*1 = does not apply - 5 = applies*). Using data from $N = 1,566$ upper secondary school students (average age: $M = 16.58$, $SD = 1.30$; 68.3% female; 9.9% with migration background), we found that students were moderately motivated with following lessons at school in general ($M = 3.26$, $SD = 1.01$). During the lockdowns students merely reported that they completed their tasks just because they were supposed to ($M = 3.84$, $SD = 1.18$) and not due to intrinsic reasons. Further manifest linear random-intercept-random-slopes models showed that students' experience of stress increased during school closures. While the stress levels were moderate before the pandemic ($M = 2.83$, $SD = 1.10$) and just a little higher during the first lockdown ($M = 2.85$, $SD = 1.31$), students reported much higher stress levels during the second and third lockdown in Austria ($M = 3.83$, $SD = 1.14$). Furthermore, the stress levels seemed to incline as a function of social background as students whose mother tongue was not German reported higher a higher increase regarding their perceived stress.

Students' group work perceptions and situational interest in face-to-face collaborative learning

Presenting Author:Tatiana Shubina, University of Oulu, Finland; **Co-Author:**Hanna Jarvenoja, University of Oulu, Finland; **Co-Author:**Kristiina Mänty, University of Oulu, Finland; **Co-Author:**Jonna Malmberg, University of Oulu, Finland; **Co-Author:**Sanna Järvelä, University of Oulu, Finland

The Covid-19 pandemic pushed educators and students to revalue face-to-face group learning opportunities. This study builds on the data collected during the Covid-19 pandemic and aims to explore students' group work perceptions and their situational interest in face-to-face collaborative learning. The sample comprised 7 collaborative groups of 20 15-year-old students (21.1 % female) from a Finnish international school. Students' task was to build a robot hand using the instructions on their tablets during two 2-hour sessions. The sessions were recorded using microphones and 360-degree cameras. Also, students were asked with a single-item measurement to report their situational interest (Tapola et al., 2013) and group work perceptions (Volet, 2001) with a 100-point slider on their tablets three times in every session. The results showed that students highly value face-to-face group work for their learning. Despite the overall downward trend in students' situational interest, the group work perceptions remained stable and high throughout the sessions. Group work perceptions were positively associated only with the first observation of students' situational interest. Additionally, we found significant differences between collaborative groups in situational interest and group work perceptions, which will be further qualitatively investigated. Based on the findings, we believe that teachers can take advantage of students' positive attitudes towards group work during the Covid-19 pandemic and use collaborative learning potential for better learning outcomes.

Tracking motivational trajectories of students with differing achievement levels

Presenting Author:Swantje Bolli, Potsdam University, Germany; **Co-Author:**Andrea Westphal, University of Greifswald, Germany; **Co-Author:**Rebecca Lazarides, University of Potsdam, Germany; **Co-Author:**Miriam Vock, University of Potsdam, Germany

Motivation is a valuable resource that promotes students' wellbeing and achievement. In general, students' motivation declines in secondary school, even though research from a person-centred perspective indicates that the level of decline differs systematically between students. While high achievement can coincide with high motivation it is no guarantee that all students showing high achievement in the beginning of secondary school, will also be highly motivated or stay motivated. This study focuses on the heterogeneity of students' development of their subjective task value for German from grade 5 – 9 within and between groups with different achievement levels in grade 5. Data was used from the BiKS-8-14 study (Artelt et al., 2013) including $N = 821$ secondary school students

attending the academic track in Germany. Based on a reading competency test, students were divided into three achievement terciles. Growth mixture modelling is applied to each group in order to identify the number and type of motivational trajectories within achievement groups. The identified trajectories can help pinpoint when and for whom interventions targeting motivation are most needed in the classroom.

Student Well-Being, Personal Optimism and Emotion Regulation among secondary school students

Presenting Author: Jakob Schnell, Universität Bern, Switzerland; **Co-Author:** Katja Saxer, Universität Bern, Switzerland; **Co-Author:** Julia Morinaj, University of Bern, Switzerland; **Co-Author:** Tina Hascher, University of Bern, Institute of Educational Science, Switzerland

This multi-dimensional approach enables to overcome the limitations of prior studies measuring SWB by using a sole indicator in a single domain or several separate measures, missing other dimensions and to focus on the interplay between optimism, emotion regulation and its influence on SWB. A regression analysis with data from the Personal Optimism Scale as independent variable, the Student Well-being Questionnaire as dependent variable and the Affective Style Questionnaire as moderator variable will be conducted. Not only since the global COVID-19 pandemic has hit us, adolescents are growing up in very challenging times, which means that their subjective well-being is at risk. Prior research showed that being optimistic (Diener et al., 2003) and able to regulate emotions (Gross, 2015) supports psychological well-being. Thus, in our study we examine the associations between student well-being (SWB), personal optimism and emotion regulation of 7th grade students ($N = 800$) in Switzerland. To promote a multidimensional view, we use the Student Well-being Questionnaire (Hascher, 2007), which contains three positive emotions and cognitions as well as three negative ones, the Personal Optimism Scale (Gavrilov-Jerković et al., 2014) and the Affective Style Questionnaire (Graser et al., 2018). We expect personal optimism to positively influence SWB in all dimensions and moreover that high levels of emotional regulation moderate this influence even for students who have a less optimistic outlook on their future.

SIG Invited Symposia 4

20 July 2022 11:00 - 12:30

Room 250

JURE 2022 SIG Invited Symposium

Promotion of Self-Regulated Learning (SRL) - Focus on Teachers' Competences and Training

Keywords: Lifelong Learning, Metacognition, Motivation, Pre-service Teacher Education, Primary Education, Secondary Education, Self-efficacy, Self-regulation, Teacher Effectiveness, Teacher Professional Development, Teaching/Instruction

Interest group: SIG 16 - Metacognition and Self-Regulated Learning

Chairperson: Antonia Fischer, German Institute for International Educational Research (DIPF), Germany

Organiser: Johannes Jud, University of Applied Sciences and Arts Northwestern Switzerland FHNW, Switzerland

Organiser: Antonia Fischer, German Institute for International Educational Research (DIPF), Germany

Discussant: Laura Menschaart, TU Delft, Netherlands

Competences in self-regulated learning (SRL) have a positive impact on various aspects like study motivation, academic achievement or lifelong learning. As such, they can be seen as highly relevant skills in a changing world. However, SRL competences do not develop automatically and have therefore to be promoted and supported by teachers. Various research shows that such a promotion is still scarce and more work should be done to find out why teachers do not promote SRL. This symposium focuses on the role of various teacher competences and how they are trained to promote SRL. Firstly, Fernández, Panadero and Dignath investigate the training pre-service teachers have been receiving towards SRL. Results show that this training had focused on training teachers' own SRL competences, centering on cognition, but not that much on how to teach SRL. Second, Fischer and Dignath investigate the relationships of different aspects of teaching competence and student and school variables with the promotion of SRL. This research indicates that teachers' self-efficacy beliefs are the strongest predictor of direct and indirect SRL promotion. Further and following expectation-value theory, Jud et al. explore the impact and interaction of various motivational constructs toward teachers' promotion of SRL. Results highlight the importance of analyzing and fostering teachers' motivation as one of the central professional competences. Finally, Backers and Van Keer examine differences in primary and secondary school teachers' competences. By gaining insight in the differences between both groups, future professionalization programs can be tuned to the specific characteristics of each group.

The Role of Teachers' Self-Efficacy Beliefs for Their Promotion of SRL

Presenting Author: Antonia Fischer, German Institute for International Educational Research (DIPF), Germany; **Co-Author:** Charlotte Dignath, DIPF Leibniz Institute for Education Research Frankfurt, Germany

This contribution examines which teacher competences, such as knowledge, beliefs consistent and inconsistent with self-regulation of learning (SRL) theory, self-efficacy and own self-regulation, as well as which context characteristics on the student, classroom and school level explain differences in teachers' direct and indirect promotion of SRL. 229 teachers participated in an online survey; a subsample of 49 teachers took part in a standardized interview to increase validity of findings. Teacher and context variables explained variation mainly in teachers' direct SRL promotion. Across both studies, teacher beliefs that are inconsistent with SRL theory negatively predicted teachers' SRL promotion. Self-efficacy moderated the effect of teachers' own self-regulation on their SRL promotion. The findings suggest that teachers adapt their SRL promotion to student characteristics. However, the findings suggests that mainly highly self-efficacious teachers adapt their SRL promotion to their students' characteristics. The results provide explanations for why teachers vary in their SRL promotion and generate ideas for future research and educational practice.

Analyzing pre-service teacher's training in SRL: Which characteristics should the training have?

Presenting Author: Alazne Fernández Ortube, University of Deusto, Spain; **Co-Author:** Ernesto Panadero, Universidad Deusto, Spain; **Co-Author:** Charlotte Dignath, DIPF Leibniz Institute for Education Research Frankfurt, Germany

"Self-regulation refers to self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals" (Zimmerman, 2000, p.14). Thus, teachers must promote the development of Self-Regulated Learning (SRL) in themselves and in students. However, this needs to be trained. *Aim:* The following research presents a systematic narrative review of 31 studies, which aim is to determine how is the training pre-service teachers are receiving about SRL. *Method:* For this, an exhaustive search through two international databases has been made about research on SRL development and teaching in pre-service teachers, verifying that the publication of scientific articles on this area is not very extensive. *Results:* The results reflect that training focuses on pre-service teachers developing their own self-regulation and not so much on how to teach students this process. Likewise, talking about self-regulation models, areas and strategies Zimmerman's model is the most used and cognitive and metacognitive areas appear as the most promoted processes concretely selection and adaption of concrete strategies.

Teachers' motivation: Exploring teachers' expectations and values on the promotion of SRL

Presenting Author: Johannes Jud, University of Applied Sciences and Arts Northwestern Switzerland FHNW, Switzerland; **Co-Author:** Carmen Hirt, University of Applied Sciences and Arts Northwestern Switzerland (FHNW), Switzerland; **Co-Author:** Amina Rosenthal, University of Applied Sciences Northwestern Switzerland, Switzerland; **Co-Author:** Yves Karlen, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

Teachers' motivation is a central element of professional competence regarding promoting self-regulated learning (SRL). However, research on teachers' motivation to promote SRL is still scarce and focuses on investigating teachers' self-efficacy. Following the expectation-value theory, this study explores the impact and interaction of various motivational constructs towards promoting SRL and metacognition. Online survey data from $N=280$ in-service teachers (52% women) in 17 different schools were gathered. Results from various multiple regressions indicate that, next to self-efficacy, several values and costs relate significantly to teachers' promotion of SRL. In line with former results, self-efficacy was the most significant predictor. Nevertheless, utility, interest, and attainment values even predicted the promotion of metacognition when controlled for self-efficacy. Further, the results revealed interaction effects between self-efficacy and utility and attainment value on teachers' promotion of metacognition. In general, the effects were stronger regarding the promotion of metacognition compared to the promotion of SRL. Overall, the results highlight the importance of widening the research focus on teachers' motivation to promote SRL. Further,

the results provide more detailed information on why teachers do or do not promote SRL from a motivational perspective.

Teachers' SRL competences: Differences between primary and secondary education

Presenting Author:Lies Backers, Ghent University, Belgium; **Co-Author:**Hilde Van Keer, Ghent University, Belgium

Teachers play a key role in supporting students with self-regulated learning (SRL) at all school levels. Yet previous research shows that teachers, like students, struggle with SRL. This study focuses on differences between primary and secondary school teachers in terms of content and pedagogical content knowledge, beliefs, self-efficacy and self-reported SRL implementation because prior studies disagree on differences on these variables. Respectively 201 and 330 primary and secondary school teachers completed self-report questionnaires to study their SRL competences. Via a coding scheme and independent t-tests, more insight is gained in similarities and differences between both educational levels. The analysis is currently ongoing and the presentation will present detailed results as well as implications for practice and further research.

SIG Invited Symposia 5

20 July 2022 11:00 - 12:30

Room 247

JURE 2022 SIG Invited Symposium

Learning and Instructional Technology, Learning and Social Interaction, Teaching and Teacher Education

Illustrations of innovative (mixed) methods in educational research

Keywords: Case Studies, Competencies, Design-based Research, E-learning/Online Learning, Educational Challenges, Educational Technology, In-service Teacher Education, Knowledge Creation, Mixed-methods Research, Pre-service Teacher Education, Qualitative Methods, Quantitative Methods, Teacher Professional Development

Interest group: SIG 17 - Methods in Learning Research

Chairperson: Bart Rienties, Open University, United Kingdom

Organiser: Laura Monique Thomas, Ghent University, Belgium

Discussant: Hans Gruber, University of Regensburg, Germany

As the overarching conference theme suggests, we are living in a rapidly changing world which imposes unpredictable challenges for education. In parallel, conducting research in educational contexts is also subject to multiple challenges. In this symposium, four young and ambitious researchers aim to give insight into the innovative methods they have used to tackle their research challenges. Specifically, there is a contribution using (a) educational design research to investigate how collaborative design in teacher design teams may contribute to the competence development of pre-service teachers, (b) mixed-method social network analysis to investigate networks supporting deliberate practice of musicians during the acquisition of expertise, (c) virtual reality simulations to investigate student-teachers' competence to deal with verbal aggression in the classroom, and (d) a contribution on people's opinions about the use of asynchronous online focus groups. The innovative research methods discussed in these four papers can inspire other researchers and are an essential contribution to the evolving fields of competence development, online research methods, and mixed-methods social network analysis.

The value of Teacher Design Teams (TDTs) for 'Project Integrated General Subjects'

Presenting Author:Tina Gryson, Ghent University, Belgium; **Co-Author:**Katrien Strubbe, Ghent University, Belgium; **Co-Author:**Tony Valcke, Ghent University, Belgium; **Co-Author:**Ruben Vanderlinde, Ghent University, Belgium

This qualitative research focuses on the value of Teacher Design Teams (TDTs) for the course 'Project Integrated General Subjects' (PGS). PGS is a cross-curricular course in vocational secondary education in Flanders and PGS teachers face difficulties in motivating and teaching their students. This research aims to find out how in-service teachers can professionalise by collaboratively developing teaching materials in TDTs. In addition, this research aims to investigate how collaborative design in TDTs can contribute to the competence development of pre-service teachers. To investigate this, TDTs were implemented at four secondary schools with in-service teachers and at Ghent University in the course 'Teaching Methodology PGS' with pre-service teachers. In both studies, the researcher takes a central role as a coach in the TDTs. Priorly, a study was conducted with relevant stakeholders to determine the necessary characteristics of TDTs in the context of PGS. The outcome of this preliminary study was a TDT programme on which both further studies could build. According to the methodology of educational design research, findings from the implemented TDTs caused adaptations to the initial TDT programme. In both studies with pre-service and in-service teachers, the teachers' experience of working in TDTs were consistently examined.

Using MMSNA to explore change in networks of popular musicians

Presenting Author:Manuel Laengler, University of Regensburg, Germany; **Co-Author:**Jasperina Brouwer, University of Groningen, Netherlands; **Co-Author:**Anneke Timmermans, University of Groningen, Netherlands; **Co-Author:**Hans Gruber, University of Regensburg, Germany

Mixed-method social network analysis (MMSNA) is a method to investigate networks from a quantitative and qualitative perspective. In the current study MMSNA was used to investigate networks supporting different aspects of deliberate practice (goal setting, structuring of learning content, feedback, error correction, motivation, provision of new learning content) of popular musicians during the acquisition of expertise. Networks are dynamic and the composition and relations within the network change during the phases of expertise acquisition. Yet, research in music has not used MMSNA to investigate the dynamic nature of networks popular musician and how the composition and relations of network actors change over time. An interview, a questionnaire, and network visualisations with focus on the egocentric network were used to explore changes in networks supporting different aspects of deliberate practice of five expert and five intermediate popular musicians during their childhood, apprenticeship, and career. The data from the interview was transferred into network matrices to calculate descriptive statistics. To indicate the network dynamics, change ratios and stability ratios were calculated. The results showed that networks of expert musicians change more and were less stable over different phases, compared to those of intermediates. Besides that, experts have been supported by a larger number of network actors. MMSNA proved itself as a proficient method to investigate networks and their dynamics. The study showed that expertise development in popular music does not only depend on deliberate practice but also on diversity and change in adaptive support networks.

Online asynchronous focus groups: Insights on participants' opinions

Presenting Author:Sofie Van Ostaeyen, Ghent University, Belgium; **Co-Author:**Anissa All, Ghent University, Belgium; **Co-Author:**Marieke Robbrecht, Ghent University, Belgium; **Co-Author:**Vasiliki Andreou, KU LEUVEN, Belgium; **Co-Author:**Mieke Embo, Ghent University, Belgium; **Co-Author:**Tammy Schellens, Ghent University, Belgium; **Co-Author:**Martin Valcke, Ghent University, Belgium

The countermeasures taken during the COVID-19 pandemic forced researchers to look for alternative and innovative research methods to collect their data. As a result, the interest in using online research methods increased. In this study, we focused on one of these online research methods, being asynchronous online focus groups (AOFG). There is a growing body of research about AOFGs but little attention has been paid to the participants' opinions about AOFGs. Therefore, the aim of this study was to investigate the participants' opinions about participating in an AOFG. Six AOFG's were organized using the platform FocusGroupIt, for which 72 participants registered. 28 of the participants completed a short anonymous survey about participating in an AOFG. The answers to the questions of this survey were analysed using descriptive statistics and inductive thematic analysis. The results indicated the participants were rather positive about the AOFG format. However, the results revealed some difficulties, including limited participant interaction, the platform's failure to deliver email alerts to participants, and unclarity about what was expected from the participants. The research protocol and findings from this study may assist other researchers interested in AOFGs, and contribute to the new and evolving field of online research methods.

The use of virtual reality simulations to foster competence development of preservice teachers

Presenting Author:Delphine Franco, University of Ghent, Belgium; **Co-Author:**Ruben Vanderlinde, Ghent University, Belgium; **Co-Author:**Martin Valcke, Ghent University, Belgium

Over the last decade, there has been increasing interest in the use of virtual reality (VR)-based simulations in teacher education to incorporate authentic

learning experiences. However, effectiveness studies mainly rely on teachers' self-reports. The current study treads a different, innovative path by investigating the development of an aggression management competence of preservice teachers via VR-based simulations. More specifically, these preservice teachers' perception, interpretation, and decision-making processes concerning classroom simulations are analyzed. Participants were 400 students, following a one-year university teacher training program, who voluntarily took part in either VR-based (i.e., the experimental group) or desktop-based (i.e., the control group) simulations. Both groups were confronted with situations that required the use of verbal aggression management strategies. A mixed-method approach was used to investigate (1) to what extent VR-based simulations foster the aggression management competence of preservice teachers, and (2) if there is a difference in aggression management competence development between both conditions. As this study is still ongoing, preliminary results will be presented during the conference.

SIG Invited Symposia 6

20 July 2022 11:00 - 12:30

Room 249

JURE 2022 SIG Invited Symposium

Assessment and Evaluation, Higher Education, Motivational, Social and Affective Processes

Challenges in writing education in a changing world

Keywords: At-risk Students, Attitudes and Beliefs, Educational Challenges, Higher Education, Instructional Design, Motivation, Writing/Literacy

Interest group: SIG 12 - Writing

Chairperson: Nina Vandermeulen, Umeå University, Sweden

Organiser: Nina Vandermeulen, Umeå University, Sweden

Discussant: Debra Myhill, University of Exeter, United Kingdom

Good writing skills are of utmost importance in all levels of education and in professional life. A large body of writing research has focused on exploring how to support students' writing. This symposium brings together three studies within writing education research. Each study sheds light on a different challenge in writing education: writing motivation, EMI programs, and differentiation. In the first presentation, Mariana Silva presents the results of an intervention study with self-regulated strategy development instruction that focuses on improving grade 6 students' writing motivation during the pandemic. Besides the frequently studied effects of SRSD on text quality and self-efficacy, this study explores effects on motivational beliefs. The second presentation explores teachers' and students' experiences with academic writing within an English as medium of instruction context. EMI programs are popular as international student mobility increases, but pose challenges to both teachers and students. This study by Vanessa Hidalgo opens up the discussion: what are students' needs concerning academic writing within an EMI context and how could they be addressed? In the third presentation, María Arrimada reports on an intervention consisting of in-class instruction for all students combined with parent-supervised homework tasks for students with a slower learning rate. This writing program supports struggling grade 1 students, reduces teacher overload, and explores possibilities of writing instruction at home. Effects on writing performance and participants' experiences are discussed.

Impact of SRSD and growth mindset intervention on sixth graders' writing motivation and performance

Presenting Author:Mariana Silva, Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto, Portugal; **Co-Author:**Ana Camacho, University of Porto and Polytechnic Institute of Porto, Portugal; **Co-Author:**Paula Cristina, Polytechnic of Leiria, Portugal; **Co-Author:**Nadine Correia, ISCTE-Instituto Universitário de Lisboa, Portugal; **Co-Author:**João Daniel, ISPA - Instituto Universitário, Portugal; **Co-Author:**Rui Alexandre Alves, University of Porto, Portugal

Self-regulated strategy development (SRSD) is an instructional approach combining background knowledge, writing strategies, and self-regulation skills to improve students' writing motivation and performance. While the impact of SRSD instruction on self-efficacy, text quality, and text length is well-documented, the effect on other motivational constructs has received considerably less attention. In this study, we examined the impact of an SRSD instructional program about opinion text writing on three extensively studied variables (i.e., self-efficacy, text quality, and text length) and on an understudied variable (i.e., implicit theories). In addition, we tested whether a brief growth mindset intervention would add value to SRSD instruction. We sampled 191 sixth graders from 11 classes and their Portuguese language teachers to participate in a six-week intervention study. The classes were randomly assigned to one of three conditions: (a) an active control condition; (b) an SRSD group; (c) an SRSD plus growth mindset intervention group (henceforth, SRSD+GM). Multilevel analyses of pre-posttest assessments showed that both the SRSD and the SRSD+GM did not significantly differ from the active control group in self-efficacy nor implicit theories at posttest. However, the SRSD and the SRSD+GM groups outperformed the active control group in text quality and text length at posttest. The added value of a brief growth mindset intervention to SRSD instruction was not supported. Overall, our study showed that a short SRSD instructional program was effective in improving students' writing performance. However, the brief nature of both SRSD and mindset interventions may have precluded a positive impact on motivational beliefs.

Keeping up with Globalization: Students' and professors' conflicting views on academic writing

Presenting Author:Vanessa Hidalgo, Umeå University, Sweden

This study examines the challenges of academic writing in English as a medium Instruction (EMI) programs. There are a growing number of EMI programs around Europe that might result in new challenges for both lecturers and students if they are not resolved. Academic writing skills are at the core of these issues, as the most used assessment tool in university settings, and an essential skill for future career development. The present study focuses on the perception of twelve students and thirteen professors that teach in various EMI master's programs. The students were asked to inform about the issues they face when writing an academic task. Lecturers were consulted about problems they perceived in their students' writing and how they deal with these issues. The findings suggest that, due to time restrictions in the master's programs and mixed attitudes towards giving detailed feedback and support related to linguistic problems, lecturers are not giving the amount of support they imagine possible with more resources. The general idea is that due to the students' immersion in an academic English environment, they would be able to develop better writing skills on their own. The lack of official support from the institutions expands the challenge on how to maximize the time in a one- or two-year master program for students that need discipline-specific writing support.

Is Response-to-Intervention feasible for young writers? Data from a multi-tiered intervention

Presenting Author:María Arrimada, University of León, Spain; **Co-Author:**Mark Torrance, Nottingham Trent University, United Kingdom; **Co-Author:**Raquel Fidalgo, University of León, Spain, Spain

Though the benefits of the Response to Intervention model to prevent reading disabilities have been well established, little is known about its outcomes in the field of writing instruction. This study describes a long-term RTI-based writing program and explores its preliminary efficacy to enhance young students' writing skills and its feasibility to be applied in full-range classes. During the first half of the school year, 161 first-grade students received Tier 1 writing instruction in transcription and planning, following a program designed by the researchers and delivered by their regular teachers. Their writing performance was monitored through frequent probes. During the second half of that year, 36 students whose rate of learning to write was falling significantly below that of their average peers (on the basis of the probes), received additional Tier 2 writing instruction in the form of homework tasks supervised by their parents. The next year, all 161 students returned to only Tier instruction. Writing variables such as text quality, text length, spelling and handwriting accuracy were assessed through both progress monitoring probes and more formal writing assessments. Teachers' and parents' perceptions about the program were collected. Results suggest feasibility of multi-tiered RTI-based writing interventions in whole-class settings and potential benefits of combined writing instruction at school and at home both for the development of written composition skills and as a way of avoiding teacher's overwhelming.

Special Panel 1

20 July 2022 14:00 - 15:00

Auditorium 2A
Policy Makers Panel

Making a splash: Research impact and educational policies

Keywords: Educational Challenges, Educational Policy, Reading Comprehension, Social and Educational Injustice

Interest group:

Chairperson: Jo Van Herwegen, United Kingdom

This special roundtable will showcase the work and societal impact of three key Portuguese research centres and foundations in the educational field: Iniciativa Educação (<https://www.iniciativaeducacao.org/en/>), ProChild Colab (<http://prochildcolab.pt/en/home/>), and Centre for Research and Intervention in Reading (<https://www.ciril.pt/index.php/en/>). The invited speakers will present ongoing educational projects for different cohort of students, and explain how they are making an impact to educational practice and policy. The speakers will further discuss the main challenges for research to influence practitioners and policymakers, and how these challenges can be tackled. Moderated by Dr Jo Van Herwegen from University College of London, this roundtable aims to shed light on the bridges among educational research, practice, and policymaking.

Making a splash: Research impact and educational policies

Presenting Author:Gabriela Bento, ProChild CoLAB, Portugal; **Presenting Author:**Gabriela Trevisan, ProChild CoLAB, Portugal

This special roundtable will showcase the work and societal impact of three key Portuguese research centres and foundations in the educational field: Iniciativa Educação (<https://www.iniciativaeducacao.org/en/>), ProChild Colab (<http://prochildcolab.pt/en/home/>), and Centre for Research and Intervention in Reading (<https://www.ciril.pt/index.php/en/>). The invited speakers will present ongoing educational projects for different cohort of students, and explain how they are making an impact to educational practice and policy. The speakers will further discuss the main challenges for research to influence practitioners and policymakers, and how these challenges can be tackled. Moderated by Dr Jo Van Herwegen from University College of London, this roundtable aims to shed light on the bridges among educational research, practice, and policymaking.

Session E 1

20 July 2022 15:30 - 17:00

Room 252

Single Paper

Assessment and Evaluation, Cognitive Science

Writing and Literacy

Keywords: At-risk Students, Comprehension of Text and Graphics, COVID-19, Educational Psychology, Emotion and Affect, Primary Education, Quantitative Methods, Secondary Education, Writing/Literacy

Interest group: SIG 12 - Writing

Chairperson: Aigul Akhmetova, University of Szeged, Doctoral School of Education, Hungary

Writing development of Year 9 students with and without migration background during the pandemic

Keywords: At-risk Students, COVID-19, Secondary Education, Writing/Literacy

Presenting Author:Nora Müller, Westfälische Wilhelms-Universität Münster, Germany; **Co-Author:**Vera Busse, University of Münster, Germany

The ability to write well-structured and coherent texts is a prerequisite for students' educational success. However, many secondary students, and especially students with migration backgrounds, struggle with writing (e.g., Neumann & Lehmann, 2008). Also, recent studies show that school closings during the ongoing COVID-19-pandemic further increase achievement disparities, and can be particularly detrimental for disadvantaged students (Helm et al., 2021). Our paper examines writing competence in terms of structure and coherence of $n = 57$ Year 9 students at two measurement points during the pandemic, in November 2020 (T1) and June 2021 (T2). In particular, we focus on the writing development of students with and without migration backgrounds (MB). The data suggest that most students had great difficulties structuring their texts and establishing text coherence at T1. Students with MB scored lower than their peers without MB. We found small progress regarding text structure but no progress regarding coherence at T2, although teachers had previously undergone a special training on how to foster writing. Surprisingly, especially students with MB increased their writing scores, yet were not able to close achievement gaps. In sum, our data indicate that both students with and without MB need more writing support.

Measuring learning from writing

Keywords: Comprehension of Text and Graphics, Educational Psychology, Quantitative Methods, Writing/Literacy

Presenting Author:Amy Peters, University of Southampton, United Kingdom; **Co-Author:**David Galbraith, University of Southampton, United Kingdom

Writing-to-learn captures the idea that writing has the capacity to facilitate learning (Emig, 1977; Klein, 1999). Learning from writing is often assessed using outcome measures such as grades and text quality. Furthermore, writing-to-learn literature suggests learning from writing involves knowledge development and improved text comprehension (e.g., Baaijen & Galbraith, 2018; Arnold et al., 2017). This paper presentation will explore the results of three studies conducted as part of my PhD using different measures of learning from source-based writing, and will consider how these measures are related. In the first two studies, learning was measured using a text comprehension test and ratings of participants' subjective knowledge. The two measures were significantly positively correlated. In addition, participants' subjective knowledge decreased from pre- to post-writing, contrasting previous literature which found an increase in subjective knowledge (Baaijen & Galbraith, 2018). Whilst these measures capture some aspects of learning, Silva & Limongi (2019) claim the field lacks a response-time measure of learning, which has potential value to explore neural processes involved in writing-to-learn. The third study discussed in this presentation is a replication of Silva and Limongi's study, to assess the reliability of using a reaction-time measure to assess the effects of writing on learning.

A longitudinal study on children's narratives and mental lexicon during pandemic

Keywords: COVID-19, Emotion and Affect, Primary Education, Writing/Literacy

Presenting Author:Giulia Vettori, University of Florence, Italy; **Co-Author:**Martina Andreini, University of Florence, Italy; **Co-Author:**Costanza Ruffini, University of Florence, Italy; **Co-Author:**Chiara Pecini, University of Florence, Italy

The present longitudinal study was aimed at investigating qualitative and quantitative changes in mental lexicon produced in written narratives by primary school children during pandemic (before [T1], during [T2] and after [T3] the first lockdown). 21 children in second grade (7 F, 14 M, mean age 6.85 years, $SD = .37$) participated in this study as a part of a larger project. Their written narratives were codified for mental lexicon, structure, cohesion, and coherence. Results showed that children used fewer terms referring to positive emotions and a higher number of terms referring to negative emotions in the narrative written during the lockdown (T2), in comparison with mental lexicon in their narratives written in the periods before (T1) and after (T3). After lockdown, we observed a reduction in the use of terms referring to negative emotions in children's narratives. This trend may be linked to the dynamic tentative adjustment to the perturbative situation of pandemic supported by children's resilience. The results are useful to understand children's emotional perspective of the current pandemic circumstances of life. The utility of the children-friendly task of creative narrative opens the way to practical implication and preventive actions for children's learning and development.

Session E 2

20 July 2022 15:30 - 17:00

Room 249

Single Paper

Higher Education, Instructional Design

Achievement and Motivation

Keywords: Achievement, Experimental Studies, Higher Education, Instructional Design, Metacognition, Motivation, Parental Involvement in Learning, Primary Education, Quantitative Methods

Interest group: SIG 01 - Assessment and Evaluation, SIG 04 - Higher Education

Chairperson: Febe Demedts, University of Leuven - Campus KULAK, Belgium

Reciprocal Relationships between Homework Support and Students' Academic Functioning

Keywords: Achievement, Motivation, Parental Involvement in Learning, Primary Education

Presenting Author: Lisa Benckwitz, IPN Leibniz Institute for Science Education, Germany; **Co-Author:** Karin Guill, Leibniz Institute for Science and Mathematics Education, Germany; **Co-Author:** Janina Roloff-Bruchmann, IPN - Leibniz Institute for Science and Mathematics Education, Germany

Many parents involve in the homework process of their child with the aim of improving the students' academic functioning. However, previous research has found that the quality of the support is more relevant for secondary school students' outcomes than the quantity. Vice versa, the quality of parental homework support was also predicted by students' academic functioning (Dumont et al., 2014). The quality of parental homework support is often measured by three dimensions derived from self-determination theory (Deci & Ryan, 2000): structure, responsiveness, control. Although homework support has partly shifted from the home to the school environment, there is a lack of research on the relationship between scholastic homework support and academic functioning. The aims of our study were to extend previous research on reciprocal relationships between homework support and academic functioning to elementary school students and to homework support at school. We calculated cross-lagged models based on longitudinal data from 332 German fourth graders. We found a reciprocal relationship between parental control and students' mean grade. Further, we found non-reciprocal relationships between the quality of homework support (T1) and academic functioning (T2) as well as relationships between academic functioning (T1) and the quality of homework support (T2) in both environments.

The perceived value of studies and its relation to study satisfaction, grades and dropout intention

Keywords: Achievement, Higher Education, Motivation, Quantitative Methods

Presenting Author: Jonas Breetzke, University of Hamburg, Germany; **Co-Author:** Derya Özbacgi, University of Hamburg, Germany; **Co-Author:** Carla Bohndick, University of Hamburg, Germany

Students' expectancies and values toward their studies are central to study motivation and important predictors of academic achievement (Eccles & Wigfield, 2020). However, many previous studies did not differentiate between the value dimensions of expectancy-value theory (Gaspard, 2016) and additional research investigating effects on multiple indicators of study success is needed. Furthermore, study disciplines are distinctly different (e.g., regarding vocational orientation) and research on earlier education stages indicates discipline specific differences in value (Gaspard, 2016), not fully investigated in higher education. To clarify the relationship between expectancies, values and study success including the moderating role of study disciplines, $N = 8,391$ German university students (mean age of 28.15, 39.5% male) from the National Educational Panel Study (Blossfeld et al., 2011) were analysed. We used structural equation modeling with students' expectation and four value dimensions (i.e., intrinsic, attainment, utility and cost) as exogenous and grades, dropout intention and study satisfaction as endogenous variables. Results indicate that (1) intrinsic value is strongly associated with study satisfaction, but not with grades, (2) utility value was not associated with dropout intention and study satisfaction, and (3) there are differences between study disciplines, mostly regarding utility value. Practical implications for teaching and counselling are discussed.

Automated Performance Feedback in Digital Testing: Effects of Error Clarification Complexity

Keywords: Experimental Studies, Instructional Design, Metacognition, Motivation

Presenting Author: Livia Kuklick, IPN - Leibniz Institute for Science and Mathematics Education, Germany; **Co-Author:** Prof. Dr. Samuel Greiff, University of Luxembourg, Esch-Sur-Alzette, Luxembourg, Luxembourg; **Co-Author:** Dr. Marlit Annalena Lindner, IPN - Leibniz Institute for Science and Mathematics Education, Germany

Corrective feedback allows students to identify their errors and can be of great formative value. Nevertheless, repeated exposure to immediate corrective (i.e., negative) feedback may impair test-taker motivation. This experimental study focusses on strategies for designing effective and motivationally beneficial or at least harmless corrective feedback for digital assessments. We systematically varied the presence and complexity of corrective feedback messages (1 × 4 between-subjects design) and analyzed effects on cognitive, metacognitive, and motivational outcomes. Our sample included 439 university students who worked on 12 computer-based constructed-response geometry tasks. Students received either no feedback or corrective feedback with varying levels of error clarification complexity after incorrect responses (i.e., Knowledge of Results [KR], Knowledge of Correct Response [KCR], or Elaborated Feedback [EF]) paired with confirmatory KCR feedback after correct responses. Feedback increased students' performance-related metacognitive accuracy (largest effect for EF) and enhanced error correction in a posttest (largest effects for KCR and EF). Only KR feedback reduced students' motivation ratings after incorrect responses (with significantly lower ratings compared to EF). Our data suggest that students benefit more from corrective EF (and KCR) messages than from simple error messages at the cognitive, metacognitive, and motivational level.

Session E 3

20 July 2022 15:30 - 17:00

Room 250

Single Paper

Higher Education, Learning and Instructional Technology

Student Learning during COVID-19

Keywords: At-risk Students, COVID-19, E-learning/Online Learning, Educational Challenges, Experimental Studies, Higher Education, Motivation, Reflection, Student Learning

Interest group: SIG 04 - Higher Education, SIG 14 - Learning and Professional Development

Chairperson: Anna-Sophia Dersch, Justus-Liebig-Universität Gießen, Germany

School motivation and the use of homeschooling-based learning strategies of students during COVID-19

Keywords: COVID-19, E-learning/Online Learning, Motivation, Student Learning

Presenting Author: Claudia Ortner, University of Salzburg, Austria

Due to the COVID-19 pandemic, everyday school situation changed and brought new challenges for students and teachers. The integration and use of home-schooling-based learning strategies was needed in order to meet these home-schooling challenges. In this study, which is part of a 4-year school development project, 114 secondary school students were surveyed using an online questionnaire. Students assessed themselves among other items concerning their general school motivation as well as their learning strategies related to home-schooling, e-learning, performance motivation and self-control. As descriptive results, we found that students reported motivational difficulties as well as attention deficits as problematic in schooling during covid times. Additionally, we collected important classroom wishes of the students. Correlation analyses showed significant relations between the use of home-schooling and motivational learning strategies. Regression analyses indicated that the use of home-schooling-based learning strategies have an impact on the self-assessed general school motivation. All results were used to design teacher trainings as part of the school development project.

Exploring Mechanisms in Online Writing Interventions to Support First-Semester Students

Keywords: COVID-19, Experimental Studies, Higher Education, Reflection

Presenting Author: Max S. Lohner, University of Mannheim, Germany; **Co-Author:** Carmela Aprea, University of Mannheim, Germany

During transition to university, students show a high vulnerability to stress and mental health problems. Transitions often lead to a phase of increased vulnerability. Writing interventions have the potential to increase the resilience of students during transition, but the underlying mechanisms are still not clear. Some authors argue in favour of broadening attention through writing interventions, while others suppose a priming towards mastered challenges. In this study, two versions of a *Resilience Journal* were used to support 62 students' resilience and life satisfaction at the beginning of their studies. The two versions were designed to either broaden attention towards all kinds of challenges or prime students' attention to successfully mastered challenges. The effects on students' resilience and life satisfaction were evaluated in a pre-post design and compared to students without an intervention. Results show that the intervention designed to broaden students' attention was advantageous in promoting students' resilience compared to the intervention priming the attention towards mastered challenges. Despite both groups show decreased life satisfaction during the first six weeks of university, the intervention designed to broaden attention was also more effective in preventing this decrease. In comparison to students without an intervention, positive but non-significant tendencies were observable.

Coping during the pandemic – development of university students' stress, resilience and well-being

Keywords: At-risk Students, COVID-19, Educational Challenges, Higher Education

Presenting Author: Natalie Peters, TU Dresden, Fakultät Wirtschaftswissenschaften, Germany

The current COVID-19 pandemic has taken its toll on the world population. As students in higher education are already facing multiple challenges and have shown to be affected by various health problems before (e.g. Auerbach et al., 2016), they are an especially vulnerable group during this time of crisis. Therefore, this study aimed to deepen the understanding of the development of university students' health over time during the pandemic at a large German university and to deduct suitable measures. The current study analyzed 135 students' perceived stress, resilience and well-being during three semesters amid the pandemic. Results show that there was no significant difference between the semesters regarding stress, resilience and well-being. Means also show a general tendency towards a decrease in well-being and resilience and an increase in perceived stress. Adding to that, having a job next to university had a significant (positive) influence on perceived stress, well-being and resilience. Students' major also had a significant effect on well-being. Hence, it is recommended to implement certain measures to further promote well-being and prevent health issues in the long-haul and other consequences, such as a decline in academic performance or student drop-out.

Session E 4

20 July 2022 15:30 - 17:00

Courtyard (Ground Floor)

Poster Presentation

Cognitive Science, Higher Education, Instructional Design, Learning and Instructional Technology, Learning and Social Interaction

Educational Technologies

Keywords: Attitudes and Beliefs, Cognitive Development, Cognitive Skills, Collaborative Learning, Computer-assisted Learning, Computer-supported Collaborative Learning, Content Analysis, Cooperative/Collaborative Learning, E-learning/Online Learning, Educational Technology, Game-based Learning, Higher Education, Language (Foreign and Second), Learning Technologies, Multimedia Learning, Neuroscience, Peer Interaction, Primary Education, Science Education, Student Learning, Technology, Writing/Literacy

Interest group: SIG 07 - Technology-Enhanced Learning And Instruction, SIG 22 - Neuroscience and Education, SIG 27 - Online Measures of Learning Processes

Chairperson: Mathias Dehne, Germany

Using HandSpy 3.0 in the classroom

Keywords: Cognitive Development, Cognitive Skills, Technology, Writing/Literacy

Presenting Author: Teresa Jacques, Faculty of Psychology and Educational Sciences of the University of Porto, Portugal; **Co-Author:** Mariana Silva, Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto, Portugal; **Co-Author:** Ana Camacho, University of Porto and Polytechnic Institute of Porto, Portugal; **Co-Author:** Rui Alexandre Alves, University of Porto, Portugal

HandSpy is a free web-based application for recording and analyzing handwriting in real-time that allows for fine-grained observations of the moment-to-moment production of a written text. For data collection, HandSpy requires no other tools besides smartpens and paper sheets with a special microdotted pattern, preserving a natural writing environment. HandSpy allows for the analysis of bursts-pauses cycles, and analysis of linguistic and emotional word usage. This ultimately allows for inferences about the dynamics of cognitive processes in writing. Currently, most writing logging tools require individual or small-group data collection and additional technological devices (e.g. digitizing tablets) limiting sample size and potentially threatening ecological validity. These aspects are lifted when using HandSpy, since it allows researchers to conduct large-scale experiments involving a familiar writing situation: writing with apparently normal pens on sheets of paper. HandSpy can be used for various purposes in education research, such as the study of writing development across schooling, when researching developmental disorders or learning disabilities, or it can be used as a tool to provide additional information during writing tasks. This makes HandSpy an ecological, reliable and powerful tool for large-scale real-time studies of composition in classrooms.

Technology in upper-secondary students' images of the future: Implications for science education

Keywords: Attitudes and Beliefs, Content Analysis, Science Education, Technology

Presenting Author: Tapio Rasa, University of Helsinki, Finland; **Co-Author:** Jari Lavonen, University of Helsinki, Finland; **Co-Author:** Antti Laherto, University of Helsinki, Finland

Modern technology continues to have various impacts on societies and human life in general. While technology may define the 'digital age' of today, discourses of 'technological progress' can dominate discussions of tomorrow. Meanwhile, various trends in education highlight the importance of pedagogies that address societal and environmental questions while promoting students' agency. However, despite research on young people's images of the future showing how technology plays a central role in how futures are imagined, such research has only recently been used to inform the development of science and technology education. We set out to address this issue by investigating 58 secondary school students' essays describing a typical day in 2040. Qualitative content analysis showed that students' images of the future feature technological changes ranging from improved everyday devices to large-scale technologisation. Various effects were attributed to technology, relating to convenience, environment, employment, privacy and more. Technological change was discussed both as incremental and radically transformative, and in both positive and negative terms. Discussions of agency over technology were mostly vague, with problematic technologies more often linked to notions of value-ladenness of technology. We conclude by discussing the potential implications for the development of future-oriented science education.

The effect of augmented reality on global coherence formation processes in elementary school pupils

Keywords: Educational Technology, Learning Technologies, Multimedia Learning, Primary Education

Presenting Author: Kristin Altmeyer, Saarland University, Germany; **Co-Author:** Sarah Malone, Saarland University, Germany; **Co-Author:** Sebastian Kapp, TU Kaiserslautern, Physics Education Research Group, Germany; **Co-Author:** Luisa Lauer, Saarland University, Germany; **Co-Author:** Michael Barz, German Research Center for Artificial Intelligence (DFKI) Saarbrücken, Germany; **Co-Author:** Michael Thees, Technische Universität Kaiserslautern, Department of Physics, Physics Education Research Group, Germany; **Co-Author:** Jochen Kuhn, TU Kaiserslautern, Physics Education Research Group, Germany; **Co-Author:** Markus Peschel, Saarland University, Germany; **Co-Author:** Daniel Sonntag, University of Oldenburg, Germany; **Co-Author:** Roland Bruenken, Saarland University, Germany

Student experiments require learners to perform resource-consuming mapping processes between spatially distant real-world and virtual sources of information. Following the Cognitive Theory of Multimedia Learning and the Cognitive Load Theory, AR can be used to facilitate those so-called global coherence formation processes by integrating virtual representations into the physical experimentation set-up. The current research investigates the assumed beneficial effect of AR and possible moderators with respect to lab work on electrical circuits in a sample of elementary school children. In a between-subjects design, the AR-

supported group was presented multiple real-time measurements integrated in the real experiment, while the separate-display group was provided with measured values on a detached display. Both groups completed a prior knowledge test and posttests differing regarding their demands on children's acquired global coherence. Results showed that AR-support did not affect reported Extrinsic Cognitive Load but tended to foster performance in tasks requiring a particular high level of global coherence. Moreover, children with pronounced phonological memory benefited most from AR-support. As a conclusion, the effective design of AR-supported lab work needs to consider both the requirements of the learning content as well as individual prerequisites of the target group.

Online learning practices in simulated consultations for improving medical professional skills

Keywords: Collaborative Learning, E-learning/Online Learning, Language (Foreign and Second), Peer Interaction

Presenting Author:Fatemeh Janesarvatan, Maastricht University, Netherlands; **Co-Author:**Maryam Asoodar, Maastricht University, Netherlands

Global students' mobility is an important trend for higher education. At Maastricht university international students can start their bachelor of medicine in English. However, the master's program and hospital working environment is in Dutch. Therefore, for students to learn medical professional skills in Dutch, a medial-Dutch course seemed necessary. Training students on how to communicate and provide feedback to each other is valuable in the development of professionalism, teamwork, and interpersonal skills. However, it becomes more challenging in a second language and in an academic/professional context. International Track Medicine students at UM followed an online medical-Dutch language course. At the end of the course, students completed a brief survey and participated in interviews to provide an insight into the perceived value of the peer feedback process and to identify the possible effects of feedback on second-language communication skills. We analyzed the data from the surveys. The results indicate that authentic tasks with simulated patients encourage students to learn while practicing an actual task that they will encounter later in their career. The emerging themes show that peer feedback is essential for medical professional skills training. However, clearly defined goals and instructions, and the presence of native bodies, teachers/facilitators are essential.

Exploring affordances and Agency in undergraduate students' engagement with platform-based resources

Keywords: Computer-assisted Learning, Higher Education, Learning Technologies, Student Learning

Presenting Author:Andres Araos, University of Oslo - IPED, Norway

Platform-based resources such as those available in YouTube or Stack Exchange play an increasingly important role in supporting undergraduate students' learning. Yet, our understanding of how such resources are used by students and how they become meaningful for their learning practices is limited, and even more in specific disciplinary contexts. This study sheds some light on this matter by exploring the affordances that emerge and how agency manifests as 27 computer and software engineering students engage with platform-based resources during a three-month period. The study involved carrying out stimulated-recall interviews, in which students were prompted to discuss their experiences with platform-based resources based on their own web-browsing history data. Findings reveal multiple emergent affordances, in which "being" a learner is enacted through different platform-based resources, but also interactions with resources beyond such boundaries, in which these are transformed and used to explore knowledge in different ways. These findings suggest that platform-based resources play a relevant role in students' learning, and that offering support within the formal curriculum could become helpful for their learning efforts.

Gaining insights into the cognitive processes in cooperative learning

Keywords: Computer-supported Collaborative Learning, Cooperative/Collaborative Learning, Game-based Learning, Neuroscience

Presenting Author:Nathalie John, DIPF | Leibniz Institute for Research and Information in Education, Germany; **Co-Author:**Franziska Baier-Mosch, DIPF | Leibniz Institute for Research and Information in Education, Germany; **Co-Author:**Sebastian Korinth, DIPF | Leibniz Institute for Research and Information in Education, Germany; **Co-Author:**Mareike Kunter, DIPF | Leibniz Institute for Research and Information in Education, Germany

While the relationship between cooperative learning and student performance is well-studied (Kyndt et al., 2013), comparatively little is known about the cognitive processes (e.g. sustained attention) that could mediate this relationship. The present study explores how an advanced technology called cEEGrids (electrodes integrated into adhesive patches attached around students' ears; Debener et al., 2015) in combination with mobile electroencephalography devices (EEG) can provide real-time and unobtrusive measures of students' cognitive states during a cooperative learning task. We investigate alpha band activity and inter-subject-correlation (ISC) as indicators of (shared) attention. In our study, groups of three university students work together in a game-based environment, where they acquire knowledge about the programming language python (Nplanned=102). In the experimental group - as compared to the control group - students are dependent on each other to successfully solve the task (positive interdependence). We assume that positive interdependence leads to a higher knowledge gain and that this effect is mediated by higher levels of (shared) attention. First results from a pilot study (N=18) show a greater increase in knowledge for those students in the experimental condition. Data collection of the main study is in its final stage and will be presented at the conference.

Session E 5

20 July 2022 15:30 - 17:00

Room 256

Single Paper

Learning and Instructional Technology, Learning and Social Interaction, Motivational, Social and Affective Processes

Reading Comprehension and Proficiency

Keywords: Attitudes and Beliefs, Case Studies, Educational Technology, Language (Foreign and Second), Learning Analytics, Learning Approaches, Metacognition, Motivation, Reading Comprehension, Secondary Education, Self-efficacy

Interest group: SIG 02 - Comprehension of Text and Graphics, SIG 08 - Motivation and Emotion, SIG 17 - Methods in Learning Research

Chairperson: Jan Luca Bahr, Leibniz Institute for Science and Mathematics Education (IPN), Germany

A Study of the Relationship among Reading Strategies, Language Attitude, and Reading Proficiency

Keywords: Case Studies, Language (Foreign and Second), Learning Analytics, Learning Approaches

Presenting Author:Tun Zaw Oo, Doctoral School of Education, University of Szeged, Hungary; **Co-Author:**Andrea Magyar, University of Szeged, MTA-SZTE Digital Learning Technologies Research Group, Hungary; **Co-Author:**Anita Habók, University of Szeged, MTA-SZTE Digital Learning Technologies Research Group, Hungary

In learning English as a foreign language (EFL), reading proficiency is one of the challenges for all students. For teachers' effective instruction, there are many factors of consideration that are related to students' reading proficiency. This study aimed to discover and examine the facts regarding the relationships among students' reading strategy use, English language attitude and reading proficiency. The participants were 290 Hungarian grade seven students. Two different instruments (a reading strategy questionnaire and a reading comprehension test) were mainly used in this research. Students' self-report English language attitude on a five-point scale and their EFL school marks were also employed. Descriptive statistics (mean, median, mode), inferential statistics (*t*-tests, and ANOVA), and Structural Equation Modeling (for confirmatory factor analysis and association model) were used for the data analysis. It was found that the instruments were reliable and valid, school girls used more reading strategies than the schoolboys during the reading text, students' English language attitude had a positive impact ($r = 0.54, p < 0.05$) on students' reading proficiency; however, students' reading strategies had no significant effect on students' reading proficiency. Accordingly, this study is useful in the EFL teaching-learning process of elementary schools in Hungary.

The Role of Students' Motivation for Reading in Reading Comprehension

Keywords: Attitudes and Beliefs, Motivation, Reading Comprehension, Self-efficacy

Presenting Author:Helta Anggia, University of Szeged, Indonesia; **Co-Author:**Anita Habók, University of Szeged, MTA-SZTE Digital Learning Technologies Research Group, Hungary

This research aims to investigate how students' English reading comprehension is supported by extensive reading involvement, motivation for reading, attitudes towards English learning, and reading self-efficacy. Our sample consists of 1.145 Indonesian undergraduate students from different majors, attitudes towards English, and English proficiency levels. We used three questionnaires and a reading comprehension test. The first questionnaire was extensive reading

involvement based on top-ten principles of extensive reading (Day, 2015). The second was an adapted motivation for the reading questionnaire (MRQ) consisting of 44 items (Wigfield & Guthrie, 1997). The third was a 9-item reading self-efficacy questionnaire developed by Zare and Davoudi (2011). The reading comprehension test consisted of 7 short passages followed by 5-6 questions for each passage. A path analysis showed that reading comprehension can be explained by extensive reading involvement through the mediation of motivation for reading dimensions, attitudes towards English learning, and reading self-efficacy. Our findings support our hypothesis that extensive reading involvement has a significant effect on various dimensions in motivation for reading in the sample. Students involved in extensive reading develop their self-efficacy and intrinsic-extrinsic motivation as they read. Especially, students with high attitudes towards English learning develop their reading self-efficacy and reading comprehension skills.

Tablet and Adolescent Readers: The Interplay between Reading Medium and Comprehension Ability

Keywords: Educational Technology, Metacognition, Reading Comprehension, Secondary Education

Presenting Author: Angelica Ronconi, University of Padova, Italy; **Co-Author:** Lucia Mason, University of Padova, Italy

Recent meta-analyses mainly focused on higher education students show that reading comprehension is better on paper than on screen for informational texts. Only few studies are available on younger students, who are increasingly involved with digital texts in learning contexts. This study aimed to investigate whether the level of comprehension ability may moderate the effect of reading medium (paper vs. tablet) on processing time, text comprehension, and calibration of performance in lower-secondary school students. Eight graders (N=150) read two informational texts, one on paper and one on a tablet screen. Reading time was recorded and text comprehension was assessed through open-ended questions. Participants were asked to self-evaluate their comprehension performance. Calibration bias was computed as the difference between student metacognitive judgment and actual performance. Results showed that adolescent readers performed better in the comprehension task when they read on paper than on tablet. No difference between mediums emerged for processing time and calibration while controlling for the interaction between medium and level of comprehension ability. Interestingly, the effect of this interaction was not significant for any outcome variable. When the screen inferiority effect emerged it affected all participants, regardless of their level of comprehension ability.

Session E 6

20 July 2022 15:30 - 17:00

Room 248

Single Paper

Assessment and Evaluation, Culture, Morality, Religion and Education, Teaching and Teacher Education

Mathematics and Science Education

Keywords: Assessment Methods and Tools, Biology, Computer-assisted Learning, Culture, Ethnography, Higher Education, Mathematics, Pre-service Teacher Education, Reasoning, Science Education, Secondary Education

Interest group: SIG 01 - Assessment and Evaluation, SIG 26 - Argumentation, Dialogue and Reasoning

Chairperson: Mareike Brehmer, University of Agder, Norway

The Diagnostic Test of Mathematical Creative Thinking Development-Based Ethnomathematics

Keywords: Culture, Ethnography, Mathematics, Secondary Education

Presenting Author: Suherman Suherman, University of Szeged, Doctoral School of Education, Hungary; **Co-Author:** Tibor Vidákovich, University of Szeged, Hungary

The purpose of this study is to examine the item difficulty patterns, the validity and reliability parameters as the development-based ethnomathematics of students' mathematical creative thinking (MCT). Participants were randomly chosen from 157 students enrolled in a secondary school in Indonesia. Using SPSS and Conquest software, the statistical analysis included Rasch measurement, descriptive statistics, and ANOVA. All data sets were analyzed to determine the extent to which items and people interact. We discovered that the reliability of the items in the developed test exceeded 0.7. (0.76 for persons and 0.984 for items). The results of the item fit analysis indicate that the mean of the outfit MNSQ was between 1.00 and 1.07. There were no significant differences in test, whole-grade-school, or MCT levels ($p > .05$). This finding indicates that there is no difference in the distribution of MCT across MCT concepts for girls and boys and that all students have the same distribution of MCT across the skill of MCT concepts. The developed diagnostic test and practical analysis based on Rasch measurements are expected to serve as guidelines and suggestions for other researchers developing MCT-based ethnomathematics research.

An approach to adaptive scaffolding in a simulation based learning environment

Keywords: Biology, Computer-assisted Learning, Pre-service Teacher Education, Science Education

Presenting Author: Marie Irmer, LMU Munich, Faculty of Biology, Biology Education, Germany; **Co-Author:** Dagmar Traub, Institute of Biology Education, LMU Munich, Germany; **Co-Author:** Christian Förtsch, LMU Munich, Germany; **Co-Author:** Birgit J. Neuhaus, LMU Munich, Germany

The here discussed learning environment was developed to foster the diagnostic competences of pre-service biology teachers. To guarantee the most effective learning experience, including in-process adaption such as scaffolds is effective. As the coding of our learning environment is very complex, so far in-process adaptation of the scaffolds was not possible. We identified keywords for the correct answers in the learning environment and investigated whether the number of keywords used in the answers by the participants give sufficient information about the learners' diagnostic competences assessed in the learning environment. A study was conducted in pre-post-test design (N=42). In the intervention, scaffolds were included in the learning environment. We coded the open text fields and counted the number of keywords used in the open text fields for the pre- and the post-test. A Pearson correlation (score from coding – keywords) was calculated. The correlation was remarkably high in the pre-test ($r=.859$, p

The measurement of inductive reasoning skill in higher education in Indonesia

Keywords: Assessment Methods and Tools, Higher Education, Reasoning, Science Education

Presenting Author: Azizul Ghofar Candra Wicaksono, University of Szeged, Doctoral School of Education, Hungary; **Co-Author:** Erzsébet Korom, University of Szeged, Hungary

This study measures students' inductive reasoning skills in higher education levels. 154 participants from mathematics and science majors (87% female; $M_{age}=20.12$; $SD=1.04$) in Indonesia were involved in this study. They participated and filled the online test about inductive reasoning skills. The test consisted of 32 items and was distributed into four categories such as figure analysis, figure series, number analogy, and number series. The data were analyzed with CFA and Rasch analysis to check the test's validity and ANOVA for providing the student's profile in inductive reasoning skill. The result indicates that the test has high reliability, acceptable individual item validity with a good infit MNSQ value. The test's construct with four categories also meets the validity standard and showed acceptable results in CFA. The mean average of students' inductive reasoning skills is 0.658 ($SD=0.277$). Among four categories, the figure analogy get highest result ($M=0.761$, $SD=0.251$) and the lowest result is found in number series category ($M=.551$, $SD=0.257$).

Workshops III 1

21 July 2022 09:00 - 11:00

Room 256

JURE 2022 Workshop

Introduction to meta-analytic structural equation modeling

Keywords: Competencies, Meta-Analysis, Quantitative Methods, Researcher Education

Interest group:

Meta-analytic structural equation modeling (MASEM) is a statistical technique that combines the strengths of meta-analysis and structural equation modeling. While standard meta-analysis evaluates each relationship between the variables of interest in a univariate way, MASEM is a multivariate technique that evaluates complete theoretical models (e.g., path models or factor models), accounts for sampling covariance between effect sizes, provides the researcher measures of overall fit of a hypothesized model, and provides parameter estimates from SEMs with confidence intervals and standard errors. It is for these reasons that MASEM is increasingly applied in the social sciences. The objective of this workshop is to learn the basics of MASEM and to get practical experience with fitting MASEM models using a dedicated online app webMASEM. The workshop will focus on the analysis part of meta-analysis (so it will not cover the search process and coding of the data).

Introduction to meta-analytic structural equation modeling

Presenting Author: Suzanne Jak, University of Amsterdam, Netherlands

Meta-analytic structural equation modeling (MASEM) is a statistical technique that combines the strengths of meta-analysis and structural equation modeling. While standard meta-analysis evaluates each relationship between the variables of interest in a univariate way, MASEM is a multivariate technique that evaluates complete theoretical models (e.g., path models or factor models), accounts for sampling covariance between effect sizes, provides the researcher measures of overall fit of a hypothesized model, and provides parameter estimates from SEMs with confidence intervals and standard errors. It is for these reasons that MASEM is increasingly applied in the social sciences. The objective of this workshop is to learn the basics of MASEM and to get practical experience with fitting MASEM models using a dedicated online app webMASEM. The workshop will focus on the analysis part of meta-analysis (so it will not cover the search process and coding of the data).

Workshops III 2

21 July 2022 09:00 - 11:00

Room 254

JURE 2022 Workshop

Best practice in intervention studies raising educational attainment

Keywords: Action Research, Design-based Research, Educational Attainment, Researcher Education

Interest group:

Recently there is a huge drive to use evidence-based practice (also known as evidence-informed or research-informed practice) in education, which suggests that education practices should be based on the best available scientific evidence, rather than tradition, personal judgement, or other influences. Randomised Control Trials (RCTs) are often seen as the gold standard measure of establishing research evidence of what works and does not work. However, the quality of the available evidence can vary and as education is inherently complex, it is not always clear how to best evaluate the educational programmes and practices. This workshop will discuss the strengths and limitations of RCTs within an educational context and discuss various other types of intervention designs used to evaluate programmes that raise educational attainment. Finally, we will discuss best practice in topics ranging from the design and implementation of control groups, to reporting of results, to dissemination and communication, taking the perspective that the best practices are not necessarily uniform across all types of study designs.

Best practice in intervention studies raising educational attainment

Presenting Author: Jo Van Herwegen, UCL Institute of Education, United Kingdom

Recently there is a huge drive to use evidence-based practice (also known as evidence-informed or research-informed practice) in education, which suggests that education practices should be based on the best available scientific evidence, rather than tradition, personal judgement, or other influences. Randomised Control Trials (RCTs) are often seen as the gold standard measure of establishing research evidence of what works and does not work. However, the quality of the available evidence can vary and as education is inherently complex, it is not always clear how to best evaluate the educational programmes and practices. This workshop will discuss the strengths and limitations of RCTs within an educational context and discuss various other types of intervention designs used to evaluate programmes that raise educational attainment. Finally, we will discuss best practice in topics ranging from the design and implementation of control groups, to reporting of results, to dissemination and communication, taking the perspective that the best practices are not necessarily uniform across all types of study designs.

Workshops III 3

21 July 2022 09:00 - 11:00

Room 250

JURE 2022 Workshop

Academic Publishing

Keywords: Doctoral Education, Meta-Analysis, Researcher Education, Writing/Literacy

Interest group:

The workshop aims to provide insights into the process of academic publishing in a scholarly journal. Educational Research Review is one of the high-prestige EARLI journals, with a focus on the publication of review studies and meta-analytic studies. The workshop leaders are responsible for the journal both from the academic perspective and the publishing perspective. The workshop is open for all JURE participants, irrespective of their prior experience and success in publishing. The participants' experiences will be included to illustrate steps that promote (or derogate) success in publishing. We will (1) present an introduction to writing (why and how?). Then we will discuss, (2) how to choose a journal and how to tailor the manuscript appropriately. We will further outline the (3) function of peer review and (4) editorial decisions. A next step will be to prepare the workshop participants (5) how to respond to peer review and editorial comments. Finally, we provide an overview of (6) essential publishing ethics.

Academic Publishing

Presenting Author: Hans Gruber, University of Regensburg, Germany; **Presenting Author:** Laura Mesquita, Elsevier, Netherlands

The workshop aims to provide insights into the process of academic publishing in a scholarly journal. Educational Research Review is one of the high-prestige EARLI journals, with a focus on the publication of review studies and meta-analytic studies. The workshop leaders are responsible for the journal both from the academic perspective and the publishing perspective. The workshop is open for all JURE participants, irrespective of their prior experience and success in publishing. The participants' experiences will be included to illustrate steps that promote (or derogate) success in publishing. We will (1) present an introduction to writing (why and how?). Then we will discuss, (2) how to choose a journal and how to tailor the manuscript appropriately. We will further outline the (3) function of peer review and (4) editorial decisions. A next step will be to prepare the workshop participants (5) how to respond to peer review and editorial comments. Finally, we provide an overview of (6) essential publishing ethics.

Workshops III 4

21 July 2022 09:00 - 11:00

Room 248

JURE 2022 Workshop

Applying the Rasch model in the educational sciences

Keywords: Competencies, Design-based Research, Doctoral Education, Researcher Education

Interest group:

The Rasch model is a readily accessible tool in the educational sciences with which to construct objective, additive scales. This model makes it possible to "[define] the difficulty of an item independently of the population and the ability of an individual independently of which item she has actually solved" (Rasch, 1960, vii). The primary aim of the workshop is to present the basic principles and application possibilities of the Rasch model. It will be demonstrated how Rasch analysis can be applied to a number of generic problems encountered by educational researchers. In discussing the different topics, I place great emphasis on practical examples, with which I attempt to make the various procedures as tangible and illustrative as possible. The first half of the workshop will focus on the key role of measurement and evaluation and the importance of creating universal, universally accepted and meaningful scales that are now indispensable for the physical world and an integral part of our daily lives. This will be followed by the function, principles, properties, conditions and application possibilities of the Rasch model (e.g. different research designs, different anchoring procedures and the basics of scaling and equating). The last part of the workshop will discuss different techniques for estimating person and population parameters as well as areas of application for multidimensional item response models.

Applying the Rasch model in the educational sciences

Presenting Author: Gyöngyvér Molnár, University of Szeged, MTA-SZTE Digital Learning Technologies Research Group, Hungary

The Rasch model is a readily accessible tool in the educational sciences with which to construct objective, additive scales. This model makes it possible to "[define] the difficulty of an item independently of the population and the ability of an individual independently of which item she has actually solved" (Rasch, 1960, vii). The primary aim of the workshop is to present the basic principles and application possibilities of the Rasch model. It will be demonstrated how Rasch analysis can be applied to a number of generic problems encountered by educational researchers. In discussing the different topics, I place great emphasis on practical examples, with which I attempt to make the various procedures as tangible and illustrative as possible. The first half of the workshop will focus on the key role of measurement and evaluation and the importance of creating universal, universally accepted and meaningful scales that are now indispensable for the physical world and an integral part of our daily lives. This will be followed by the function, principles, properties, conditions and application possibilities of the Rasch model (e.g. different research designs, different anchoring procedures and the basics of scaling and equating). The last part of the workshop will discuss different techniques for estimating person and population parameters as well as areas of application for multidimensional item response models.

Session F 1

21 July 2022 11:30 - 13:00

Room 250

Single Paper

Teaching and Teacher Education

Self-Regulation in Teachers

Keywords: Emotion and Affect, In-service Teacher Education, Motivation and Emotion, Quantitative Methods, Self-regulation, Teacher Effectiveness, Teacher Professional Development

Interest group: SIG 08 - Motivation and Emotion, SIG 11 - Teaching and Teacher Education

Chairperson: Natalie Peters, Germany

Chinese early career teachers' sense of professional agency and burnout

Keywords: In-service Teacher Education, Quantitative Methods, Self-regulation, Teacher Professional Development

Presenting Author: Liyuan E, University of Helsinki, Finland; **Co-Author:** Auli Toom, University of Helsinki, Finland; **Co-Author:** Jenni Sullanmaa, Tampere University, Finland; **Co-Author:** Janne Pietarinen, University of Eastern Finland, Finland; **Co-Author:** Tiina Soini-Ikonen, Tampere University, Finland; **Co-Author:** Kirsi Pyhältö, University of Helsinki, Finland

Professional agency plays a crucial role in teachers' professional development, pedagogical innovation, constructing professional identity, and promoting school improvement. Early career teachers' professional agency in the classroom (ECTPA) consists of motivation to continuously learn, self-efficacy beliefs for learning, and intentional activities to facilitate and manage to learn. This study explores Chinese early career teachers' professional agency in the classroom, their experienced burnout, and the interrelation between these two. A total 779 Chinese early career teachers, including primary and junior secondary school teachers, completed the questionnaire and the data were analyzed by using structural equation modeling (SEM). The results showed that Chinese early career teachers' professional agency in the classroom consisted of reflection in the classroom and intentional endeavour to develop a collaborative environment. The findings also revealed that Chinese early career teachers' professional agency in the classroom was related to the burnout they experienced. This implies that engaging Chinese early career teachers in active learning in the classroom provides a strategy to reduce their work-related burnout.

patterns of dealing with occupational stress and their predictors

Keywords: Motivation and Emotion, Self-regulation, Teacher Effectiveness, Teacher Professional Development

Presenting Author: Claudia Menge, German Centre for Higher Education Research and Science Studies (DZHW), Germany; **Co-Author:** Stefanie Gaeckle, German Centre for Higher Education Research and Science Studies (DZHW), Germany

Using data from the German National Education Panel Study (n=401), this contribution examines the development of occupational self-regulation during the transition from teacher training to employment as a teacher. Occupational self-regulation, defined as the ability to manage one's own resources effectively (Klusmann 2011), is measured by a short scale of the Occupational Stress and Coping Inventory by Schaarschmidt and Fischer (2001) with subscales for occupational engagement and resilience to occupational stress. Based on the short scale, four self-regulation patterns can be distinguished, two of which are considered risk factors for the mental and physical health. To examine the stability of these patterns over time, a latent transition analysis was estimated. It showed that 68% of the sample retained their original self-regulation pattern after entering the teaching profession. Particularly the patterns without health risks were characterized by a high degree of stability; transitions between patterns occurred more frequently from risk patterns to health-promoting patterns. The extent to which this can be attributed to different entry conditions of the participants – such as school and university final grades, career choice motives, self-efficacy expectations, well-being and Big Five personality traits – will be analyzed in a next step and discussed in this presentation.

Teachers' emotions, mood and emotion regulation: A diary-study approach

Keywords: Emotion and Affect, Motivation and Emotion, Self-regulation, Teacher Professional Development

Presenting Author: Tanja Bross, Augsburg University, Germany; **Co-Author:** Ulrike Nett, Augsburg University, Germany

Teachers experience numerous emotions in their daily work life. These can vary between situations and are influenced by them. To mainly upregulate positive emotions and downregulate negative emotions, emotion regulation strategies are essential. Previous research mainly investigates these situations and their impact on different outcomes, but neglected the role of emotions and emotion regulation. The aim of the current study was to investigate emotions, mood and emotion regulation on day-to-day experiences to (1) identify strategies used by teachers and (2) reveal potential moderator effects of these strategies on emotion and valence (mood). Overall, 109 teachers participated in the diary study over sixteen consecutive days. Results hint to the usage of various regulation strategies, including reappraisal, expression, social support and rumination. With the expectation of reappraisal in the positive regression model, no other strategy could be identified as a moderator between emotions and valence. The findings of the study yield information on the interplay of the constructs. Further implications for theoretical and practical relevance are discussed.

Session F 2

21 July 2022 11:30 - 13:00

Room 252

Single Paper

Learning and Social Interaction, Teaching and Teacher Education

Arts, Music and Dance

Keywords: Arts, Case Studies, Developmental Processes, Interdisciplinarity, Mixed-methods Research, Motivation, Quantitative Methods, Secondary Education, Teacher Professional Development, Teaching/Instruction

Interest group: SIG 11 - Teaching and Teacher Education, SIG 14 - Learning and Professional Development

Chairperson: Külli Kallas, University of Tartu, Estonia

Does Music Genre Matter? Effects of Motivation, Self-Efficacy, and Experience on Deliberate Practice

Keywords: Arts, Developmental Processes, Mixed-methods Research, Motivation

Presenting Author: Simon Schmidt, Universität Regensburg, Germany; **Co-Author:** Hans Gruber, University of Regensburg, Germany

This study investigates the motivational conditions, self-efficacy beliefs and practice of classical (symphonic, wind) orchestra/popular (rock, pop) band musicians. It thus complements previous research which has shed light on individual aspects of music learning. In both individual and collective work, high-quality practice performed in a sufficient amount of time was shown to be very effortful. A mixed-method approach combined a questionnaire and an additional prototypical case interview for each genre with professional musicians. The results show that classical musicians were younger than popular musicians when they started to learn their first and main music instrument and entered their first orchestra or band. While it was confirmed that individual experience was crucial for the time invested in and the quality of deliberate practice, collective practice experiences were also indicated to be a determinant. Furthermore, individual and collective practice were shown to be interrelated. Professional level was suggested to be a more discriminating factor with regard to the variables studied than genre, as professional musicians from both genres deploy deliberate practice strategies in an individual and in a collective context. Improvisation and jamming, however, only appeared in the popular collective and classical individual practice context.

Visual arts teachers' experience of professional teacher identity dilemmas during early career.

Keywords: Arts, Quantitative Methods, Secondary Education, Teacher Professional Development

Presenting Author: Maeve O'Brien Braun, ArteZ University of the Arts, Netherlands; **Co-Author:** Paulien C. Meijer, Radboud University, Teachers Academy, Netherlands; **Co-Author:** Ida Oosterheert, Radboud University, Teachers Academy, Netherlands

The early career dilemmas that secondary school visual art teachers experience are often attributed to artist identity appearing to be, or explicitly being framed as, oppositional to teacher identity. Evidence to support this view is largely based on narrative descriptions of art teacher identity. To date, there have been few studies that specifically explore dilemma experience using frames drawn from the visual arts teachers' multiple professional identity positions. This study addressed this gap by using a cross-sectional survey to examine beginning visual arts teachers' experience of early-career dilemmas. The dilemmas described in the survey represented both generic concerns facing all teachers, and subject-specific concerns arising from teaching the arts in secondary schools. In the sample, no conclusive evidence was found that arts subject-specific dilemmas were experienced more frequently or more strongly than generic early-career dilemmas. However, our findings do suggest that some generic dilemma experience may be being conflated with subject-specific concerns.

Exploring the Necessities of Teaching Chemistry through Ballet with CHEMDANCE: A Case Study

Keywords: Case Studies, Interdisciplinarity, Secondary Education, Teaching/Instruction

Presenting Author: Yagmur Cisem Yilmaz, Tallinn University, Estonia; **Co-Author:** Kadri Mettis, Tallinn University, Estonia

Abstract Integrating art and STEM fields is considered a creativity stimulating experience that could improve learning and elevate success [3]. As activities of STEAM vary depending on the preferences of the practitioner and the state policy, we conducted a case study named CHEMDANCE in order to understand how such an intervention would be implemented in Estonia. The aim of this research is to identify the shortcomings of the teachers in teaching interdisciplinary STEM subjects with the inclusion of arts, and of students in learning chemistry through artistic practice. We have assigned 14 secondary dance school students to create a choreography based on the attributes of the chemical elements and reactions. The students demonstrated their critical thinking and creativity by creating their dance movements to reflect their knowledge of chemistry. However, teachers' feedback revealed that they find it difficult to support students' creative processes. The latter one suggests that when students need further guidance, the teachers have struggled to provide insight if the needed information is not about chemistry or technical aspects of arts.

Session F 3

21 July 2022 11:30 - 13:00

Room 247

Single Paper

Assessment and Evaluation

Assessment Methods and Citizenship Education

Keywords: Achievement, Assessment Methods and Tools, Citizenship Education, Content Analysis, School Effectiveness, Secondary Data Analysis

Interest group: SIG 01 - Assessment and Evaluation, SIG 13 - Moral and Democratic Education

Chairperson: Helta Anggia, University of Szeged, Indonesia

Improving Citizenship Competences: Towards an Output-driven Approach in Citizenship Education

Keywords: Achievement, Assessment Methods and Tools, Citizenship Education, School Effectiveness

Presenting Author: Lianne Hoek, University of Amsterdam, Netherlands; **Co-Author:** Anke Munnikma, University of Amsterdam, Netherlands; **Co-Author:** Anne Bert Dijkstra, University of Amsterdam, Netherlands

Abstract Purpose: Scholars increasingly pay attention to the characteristics of effective citizenship education and to gaining insight into its outcomes. The systematic use of data to maximize student learning, also referred to as an output-driven approach, is often presented as a powerful predictor of student outcomes. However, its effectiveness has not been studied in the context of citizenship education. This paper aims to theoretically reflect whether an output-driven approach is also feasible for citizenship education. Methodology: Based on a review of the literature, we distinguish five steps of an output-driven approach and elaborate on their applicability in citizenship education. While doing so, we draw attention to three characteristics of citizenship education: its normative notion, the availability and quality of measurement instruments, and the relatively young tradition of measuring the outcomes of citizenship education. Findings: We conclude that an output-driven approach in citizenship education seems feasible provided that these three characteristics are carefully considered.

Measuring economic literacy: a systematic review of measurement tools over the past 30 years

Keywords: Assessment Methods and Tools, Citizenship Education, Content Analysis, Secondary Data Analysis

Presenting Author: Nina Welsandt, University of Duisburg-Essen, Germany; **Co-Author:** Hermann J. Abs, University of Duisburg-Essen, Germany

This paper focuses on the systematic presentation and critical analysis of currently available English and German measurement instruments for the assessment of economic literacy. For this purpose, the databases Psyn dex, ERIC, FIS Bildung and GESIS were systematically analyzed. In the predefined period from 1990-2021, 342 publications dealing with the assessment of economic literacy could be identified. From these, 25 independent test instruments could be extracted. The aim of this work is to map the knowledge tests to a previously developed criteria catalogue based on the taxonomy of Marzano and Kendall (2007) and to analyze them according to technical implementation, target groups, covered economic subareas and test formats. Furthermore, the instruments will be evaluated with regard to their compatibility with authentic assessments. Authentic assessments are dynamically designed test items, which are oriented towards the abilities relevant to everyday life. Students are asked to use their judgement in the innovatively designed tasks. Knowledge, skills and abilities must be used effectively and efficiently to solve the problems presented in the tasks (Janesick, 2006, p.4ff.). Subsequently, the study will contribute to point out

implications for the construction of an authentic, computer-based competency test in the field of economic education.

A systematic review: international political knowledge tests

Keywords: Assessment Methods and Tools, Citizenship Education, Content Analysis, Secondary Data Analysis

Presenting Author:Rukiye Ates, Universität Duisburg-Essen (Campus Essen), Germany; **Co-Author:**Katrin Hahn-Laudenberg, University of Leipzig, Germany; **Co-Author:**Hermann J. Abs, University of Duisburg-Essen, Germany

Aim/Question: This paper provides a systematic overview of internationally available standardised measurement instruments for capturing political knowledge. The aim of this paper is to summarise the currently available measurement instruments, to re-categorise their content in various ways, and ultimately to analyse them critically. In particular, the question will be addressed as to which content dimensions of political knowledge are included or excluded in the measurement instruments. For this purpose, political knowledge is first considered from an atheoretical point of view. In the first place, in what way the political knowledge is stored in the memory. For this reason, the concept of political knowledge is considered from a cognitive psychological perspective for the first time and then re-analyzed or located. This unbiased positioning will contribute to the fact that the substantive aspects of political knowledge in measuring instruments, in the categorization and assignment in dimensions, can be reconstructed more objectively. As a result, the collected measuring instruments are subjected to a detailed analysis with the help of the Systematic Review procedure and categorized theory-based according to content dimensions.

Session F 4

21 July 2022 11:30 - 13:00

Courtyard (Ground Floor)

Poster Presentation

Assessment and Evaluation, Higher Education, Instructional Design

Educational Challenges

Keywords: Achievement, Argumentation, Case Studies, Citizenship Education, Climate Change, Comparative Studies, Content Analysis, Cooperative/Collaborative Learning, Educational Challenges, Educational Policy, Environmental Education, Higher Education, Language (L1/Standard Language), School Effectiveness, Science Education, Social Sciences, Video Analysis

Interest group: SIG 04 - Higher Education, SIG 06 - Instructional Design, SIG 13 - Moral and Democratic Education, SIG 26 - Argumentation, Dialogue and Reasoning

Chairperson: Anabela Santos, Universidade de Lisboa, Portugal

Business schools' transformation towards sustainability

Keywords: Content Analysis, Environmental Education, Higher Education, School Effectiveness

Presenting Author:Bich-Ngoc Nguyen, Justus-Liebig University of Gießen, Germany; **Co-Author:**Jasmin Godemann, Department of Communication and Engagement in Agricultural, Nutritional and Environmental Sciences, Germany; **Co-Author:**Christian Herzig, Department of Management in the International Food Industry, Germany

Higher education plays an important role in achieving a more sustainable society (Cortese 2003, Kohl et al. 2021). Previous studies have focused on specific case studies or have been limited to certain dimensions of higher education institution (e.g. education or campus development), while research on how higher education institutions transform as a whole towards sustainability in a comprehensive way is still very limited. Through analysing reports of PRME signatories (Principles for Responsible Management Education) and a comparison with evidence from a previous study by Godemann et al. (2011), we show how the integration of sustainability at business schools develop over time. Organisational learning theory (Argyris & Schön 1978, Dee & Leisyte 2016) is used to enhance our understanding of business schools' learning process on their way to integrate sustainability within their organisation. Initial results show: 1) Business schools are moving towards a whole-institution approach to implementing sustainability. 2) There is evidence of double-loop learning processes, which can be considered to be crucial for a whole-institution approach during the organisational transformation towards sustainability.

Discussion vs. debate in civic education: a quasi-experimental video study

Keywords: Argumentation, Citizenship Education, Cooperative/Collaborative Learning, Video Analysis

Presenting Author:Lukas Conrad Brandt, Technische Universität Dortmund, Germany

Argumentation is of particular importance for political learning processes (Gronostay, 2019). It serves, among other things, the development of communicative political capacity and democratic conflict skills. Argumentation also plays an important role in everyday teaching practice. In political didactic research, however, there is little known as to whether and under what conditions discussion-oriented methods promote the students' ability to make political judgements. The video study aims to find out to what extent political judgement competence (Detjen, 2012) can be promoted by cooperative and competitive discussion formats (Johnson, 2015) in politics lessons and how the use of a structuring aid in the form of an Argumentation Vee Diagram (Nussbaum, 2008) affects this process. To investigate this question, the same learning unit with different discussion methods will be conducted and video-recorded in several school classes. In addition to the video data, further data will be collected by means of questionnaires and workbooks from the students. In addition, the oral arguments will also be coded regarding their quality. The evaluation of the collected data is quantitative. The video study will be conducted in the second quarter of 2022.

The narratives of Europe in social science education curricula – an international comparison

Keywords: Citizenship Education, Comparative Studies, Educational Policy, Social Sciences

Presenting Author:Saskia Langer, Trier University, Germany

Due to the progression of European integration the possibility for transnational educational spaces increases. In addition to forming an European Education Area, the institutions of the European Union promote an „European identity“ and „common values“ as goals for education while also stating the importance of forming „active and critically aware citizens“ (The Council of the European Union 2018/C 195/01). These goals form a discrepancy between education for positive identification and education for autonomy and critical thinking. Furthermore, it remains unclear what exactly constitutes „Europe“, respectively the „European identity“. The resulting gap is filled by diverse narratives in the national discourses. The questions arise as to which concrete objectives the political guidelines on education follow in the participating member countries, where differences can be seen and which narratives can be associated with them. This paper examines narratives about Europe in the border region between Germany, France, Luxembourg and Belgium. For this purpose, the curricula for social science subjects at the first stage of secondary education are analyzed comparatively. The narratives are then critically reflected and placed in the field of tension between education for autonomy and education for positive identification.

Climate Change Education at First Public Sustainable School: Case Study

Keywords: Case Studies, Climate Change, Educational Challenges, Environmental Education

Presenting Author:Diego Posada, University of Padova, Italy

This study focuses on the enablers and barriers to Climate Change Education in the first sustainable and self-sufficient public school in Latin America: School No.294 in Jaureguierry, Uruguay. This research studied how the Climate Change Education (CCE) policies and practices carried out in the school have been interpreted by the school community. Data was collected through 14 interviews and document analysis. The active and sustainability-oriented educational approach was defined as 'transformative education for sustainability' and a Theory of Change for the school project was developed. Findings include a review of enablers and barriers to transformative education for sustainability using Ball's four contextual dimensions for policy enactment as a lens. This analysis indicates that the community has had a mixed reception to the CCE policies and practices. For instance, at the start of the school project in 2016, only 15% of families had an organic vegetable garden at home whereas in 2019, 80% of families did. On the other hand, only a few members of the community actively participate and support school activities. The findings of this study highlight the importance of the support from the community and authorities for CCE projects.

Effects of integrated language and science and technology instruction on student achievement

Keywords: Achievement, Comparative Studies, Language (L1/Standard Language), Science Education

Presenting Author:Miriam Knoef, University of Twente, Netherlands; **Co-Author:**Adrie Visscher, Univ. of Twente, Netherlands; **Co-Author:**Hanno van Keulen, Windesheim University of Applied Sciences, Netherlands; **Co-Author:**Martine Gijssels, Saxion, Netherlands

In this review study, the effects of integrated language and S&T interventions on the achievement of students in elementary schools (kindergarten through sixth grade) were analyzed. A systematic literature search identified 23 relevant (quasi)experimental studies. A quantitative comparison of the weighted average effect sizes revealed that in almost all studies, students receiving the integrated language and S&T intervention outperformed their peers in the control group for learning achievement in language and S&T. The characteristics of the interventions were compared more qualitatively. The findings showed that interventions with a good alignment between student learning goals, learning content, and learning method yielded higher effects. Furthermore, the interventions with a teacher professional development program focusing on (pedagogical) content knowledge and/or teacher skills, and with a relatively long duration, appeared to go together with higher student achievement. Overall, this review study indicates that integrated language and S&T instruction can enhance student achievement for both subjects in elementary schools.

Session F 5

21 July 2022 11:30 - 13:00

Room 248

Single Paper

Higher Education, Lifelong Learning

Lifelong Learning

Keywords: Case Studies, Doctoral Education, Educational Challenges, Educational Psychology, Higher Education, Informal Learning, Learning Analytics, Lifelong Learning, Problem Solving, Workplace Learning

Interest group: SIG 07 - Technology-Enhanced Learning And Instruction, SIG 14 - Learning and Professional Development

Chairperson: Azizul Ghofar Candra Wicaksono, University of Szeged, Doctoral School of Education, Hungary

Intuition in Psychosocial Emergency Support

Keywords: Informal Learning, Lifelong Learning, Problem Solving, Workplace Learning

Presenting Author:Bianca Steffen, University of Paderborn, Germany

Mental simulation describes the cognitive processing of challenging situations and evaluate possible solutions (Klein, 1997). This practice is assumed to be conducive to intuition, which is the ability to recognize situational cues that allow experts to access memorized information spontaneously (Simon, 1992). Intuition is an important quality of expertise which is developed through professionals' learning through experience. Only few empirical studies concerning this particular relationship exist. Psychosocial emergency support workers offer counselling and mental support to victims in emergency situations. So far, empirical research in the domain of crisis response is scarce (Kremer, 2016). This contribution aims to answer how mental simulation contributes to the professional development of crisis response workers' intuition. Data will be collected using vignettes designed for this project in combination with standardized scales. Outcomes are expected to reveal differences between participants who use mental simulation and those who do not. By now, the vignettes are being in the process of construction and validation.

Users' Perceptions of Transparency and Trust in Career Recommendations from Learning Analytics

Keywords: Case Studies, Educational Psychology, Learning Analytics, Lifelong Learning

Presenting Author:Egle Gedrimiene, University of Oulu, Finland; **Co-Author:**Kati Mäkitalo, University of Oulu, Finland; **Co-Author:**Hanni Muukkonen, University of Oulu, Finland

In this exploratory study we address the research gap of users' perceived transparency, trustworthiness, and trust in the digital tools providing career guidance to users. We summarize ethical challenges in the computer-assisted career guidance and review current literature in big data, Artificial Intelligence and Learning Analytics in connection to perceived transparency, trustworthiness and trust. We analyse the users (N=106) experiences of the Learning Analytics (LA) career guidance tool, which recommended study programs and places to the users in the real world lifelong career guidance context. Results indicate that the LA career guidance tool was perceived as trustworthy but not transparent. Accuracy dimension of transparency was more important for the intentions to follow the recommendations of the LA guidance tool than was clarity. Younger people perceived the recommendations as more transparent and trustworthy. We discuss implications of these findings and state that accuracy should be given a priority over transparency in development of LA tools for guidance.

Career Development for Doctoral Students: key messages in literature and practice

Keywords: Doctoral Education, Educational Challenges, Higher Education, Lifelong Learning

Presenting Author:Beatriz Almeida, Faculty of Psychology and Education Sciences of the University of Porto (FPCEUP), Portugal; **Co-Author:**Ana Isabel Bento Rodrigues, Faculty of Psychology and Education Sciences - University of Porto, Portugal; **Co-Author:**Maria Cadilhe, Center for Psychology at University of Porto, Faculty of Psychology and Education Sciences at University of Porto, Portugal; **Co-Author:**Liliana Cunha, Center for Psychology at University of Porto, Faculty of Psychology and Education Sciences at University of Porto, Portugal; **Co-Author:**Marta Santos, Center for Psychology at University of Porto, Faculty of Psychology and Education Sciences at University of Porto, Portugal

As the number of Doctorate graduates rise, society faces emerging employability challenges. Academia, as their traditional employer, offers limited opportunities of permanent employment (der Boon, et al., 2018), while there are transversal shifts occurring in employability trends and careers (Savickas et al, 2009), that demand a flexible approach to career decision-making (Callanan, et al., 2017). This context urges the need to understand, develop and intervene in the employability and career development of Doctoral students and Doctorates. In this scope, the present paper aims to understand and critically analyse what has been studied, and what practices have been developed and used by Higher Education Institution (HEI) regarding the career development of Doctoral students. Through a critical literature review and a global benchmark of HEIs' initiatives, we highlight key messages related to the importance of HEI to offer formative components, along with practical work experience activities in contact with non-academic organizations, in order to promote Doctoral students' power to act in their future career development. Through these actions, HEI can also prepare Doctorates for the more transversal shifts taking place in careers (Savickas et al, 2009), enabling them to flexibly design their lifelong career decision-making (Callanan, et al., 2017).

Session F 6

21 July 2022 11:30 - 13:00

Room 254

Single Paper

Learning and Instructional Technology

Digital Literacy and Technology

Keywords: Educational Challenges, Educational Technology, Higher Education, Learning Technologies, Literacy, Qualitative Methods, Quantitative Methods, Survey Research, Teaching/Instruction, Technology

Interest group: SIG 07 - Technology-Enhanced Learning And Instruction

Chairperson: Franziska Muehlbacher, University of Salzburg, Austria

A comparison of digital literacy and technology usage among undergraduates in different age cohorts

Keywords: Higher Education, Learning Technologies, Survey Research, Technology

Presenting Author:Lan Anh Thuy Nguyen, Doctoral School of Education, University of Szeged, Hungary; **Co-Author:**Tun Zaw Oo, Doctoral School of Education, University of Szeged, Hungary; **Co-Author:**Anita Habók, University of Szeged, MTA-SZTE Digital Learning Technologies Research Group, Hungary

The focus of the study is to reveal the disparities among 947 university students in different age cohorts in their level of digital literacy and their technology usage for language learning purposes. We used an adapted questionnaire to assess the level of ability using a host of digital applications among English as a Foreign Language (EFL) learners and their frequency of usage for English learning. It could be concluded from the study that the reliability and validity of the questionnaire were confirmed. Also, the ANOVA results of the research found that fourth-year students' knowledge relating to technology is the best among the four groups, and there is no significant difference in terms of their technical skills in using digital applications for their language learning. Additionally, the frequency of using multiple applications for English learning was also explored, and the data analysis results showed that the disparity of EFL students in using some digital applications like editing and visual representation of information, communication tools, and translation was significantly different or the frequency of using those three types of mentioned applications of seniors surpassed the other groups. The findings of the study may contribute to the technology integration in Vietnamese education.

Measures of technology integration in survey-studies from 2010-2021: A systematic review

Keywords: Educational Technology, Quantitative Methods, Survey Research, Teaching/Instruction

Presenting Author:Tessa Consoli, University of Zurich, Institute of Education, Switzerland; **Co-Author:**Juliette Désiron, Institute of Education, University of Zurich, Switzerland; **Co-Author:**Dominik Petko, University of Zurich, Switzerland

The aim of this systematic review is to provide a comprehensive overview of the current quantitative survey instruments measuring technology integration (TI) in educational technology research. Given the rising interest surrounding the quality of TI, we have paid particular attention to the qualitative aspects of TI. Search results from the PsycINFO, ERIC, Web of Sciences and Scopus databases yielded 695 journal articles, of which 38 met our eligibility criteria, reporting a total of 36 different instruments. Preliminary results indicate that all instruments were used once, apart from one, which has been used five times. Our analysis also indicates that the diversity of instruments is very high and that several instruments have no conceptual or theoretical underpinnings. The most frequently measured qualitative aspects of TI include the use of technology to 1) enhance the cognitive engagement of learners and 2) promote collaboration between learners. The diversity of the instruments emphasizes the lack of a shared understanding of TI and the need to establish it.

Using focus groups to gather adolescents' perspectives concerning challenges faced on social media

Keywords: Educational Challenges, Literacy, Qualitative Methods, Technology

Presenting Author:Rui Maio, Faculty of Psychology and Educational Sciences of the University of Porto, Portugal; **Co-Author:**Diana Alves, Faculty of Psychology and Educational Sciences of the University of Porto, Portugal; **Co-Author:**Catarina Grande, University of Porto, Portugal; **Co-Author:**Joana Cadima, University of Porto, Portugal

Young people nowadays are growing up within an unprecedented and complex digital ecosystem, constantly engaging with socially networked technological platforms. Therefore, this study sought to explore young people's perspectives regarding specific challenges they face when navigating the digital world: image editing, social media privacy, and civic engagement. By conducting focus groups with 30 students aged between 12 and 16 from European formal and non-formal educational institutions, the aim was to understand their perspectives on the main topics addressed. The results showed an overall agreement between the participants. They viewed image editing as potentially positive, despite acknowledging its risks; social media privacy was seen as a balance between the individual being aware of the dangers of sharing personal information online and the ability to discern between information that should or should not be shared. When it comes to civic engagement, the students focused on the opportunities social media offer to address social issues within a wider audience, despite expressing concerns regarding people's authenticity when doing so. In a general sense, this study allowed the research team to understand adolescents' concerns and priorities when using social media, and emphasized the importance of promoting digital and social engagement skills in educational contexts.

Keynote III 1

21 July 2022 14:00 - 15:00

Auditorium 2A

JURE 2022 Keynote

Education and climate change activism: 'May you stay forever young'?

Keywords: Climate Change, Educational Challenges, Environmental Education, Secondary Education

Interest group:

Chairperson: Ana Camacho, Portugal

Young people, now and in the past, have been at the forefront of the fight for environmental causes. From opposition to nuclear power – in the 1980s, a Portuguese rock song urged that it was "better to be active today than radioactive tomorrow" – to Fridays for Future, children and young people have made a considerable effort to draw attention to the potentially disastrous consequences of environmental deterioration and climate change. However, far from recognising the political significance of this activism, the position of adults, political leaders included, has been at best patronising and at worst ignorant. Therefore, a call for a 'childist perspective' (Biswas and Mattheis, 2021) is indispensable, not only recognizing children and young people as full political actors but also how their engagement and participation in relation to environmental causes involves a learning process not only for themselves but also to other people around them, including adults. I will illustrate and discuss this vision based on data from *ClimActiC: Connecting Citizenship and Science for Climate Adaptation*, a project that involves several middle and secondary schools from the Norte Region in Portugal. Using a participatory research approach, the project supports students' development of a community climate profile that they present and discuss in collaborative laboratories where, together with other community actors (policy makers, environmental activists, informal leaders, local entrepreneurs, scientists, experts in local development, etc.), they generate actionable solutions for climate change adaptation. I hope that the process can illustrate ways in which we can stay forever young – at least in our commitment to environmental justice.

Education and climate change activism: 'May you stay forever young'?

Presenting Author:Isabel Menezes, University of Porto, Portugal

Young people, now and in the past, have been at the forefront of the fight for environmental causes. From opposition to nuclear power – in the 1980s, a Portuguese rock song urged that it was "better to be active today than radioactive tomorrow" – to Fridays for Future, children and young people have made a considerable effort to draw attention to the potentially disastrous consequences of environmental deterioration and climate change. However, far from recognising the political significance of this activism, the position of adults, political leaders included, has been at best patronising and at worst ignorant. Therefore, a call for a 'childist perspective' (Biswas and Mattheis, 2021) is indispensable, not only recognizing children and young people as full political actors but also how their engagement and participation in relation to environmental causes involves a learning process not only for themselves but also to other people around them, including adults. I will illustrate and discuss this vision based on data from *ClimActiC: Connecting Citizenship and Science for Climate Adaptation*, a project that involves several middle and secondary schools from the Norte Region in Portugal. Using a participatory research approach, the project supports students' development of a community climate profile that they present and discuss in collaborative laboratories where, together with other community actors (policy makers, environmental activists, informal leaders, local entrepreneurs, scientists, experts in local development, etc.), they generate actionable solutions for climate change adaptation. I hope that the process can illustrate ways in which we can stay forever young – at least in our commitment to environmental justice.

Session G 1

21 July 2022 15:30 - 17:00

Room 250
Single Paper
Lifelong Learning, Teaching and Teacher Education

Competencies in Teacher's Professional Development

Keywords: Competencies, Lifelong Learning, Quantitative Methods, Self-efficacy, Teacher Effectiveness, Teacher Professional Development, Teaching/Instruction, Technology

Interest group: SIG 11 - Teaching and Teacher Education, SIG 14 - Learning and Professional Development, SIG 17 - Methods in Learning Research

Chairperson: Anastasia Kurysheva, Netherlands

The development of a technical application model to support and evaluate teachers' professionalism

Keywords: Competencies, Lifelong Learning, Teacher Professional Development, Technology

Presenting Author:Tiiu Leibur, University of Tartu, Estonia; **Co-Author:**Katrin Saks, University of Tartu, Estonia; **Co-Author:**Irene-Angelica Chounta, University of Duisburg-Essen, Germany, Germany

Teacher professional evaluation and teacher self-evaluation have always been a challenge. Unfortunately, there are not enough opportunities to help teachers assess their professional development, developmental needs and levels of qualifications. The current study examines teachers' expectations for a possible technical application to support their professional development and the qualification application process. The theoretical framework of the study is based on the concept of professionalism, which includes the expected qualification of a teacher and their lifelong professional development. The data for this paper were collected through semi-structured focus group interviews and analysed using qualitative inductive content analysis. The results clearly reveal the teachers' vision of the specific expectations and the need for such technical application (TAPP) to be created. That would support the teacher in both self-analysis and self-assessment, as well as in the professional qualification application process. The technical application created would help teachers in valuing their work, and defining themselves as learning professionals, while supporting their professional self-development and self-esteem

Measurement of teacher professional vision in eye-tracking research

Keywords: Competencies, Teacher Effectiveness, Teacher Professional Development, Teaching/Instruction

Presenting Author:Özün Keskin, University of Augsburg, Germany; **Co-Author:**Andreas Gegenfurtner, University of Augsburg, Germany; **Co-Author:**Tina Seidel, Technische Universität München, Germany; **Co-Author:**Kathleen Stürmer, University of Tübingen, Germany

A key skill for successful teaching is teacher professional vision, defined as the connection between teacher's noticing of and knowledge about classroom situations. In the last few years, past research explored teacher professional vision with eye tracking. However, previous studies show a massive heterogeneity in terms of theory, methodology, and results. Therefore, we aimed to conduct a systematic literature review for creating an overview of eye-tracking studies examining the professional vision of teachers. A total of 61 studies were included in our review. We analysed the studies descriptively by screening for theoretical, methodological, and outcome characteristics. Our findings indicate heterogeneity in all three characteristics. Furthermore our results may allow for better characterization of expertise development in classroom situations and provide a framework for future eye-tracking research of professional teacher vision. The outcomes of this review add to the examining of teacher professional vision. Implications for future research on teacher vision are discussed.

On the role of teachers' competencies and beliefs for the implementation of a Media & ICT curriculum

Keywords: Competencies, Quantitative Methods, Self-efficacy, Teacher Professional Development

Presenting Author:Marina Grgic, Pädagogische Hochschule Bern, Switzerland

Ajzen's theory of planned behaviour emphasises that a person's beliefs and competencies are crucial for a person's behavioural intentions. Transferred to the implementation of a new curriculum, it can thus be hypothesised that teachers' competencies and beliefs are core antecedents of a successful implementation of new curricula. The context of this study is the new module curriculum "Media and ICT (M&I)" that was introduced in the German-speaking part of Switzerland in 2017. This study, hence, investigates the current state of teachers' competencies as well as their beliefs about the new module curriculum M&I. In addition, the relationship between these competencies and beliefs and teachers' intention to implement this new curriculum in the classroom is tested. Methodologically, an online survey of approximately 220 teachers is applied. It is expected that teachers' who exhibit higher M&I competencies and who show a positive belief pattern (i.e. positive attitudes towards M&I, high self-efficacy beliefs and a positive perceived subjective norm attributed towards M&I), have more pronounced intentions to implement the new curriculum in their classrooms. Regarding practical relevance, the expected findings could guide and support the professionalization of teachers and their initial and further training pertaining to M&I.

Session G 2

21 July 2022 15:30 - 17:00

Room 248

Single Paper

Educational Policy and Systems, Learning and Instructional Technology, Teaching and Teacher Education

Attitudes and Beliefs in Teachers

Keywords: Attitudes and Beliefs, Educational Policy, Learning Technologies, Misinformation, Primary Education, Qualitative Methods, Quantitative Methods, Secondary Education, Survey Research, Teaching Approaches

Interest group: SIG 07 - Technology-Enhanced Learning And Instruction, SIG 11 - Teaching and Teacher Education

Chairperson: Olena Kryshko, Universität Duisburg-Essen, Germany

How do teachers' self-reported knowledge and beliefs influence the quality of technology use?

Keywords: Attitudes and Beliefs, Learning Technologies, Quantitative Methods, Secondary Education

Presenting Author:Chiara Antonietti, Swiss Federal University for Vocational Education and Training (SFUVET), Switzerland; **Co-Author:**Maria-Luisa Schmitz, University of Zurich, Institute of Education, Switzerland; **Co-Author:**Tessa Consoli, University of Zurich, Institute of Education, Switzerland; **Co-Author:**Alberto Cattaneo, Swiss Federal University for Vocational Education and Training, Switzerland; **Co-Author:**Philipp Gonon, University of Zurich, Switzerland; **Co-Author:**Dominik Petko, University of Zurich, Switzerland

Since educational technologies have the potential to enhance knowledge acquisition when they are used to support learning activities that cognitively engage students, investigating how technology is used in lessons and identifying the facilitators for constructive and interactive use of technology might be interesting. Teachers' Technological Pedagogical Content Knowledge (TPCK) and positive beliefs towards technology are factors that foster effective technology integration in education. Since previous research has not investigated the relationship between TPCK, belief and technology use by distinguishing different degrees of student engagement in learning activities, we aimed to assess how technology is used in lessons and to evaluate what extent teachers' TPCK and beliefs positively influence the quality of technology use as conceptualized by the Interactive, Constructive, Active, and Passive framework (ICAP). A Structural Equation model was built with data from an online survey of Swiss teachers to test the relationship between self-reported TPCK, beliefs and ICAP technology use. Descriptive analyses revealed that teachers use technology mainly for passive learning activities. Results showed that teachers' positive beliefs better explain the implementation of activities involving technology use than TPCK. Our findings are relevant to lead educational stakeholders toward the digital transformation of education sector and to design teachers' training.

Analysing Teachers' Beliefs about Second-Grade Retention

Keywords: Attitudes and Beliefs, Educational Policy, Primary Education, Survey Research

Presenting Author:Natalie Santos, ISPA-Instituto Universitário, Portugal; **Co-Author:**Vera Monteiro, ISPA- Instituto Universitário, Portugal

Teachers have a complex and multifaceted beliefs system that influence their professional practice. This study aimed to explore teachers' second-grade retention beliefs and their relation to teachers' practices. Two characteristics of belief systems were studied: the level of connectivity with other beliefs and the strength with which they are held. Three hundred fifty-eight Portuguese primary teachers answered a beliefs questionnaire designed for this purpose. The results of the structural equation modelling indicated that teachers' beliefs about second-grade retention were predicted by their beliefs about the constructivist and transmissive models of teaching and learning and by their beliefs about the summative and formative purposes of assessment. A latent profile analysis identified four groups of teachers distinguishable by how strong their beliefs about second-grade retention were: strongly against, slightly against, slightly in favour and strongly in favour. Teachers' beliefs were reflected in their practices only when their beliefs were strongly held. These findings suggest that Portuguese teachers' beliefs about second-grade retention are integrated within their psycho-pedagogical beliefs system with a high degree of connectivity and intensity. These characteristics could make retention beliefs more enduring, influencing teachers practices and making difficult the integration of educational policies that aim to reduce grade retention rates.

Teachers' beliefs on options developing students' fact-checking skills – an interview series results

Keywords: Attitudes and Beliefs, Misinformation, Qualitative Methods, Teaching Approaches

Presenting Author: Annamária Ablonczy-Bugris, University of Szeged, Doctoral School of Education, Hungary; **Co-Author:** Laszlo Kinyo, University of Szeged, Hungary

Nowadays, new opportunities and challenges have emerged in education, such as acquiring the skill of information analysis and the conscious use of fact-checking. Previous research showed the problem of false news to be significant and dangerous to our modern society, while the education system seems unable to handle the phenomenon properly (Bálint et al., 2019). This paper presents the results of an interview sequence with Hungarian practising teachers (N=25). The research seeks to answer the questions of (1) what role do educators attribute to the development of critical information-analytical skills, (2) how do they see the role and significance of judging information from different sources. Transcribed interviews were analysed using the content analysis method. According to the results, the need for fact-checking appears between grades 6 to 11, and the following affect it most significantly: the teachers, the peers and the family environment. The survey findings emphasise the development of the childrens' research skills and developing a questioning culture and attitude. It has become clear that there is a need for new methods of transferring information in education that encourage teachers not to regurgitate ready-made information but to encourage students to take active responsibility for their own learning processes.

Session G 3

21 July 2022 15:30 - 17:00

Room 247

Single Paper

Cognitive Science, Learning and Social Interaction

Early Childhood Education

Keywords: Bilingual Education, Cognitive Development, Cognitive Skills, Developmental Processes, Early Childhood Education, Educational Psychology, Literacy, Problem Solving, Quasi-experimental Research, Teaching/Instruction

Interest group: SIG 05 - Learning and Development in Early Childhood

Chairperson: Ariadne Warmoes, Vrije Universiteit Brussel (VUB), Belgium

The effect of interactive reading aloud on problem-solving skills in preschoolers

Keywords: Early Childhood Education, Problem Solving, Quasi-experimental Research, Teaching/Instruction

Presenting Author: Joris Van Elsen, University of Antwerp, Belgium

Problem solving is one of the so called 21st century skills and is needed for learning and living in an ever-changing society. Preschool age is the ideal moment to foster these skills. Research on effective classroom activities promoting problem-solving skills in preschoolers is scarce. This study aims to investigate to what extent interactive reading aloud from picture books can promote problem-solving skills in preschoolers. Ninety-four preschoolers from six classes took part in the study. Teachers were asked to read interactively from a selection of picture books to small groups of preschoolers for five consecutive days. Pictorial Multiple Solutions Tasks (PMST) were used to assess fluency, flexibility and originality in coming up with possible solutions to a problem. The results of multilevel analysis indicate that interactive reading aloud improves the flexibility with which children are able to come up with different solutions, but had no effect on fluency and originality. Moreover, we found that reactions of the preschoolers to the test, such as shyness or a lack of interest, influenced the results. Gender, age and language spoken at home were found to have no effect.

Developmental trajectories of executive functions in Chilean children according to SES

Keywords: Cognitive Development, Cognitive Skills, Developmental Processes, Early Childhood Education

Presenting Author: Victoria Espinoza, Pontificia Universidad Católica de Chile, Chile; **Co-Author:** Ricardo Rosas, Psychology, Chile; **Co-Author:** Catalina Santa Cruz, Centro de Justicia Educacional, Chile

Executive functions are essential in today's society as they allow us to focus on our goals, analyze situations and plan our actions. The development of executive functions has a substantial slope during preschool age and strongly impacts the school readiness of children. However, not all students develop these skills in the same way; various conditions can affect the development of executive functions, one of which is socioeconomic status. Children from families of low socioeconomic status enter school with diminished development of executive functions. This research aimed to investigate possible differences in the development trajectories of the executive functions of a group of Chilean preschoolers. A group of 81 high SES children and 80 low SES children were evaluated four times using the Cat-dog test, a playful digital application designed to assess EF. An ANOVA of repeated measures was performed, and it was possible to observe a significant effect of time and SES, but not of the interaction term. This means that there are critical differences between children from low and high SES that do not disappear over time. The results are discussed around the need to have tools in the preschool education system to reduce the initial gaps.

Improving Bilingual Preschoolers' Notational Ability: The Efficacy of Two School-Based Interventions

Keywords: Bilingual Education, Early Childhood Education, Educational Psychology, Literacy

Presenting Author: Oriana Incognito, University of Florence, Italy; **Co-Author:** Giulia Vettori, University of Florence, Italy

We present a randomized trial study aimed to analyze the efficacy of two different school-based interventions—normal preschool literacy teaching, and the PASSI intervention carried out for different durations (12 versus 30 weeks)—on improving notational ability of 251 children (bilingual language-minority [BLM] preschoolers and their monolingual peers) aged 4–5 years (49% males, 51% females). The participants were recruited from preschools in Italy and randomly assigned to three groups involved in different notational-focused interventions: (1) normal preschool literacy teaching (Group 1); (2) the PASSI intervention carried out for 12 weeks (Group 2); and (3) the PASSI intervention carried out for 30 weeks (Group 3). Results from the comparison of children's notational ability before and after the interventions showed that the PASSI intervention (both durations of 12 and 30 weeks) led to a significantly higher level of notational ability in BLM children and their monolingual peers. Moreover, the PASSI intervention carried out for 30 weeks, filled the gap between the baseline difference between BLMs and their monolingual peers.

Session G 4

21 July 2022 15:30 - 17:00

Room 256

Single Paper

Motivation in Mathematics

Keywords: Achievement, At-risk Students, Educational Psychology, Emotion and Affect, Game-based Learning, Mathematics, Metacognition, Motivation and Emotion

Interest group: SIG 07 - Technology-Enhanced Learning And Instruction, SIG 08 - Motivation and Emotion

Chairperson: Kevin Ackermans, Open University, Netherlands

Effects of an Adaptive Math Learning Program on Students' Competencies, Self-concept and Anxiety

Keywords: At-risk Students, Game-based Learning, Mathematics, Motivation and Emotion

Presenting Author:Anna Hilz, IPN - Leibniz Institute for Science and Mathematics Education, Germany; **Co-Author:**Karin Guill, Leibniz Institute for Science and Mathematics Education, Germany; **Co-Author:**Janina Roloff-Bruchmann, IPN - Leibniz Institute for Science and Mathematics Education, Germany

Math learning programs offer beneficial features, especially for low-achieving students, as they provide direct and positive feedback while students practice at their individual skill level. Thus, on the one hand, math competencies can be improved, and on the other hand, feedback should have a positive effect on emotional outcomes such as self-concept and anxiety. Therefore we investigated whether the provision of an adaptive computer-based arithmetic learning program fosters student's math performance, in terms of mental arithmetic skills and conceptual math knowledge, their math ability self-concept, and a reduction of math anxiety. Moreover we investigated if students with higher conceptual math knowledge benefit more from the implementation of an arithmetic learning program. We used a pretest-posttest control group design with a total of 366 students (grade 5) from Northern German non-academic track schools. Randomization took place on class level. In the experimental condition, an arithmetic learning program was used for 22 weeks. Math self-concept only improved in the experimental condition, suggesting that beneficial features of the program positively affect students' ability math self-concept.

Unraveling several issues within the research domain of math anxiety

Keywords: Educational Psychology, Emotion and Affect, Mathematics, Metacognition

Presenting Author:Febe Demedts, University of Leuven - Campus KULAK, Belgium; **Co-Author:**Bert Reynvoet, KU LEUVEN, Belgium; **Co-Author:**Delphine Sasanguie, HoGent, Belgium; **Co-Author:**Fien Depaepe, KU Leuven, Belgium

Math anxiety (MA) is one of the most studied affective factors related to learning mathematics. However, only limited insights were gained into some crucial issues: (1) the link between state and trait MA, (2) the domain-specificity of MA, and (3) the impact of MA on math self-concept. This study attempts to address some of these issues, by using an experimental research design with easy and difficult math and non-math tasks, questioning both state and trait MA and math self-concept, and additionally gauging their general anxiety. We found that state and trait MA showed only a weak correlation, but that depending on the difficulty of the math task, another component of MA was predictive of mathematical performance, namely, state MA in the easy task and trait MA in the difficult condition. A moderate correlation was observed between MA and general anxiety, but the latter was not of predictive value for the accuracies of both math and non-math tasks. Lastly, we observed that math self-concept is influenced by both actual performance and MA. These results provide insight into the concept of MA and provide indications to design educational interventions.

Students excelling in Math in various contexts: Metacognitive, motivational & emotional comparisons

Keywords: Achievement, Mathematics, Metacognition, Motivation and Emotion

Presenting Author:Dimitrios Moustakas, University of Macedonia, Greece; **Co-Author:**Eleftheria Gonida, Aristotle University of Thessaloniki, Greece

The main aim of this study was to examine metacognitive awareness, achievement motivation and achievement emotions of high achieving adolescents studying in different educational settings. A secondary aim was to investigate if these characteristics vary depending on students' academic identification status. A sample of 492 adolescents was sourced from regular and advanced high schools, as well as from a summer program for academically gifted students. Based on their performance on a battery of school-type mathematical tasks, 141 high achievers in Mathematics were found. Comparisons of the three different educational settings revealed that high achievers from advanced high schools and the summer program performed better in Mathematics than their high achieving peers from the regular high schools; however, no significant differences were found among them for the majority of the examined metacognitive, motivational and affective variables. The results verified both the Big Fish Little Pond Effect and the Happy Fish Little Pond Effect for students attending regular and advanced high schools. Academically gifted students were characterized by greater expectations for success compared to their peers, while further analyses showed no significant differences between genders for all examined variables.

Session G 5

21 July 2022 15:30 - 17:00

Courtyard (Ground Floor)

Poster Presentation

Higher Education, Learning and Social Interaction, Motivational, Social and Affective Processes, Teaching and Teacher Education

Self-Efficacy

Keywords: Action Research, Argumentation, Attitudes and Beliefs, Climate Change, Competencies, Educational Psychology, Environmental Education, Higher Education, Motivation, Parental Involvement in Learning, Pre-service Teacher Education, Professions and Applied Sciences, Quantitative Methods, School Effectiveness, Self-efficacy, Social Interaction, Teacher Effectiveness, Technology, Writing/Literacy

Interest group: SIG 11 - Teaching and Teacher Education, SIG 14 - Learning and Professional Development, SIG 26 - Argumentation, Dialogue and Reasoning

Chairperson: Beatriz Almeida, Portugal

Adaptation of the Sources of Self-Efficacy in Writing Scale with a sample of Portuguese students

Keywords: Educational Psychology, Motivation, Self-efficacy, Writing/Literacy

Presenting Author:Mariana Silva, Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto, Portugal; **Co-Author:**Ana Camacho, University of Porto and Polytechnic Institute of Porto, Portugal; **Co-Author:**Rui Alexandre Alves, University of Porto, Portugal

The first contacts with writing take place at school but writing remains essential to communication and expression in daily life. However, it is a cognitively demanding task that requires sustained motivation. Therefore, it is essential to develop students' writing skills and self-efficacy. The present study aimed to: (a) adapt the Sources of Middle School Mathematics Self-Efficacy Scale (Usher & Pajares, 2009) to the writing domain and to Portuguese language; (b) explore the relationship between students' sources of self-efficacy, self-efficacy and writing skills; and (c) test for gender differences across these variables. One hundred fifty-five eighth grade students answered the Sources of Self-Efficacy in Writing scale and the Self-Efficacy in Writing Scale and wrote an argumentative text. The Portuguese adaptation of Usher and Pajares' scale (2009) was shown to be valid and reliable in the writing domain and with Portuguese students. In addition, sources of self-efficacy and self-efficacy explained students' writing performance, and girls had higher scores than boys in sources of self-efficacy and wrote better argumentative texts. We conclude by highlighting the role of teachers as models, persuasion agents, and promoters of self-efficacy in writing.

The interplay of job characteristics, personal resources and teachers' personal initiative

Keywords: Quantitative Methods, School Effectiveness, Self-efficacy, Teacher Effectiveness

Presenting Author:Verena Jörg, DIPF | Leibniz Institute for Research and Information in Education, Germany

Individual teachers' self-starting and future-oriented initiatives towards organizational improvement are central when it comes to schools' capability for change and innovation. Drawing from research in organizational psychology, namely the construct of proactive behavior and the Job Demands - Resources Model, this study investigates how the prominent job demand of time pressure, as well as job resources (scope for action and innovative climate at school) and personal resources (teachers' professional knowledge, self-regulation skills and self-efficacy) contribute to proactive behavior on an individual level. In a sample of $N =$

130 German secondary school teachers, we find that personal resources outweigh the influence of job demands and resources, when considered simultaneously. While direct effects of job characteristics on teachers' proactive behavior are non-significant, the results point to the relevance of personal resources as direct factors of influence, as well as to their mediating effect on the impact of job resources on teachers' proactive behavior. Consistent with previous research, reverse effects of teachers' proactive behavior on their subsequent personal resources are evident.

ICT-related parenting profiles and their effect on children's ICT literacy and motivational factors

Keywords: Competencies, Parental Involvement in Learning, Self-efficacy, Technology

Presenting Author:Sümevra Tural, Leibniz Institute for Educational Trajectories, Germany; **Co-Author:**Cordula Artelt, Leibniz Institute for Educational Trajectories, Germany; **Co-Author:**Martin Senkbeil, Leibniz Institute for Science Education, Germany

Mediation strategies are according to the parental mediation theory derived based on the ICT-related parenting practices that parents use (Symons et al., 2017), which can be commonly classified as active, restrictive, and co-view mediation (Valkenburg et al., 1999). Mediation strategies are distinguished in that they are mostly based on either an intent to control or support the ICT use of the children (Symons et al., 2017). Assuming that parenting practices do not occur in isolation, but often in combination, we use a person-centered approach in this study in order to investigate the question to what extent ICT-related parenting profiles can be identified and what significance they have for the ICT literacy and motivational factors of the children. We used data from a study conducted by the Leibniz Institute for Science Education (IPN) in Germany, in which 563 sixth graders and their parents (N=449) participated. A latent profile analysis will be conducted to identify the parenting profiles. We expect the following four profiles: active, restrictive, permissive and neglectful. We expect positive effects regarding the active profile on children's ICT literacy and motivational factors, but negative effects regarding the restrictive, permissive and neglectful parenting profiles.

Expanding Students' Power to Act by including Employability in Higher Education Pathways

Keywords: Action Research, Higher Education, Professions and Applied Sciences, Self-efficacy

Presenting Author:Ana Isabel Bento Rodrigues, Faculty of Psychology and Education Sciences - University of Porto, Portugal; **Co-Author:**Maria Cadilhe, Center for Psychology at University of Porto, Faculty of Psychology and Education Sciences at University of Porto, Portugal; **Co-Author:**Liliana Cunha, Center for Psychology at University of Porto, Faculty of Psychology and Education Sciences at University of Porto, Portugal; **Co-Author:**Marta Santos, Center for Psychology at University of Porto, Faculty of Psychology and Education Sciences at University of Porto, Portugal

Higher Education students are typically associated with an intensified experience of labour market integration, and it is therefore crucial to create the conditions in Higher Education Institutions to support all students to develop employability and career management skills. Our aim is to understand how the consideration of training modules on employability-related topics in Higher Education pathways is reflected in the expansion of students' power to act (Clot, 2008). A training programme composed of five modules related to analysing the labour market, creating their CV, writing a cover letter, managing their digital footprint and network, and preparing for an interview was developed and implemented in a pilot edition with 32 engineering students. An impact questionnaire with a pre- and post-test comparison was implemented and allowed to understand that the training in key issues related to students' employability promoted their perception of competence, which facilitated the implementation of a set of actions, thus expanding their power to act. Impacts on perceived individual and collective influence were also found. Programmes of this nature contribute to equipping everyone with the necessary employability and career management skills to navigate in these uncertain contexts without being left behind.

Adapting Theory of Planned Behavior and Protection Motivation Theory on everyday climate-protection

Keywords: Attitudes and Beliefs, Climate Change, Environmental Education, Self-efficacy

Presenting Author:Melanie Keller, University of Augsburg, Germany; **Co-Author:**Melissa Özsoy, Augsburg University, Germany; **Co-Author:**Martin Daumiller, University of Augsburg, Germany; **Co-Author:**Markus Dresel, University of Augsburg, Germany

The Theory of Planned Behavior (TPB) and the Protection Motivation Theory (PMT) are successfully used to describe, explain, and predict a wide range of behaviors of individuals. Recently, both have been applied to the highly relevant topic of climate-protective behavior. We extend this line of research by integrating both models and investigating actual behavior instead of mere intentions (focussing on three aspects: daily climate-protective transportation, grocery-shopping, and energy conservation). For this, we conducted a study combining online questionnaires with experience sampling methods with 150 participants from three mid-sized German cities. The results showed that both theories can be applied to climate-protective behavior. Integration of both theories led to only little, more explained variance. In contrast to the theory behind both models, we found that personal predictors were related to climate protective behaviors also beyond intentions, possibly pointing to an intention-behavior gap. These findings thus illuminate relevant personal antecedents of climate-protective intention. Our findings imply that particularly potential reward and self-efficacy emerged as important factors to foster climate-protective intention and behavior and thus could be key approaches for educators.

Influences of Personalised Feedback and Varying Providers on Students' Self-Efficacy and Motivation

Keywords: Argumentation, Motivation, Pre-service Teacher Education, Social Interaction

Presenting Author:Theresa Ruwe, Humboldt University Berlin, Germany; **Co-Author:**Elisabeth Mayweg, Humboldt University of Berlin, Germany

A 3x2 experimental between-subject study aims to shed light on the impact of feedback personalisation and feedback providers on student teachers' motivation and self-efficacy. Building on research on feedback and non-cognitive aspects in online learning environments, the influence of social cues, determined by feedback type (i.e., personalised vs impersonalised) and feedback provider (i.e., peer, educator, and system), and their effect on non-cognitive aspects of learning, i.e., self-efficacy and motivation as outcomes of the social interaction influencing students' incorporation of feedback, are investigated. Student teachers are asked to write an argumentative essay, receive feedback on their essay, and are then asked again to incorporate the feedback, i.e., improve their argumentative writing skills. We assume that there will be differences in participants' self-efficacy and motivation as well as in the incorporation of the feedback (e.g., increased quality of argumentative writing) depending on the type, i.e., the personalisation, and the provider of feedback. Practically and theoretically, this study will help to describe the appropriate implementation of social cues in online learning environments.

Session G 6

21 July 2022 15:30 - 17:00

Room 254

Roundtable

Assessment and Evaluation, Instructional Design

Educational Psychology and Problem Solving

Keywords: Argumentation, Comprehension of Text and Graphics, Educational Psychology, Experimental Studies, Instructional Design, Mathematics, Multimedia Learning, Problem Solving, Quantitative Methods, Secondary Education, Writing/Literacy

Interest group: SIG 02 - Comprehension of Text and Graphics, SIG 06 - Instructional Design, SIG 12 - Writing

Chairperson: Bich-Ngoc Nguyen, Germany

Goal Formulations in Problem Solving Prior to Instruction

Keywords: Experimental Studies, Instructional Design, Problem Solving, Quantitative Methods

Presenting Author:Charleen Brand, Ruhr University Bochum, Institute of Educational Research, Germany; **Co-Author:**Katharina Loibl, University of Education Freiburg, Germany; **Co-Author:**Nikol Rummel, Ruhr University Bochum, Germany

Problem solving prior to instruction (PS-I) is an instructional design that implements an initial problem-solving phase followed by an instruction. During problem solving, students are prepared for learning by activating prior knowledge and generating own solutions to a novel problem. Previous studies suggest that the activation of broad (i.e., conceptually diverse) prior knowledge, is associated with better conceptual learning. However, it is unclear how to foster a broad

knowledge activation. One factor that may influence students' problem solving and knowledge activation, relates to the goal formulation of the problem-solving task. Literature on problem solving and inquiry learning has shown that students' problem-solving is altered, and thus, their activation of prior knowledge relevant for solving the problem at hand, based on whether they receive (1) a learning or problem-solving goal, and (2) a specified or unspecified goal. In order to investigate the effect of goal formulation on prior knowledge activation in PS-I, we plan a 2x2 experimental design that varies the factors goal type (problem-solving vs. learning goal) and goal specificity (unspecified vs. specified goal). The implications of this study could give further insights into how a broad prior knowledge activation, and in turn, learning, may be facilitated in PS-I.

Learning with multiple external representations in the domain of propositional logic with children

Keywords: Comprehension of Text and Graphics, Educational Psychology, Mathematics, Multimedia Learning

Presenting Author: Julia Harenz, Saarland University, Germany; **Co-Author:** Markus Vogel, University of Education Heidelberg, Germany; **Co-Author:** Kristin Altmeyer, Saarland University, Germany; **Co-Author:** Roland Brünken, Saarland University, Germany; **Co-Author:** Sarah Malone, Saarland University, Germany

There are many ways to provide learning materials to learners. Using multiple external representations (MERs) is one of these options. Science, technology, engineering, and mathematics (STEM) education combines a lot of different external representations, such as text, graphics, formula, visualizations, and more, for describing and explaining complicated topics and models. Several studies show that MERs have an advantage over single representations for learning and problem solving. The advantage of combinations of text and graphics, which can be called heterogeneous MERs, over single representations can be explained by means of the widely demonstrated multimedia effect. However, less is known about the effect of using text and formula, as one type of homogeneous MERs. This research gap is the focus of our investigation. We compare the effect of different types of MERs with each other and with single representations on children's problem solving in the domain of propositional logic. Further insights about learning with homogeneous and heterogeneous MERs can inform instructional practice and thus improve instructional quality as well as student learning outcomes.

Feedback in Argumentation: The role of Receptivity to Feedback and Perceived Feedback Usefulness

Keywords: Argumentation, Educational Psychology, Secondary Education, Writing/Literacy

Presenting Author: Jan Luca Bahr, Leibniz Institute for Science and Mathematics Education (IPN), Germany; **Co-Author:** Thorben Jansen, Leibniz Institute for Science and Mathematics Education (IPN), Germany; **Co-Author:** Lars Höft, Leibniz Institute for Science and Mathematics Education (IPN), Germany; **Co-Author:** Nils-Jonathan Schaller, Leibniz Institute for Science and Mathematics Education (IPN), Germany

Writing argumentative texts about socio-scientific issues prepares students for a meaningful societal participation in addressing global challenges. However, written argumentations are rarely provided with feedback that is conducive to learning. Even though feedback has been shown to promote learning on average, the effects are heterogeneous and in some cases even hinder learning. Thus, it is unclear what drives the effectiveness of feedback. Student characteristics, both, situational or of relatively stable nature, may help in explaining. However, they remain largely understudied. Therefore, in this study we investigated links between students' receptivity to feedback and the perception of the usefulness of the feedback on students' interest and achievement when revising written argumentations with feedback in an online learning environment. The sample survey is scheduled to start in March 2022. The sample will contain 1000 students (grades 10 to 13, age 16 to 21) from secondary schools in Germany. Insights into the determinants of effective automated feedback may help researchers and educators alike in developing learning tools and interventions fostering argumentation skills and interest in global challenges.

Workshops IV 1

22 July 2022 09:00 - 11:00

Room 256

JURE 2022 Workshop

Neuroeducation

Keywords: Achievement, Action Research, Argumentation, Artificial Intelligence

Interest group:

Neuroeducation is a multidisciplinary field that combines neuroscience, psychology and education to improve our understanding about learning/teaching processes. It focuses on the brain-behavior link and how this knowledge can be translated to practices that improve education. In this workshop we will approach major themes of neuroeducation, including myths and common misperceptions, how cognitive functions that are critical for learning are instantiated in the brain, neuroscientifically derived training programs of cognitive functions that are important in the classroom, and tools of neuropsychological testing. We will provide practical skills and resources that are useful for educational practices.

Neuroeducation

Presenting Author: Marta Martins, University Institute of Lisbon (ISCTE-IUL), Portugal

Neuroeducation is a multidisciplinary field that combines neuroscience, psychology and education to improve our understanding about learning/teaching processes. It focuses on the brain-behavior link and how this knowledge can be translated to practices that improve education. In this workshop we will approach major themes of neuroeducation, including myths and common misperceptions, how cognitive functions that are critical for learning are instantiated in the brain, neuroscientifically derived training programs of cognitive functions that are important in the classroom, and tools of neuropsychological testing. We will provide practical skills and resources that are useful for educational practices.

Workshops IV 2

22 July 2022 09:00 - 11:00

Room 252

JURE 2022 Workshop

Introduction to R and RStudio

Keywords: Higher Education, Quantitative Methods, Researcher Education, Secondary Data Analysis

Interest group:

R is an open-source programming language particularly suitable for statistical analysis. With increasing popularity among researchers in the field of social sciences, R offers a flexible programming environment for conducting virtually any type of statistical procedure. This workshop offers an introduction to R and RStudio. We will focus on presenting the R basic syntax and way of functioning. The general goal is to give attendees the necessary skills to perform basic operations for data manipulation and management, data visualization, and simple descriptive and inferential statistical procedures. The workshop will give attendees' the opportunity to put these skills into practice. During these sessions, the instructor and participants will work together to perform a set of tasks and solve practical exercises using R. Three blocks of contents are planned. - 1st Block: Introduction to R and RStudio environments, R basic operators, objects, data structures, and built-in functions; - 2nd Block: Creating, indexing, and manipulating data objects in R; - 3rd Block: Plotting data and computing descriptive and basic inference statistics using R.

The workshop is open up to 20 participants. No previous R knowledge is required. Basic statistical knowledge namely on summary measures, correlation, and regression is assumed. Participants should have installed in their laptops the latest version of R (<https://www.r-project.org/>) and RStudio (<https://rstudio.com/products/rstudio/download/>).

Introduction to R and RStudio

Presenting Author: Tiago Ferreira, University of Porto, Portugal

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sciences, R offers a flexible programming environment for conducting virtually any type of statistical procedure. This workshop offers an introduction to R and RStudio. We will focus on presenting the R basic syntax and way of functioning. The general goal is to give attendees the necessary skills to perform basic operations for data manipulation and management, data visualization, and simple descriptive and inferential statistical procedures. The workshop will give attendees the opportunity to put these skills into practice. During these sessions, the instructor and participants will work together to perform a set of tasks and solve practical exercises using R. Three blocks of contents are planned. - 1st Block: Introduction to R and RStudio environments, R basic operators, objects, data structures, and built-in functions; - 2nd Block: Creating, indexing, and manipulating data objects in R; - 3rd Block: Plotting data and computing descriptive and basic inference statistics using R.

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Workshops IV 3

22 July 2022 09:00 - 11:00

Room 250

JURE 2022 Workshop

Should you slow down your science?

Keywords: Competencies, Higher Education, Researcher Education, Writing/Literacy

Interest group:

In this technology driven, fast-paced world we live in, it might sound counterintuitive contemplating the idea of slowing down the pace at which science is produced. Still, that is precisely what most researchers should be doing, if we care for the development of sound, ethically driven, self-correcting, trustworthy science, and well-being in general. For many years the "publish or perish" mindset has dominated research and academia, in part driven by the publications industry and certain notions of meritocracy and accountability. While this mindset coupled with the digital revolution bore valuable fruits for science and society, it has probably outlived its usefulness and some of its indirect drawbacks are ever more apparent. Problems such as predatory publishing, replication crisis, breaches of research integrity, and researchers' poor mental health make it clear that science and scientists would be better off if a new mindset is espoused. In the workshop, we will start by discussing the diseases of fast science, sharing experiences, and then building a case of good reasons to slow down your science.

Should you slow down your science?

Presenting Author: Rui Alexandre Alves, University of Porto, Portugal

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Workshops IV 4

22 July 2022 09:00 - 11:00

Room 249

JURE 2022 Workshop

Incorporating Open Science Practices on Your Research Workflow

Keywords: Competencies, Doctoral Education, Higher Education, Researcher Education

Interest group:

The aim of this workshop is to present an introduction to open science practices, highlighting their benefits for the researcher, the scientific community, and the society at large. Open science practices enable the sharing of any kind of output, resource, material, method or tool produced throughout the research workflow. Their advantages include the increase in transparency, robustness, and rigor of the conducted research, as well as added accessibility and magnified impact of the different research outputs produced during the lifetime of a project beyond the traditional focus on publication of manuscripts. Based on this framework, the current workshop will provide an overview on the different open science practices and how they fit into the research workflow, while specifically offering resources and examples regarding the practices of sharing materials and methods (open materials), data (open data), as well as manuscripts as pre and post prints (open access). Information on the open science practices will be framed and presented in line with the European Commission recommendations, and the examples will be demonstrated using the Open Science Framework (OSF) platform (www.osf.io), which will also be followed by practical exercises. At the end of the workshop, attendees will be able to: (a) list the benefits of including open science practices in their research workflow, and (b) use the OSF to share their data, materials, and manuscripts. Researchers are encouraged to bring their laptops to work on the proposed exercises live during the session.

Incorporating Open Science Practices on Your Research Workflow

Presenting Author: Alessandra Souza, Faculty of Psychology and Educational Sciences of the University of Porto, Portugal; **Presenting Author:** Ana Catarina Canário, Faculty of Psychology and Education Sciences of the University of Porto, Portugal; **Presenting Author:** Teresa Jacques, Faculty of Psychology and Educational Sciences of the University of Porto, Portugal

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Workshops IV 5

22 July 2022 09:00 - 11:00

Room 254

JURE 2022 Workshop

Eye-tracking in educational research

Keywords: Design-based Research, Educational Technology, Learning Analytics, Technology

Interest group: SIG 27 - Online Measures of Learning Processes

Eye-tracking plays an important role in educational research, since it enables researchers to capture conscious and more automatized and unconscious processes during learning and instruction (e.g., visual intake of information, integration of information, searching for information, etc.). It offers the opportunity to register micro-processes of learning and instruction during learning and instructional activities. Eye-tracking research can be conducted in more artificial settings in which one student or teacher is invited for a lab study in which high-quality screen-based eye-trackers are used. This is useful for investigating multimedia learning, reading, visual expertise, learning from video, etc. However, more and more eye-tracking is conducted outside the lab in more authentic settings. In more authentic scenarios, eye-tracking glasses or webcam eye-tracking are used. This is useful for examining teacher expertise in authentic classroom environments. Eye-tracking inside or outside the lab brings different methodological and ethical challenges with it. During the first part of the workshop, an overview will be given of the different eye-trackers and how they can be used in educational research. The second part of the workshop will be more interactive and hands-on, in that we will brainstorm on how to use eye-tracking in your own research and what aspects you need to take into account when designing your research. We will discuss several methodological choices or challenges coming along with the data-analysis. Finally, we will discuss ethical challenges you need to take into account when setting up eye-tracking research. This workshop is made for researchers with no or limited experience in using eye-tracking.

Eye-tracking in educational research

Presenting Author: Leen Catrysse, Open Universiteit Nederland, Netherlands

Eye-tracking plays an important role in educational research, since it enables researchers to capture conscious and more automatized and unconscious processes during learning and instruction (e.g., visual intake of information, integration of information, searching for information, etc.). It offers the opportunity to register micro-processes of learning and instruction during learning and instructional activities. Eye-tracking research can be conducted in more artificial settings in which one student or teacher is invited for a lab study in which high-quality screen-based eye-trackers are used. This is useful for investigating multimedia learning, reading, visual expertise, learning from video, etc. However, more and more eye-tracking is conducted outside the lab in more authentic settings. In more authentic scenarios, eye-tracking glasses or webcam eye-tracking are used. This is useful for examining teacher expertise in authentic classroom environments. Eye-tracking inside or outside the lab brings different methodological and ethical challenges with it. During the first part of the workshop, an overview will be given of the different eye-trackers and how they can be used in educational research. The second part of the workshop will be more interactive and hands-on, in that we will brainstorm on how to use eye-tracking in your own research and what aspects you need to take into account when designing your research. We will discuss several methodological choices or challenges coming along with the data-analysis. Finally, we will discuss ethical challenges you need to take into account when setting up eye-tracking research. This workshop is made for researchers with no or limited experience in using eye-tracking.

Session H 1

22 July 2022 11:30 - 13:00

Room 250

Single Paper

Culture, Morality, Religion and Education, Teaching and Teacher Education

Teacher Professional Development

Keywords: Case Studies, Citizenship Education, Culture, Emotion and Affect, Multicultural Education, Secondary Education, Teacher Professional Development, Teaching Approaches

Interest group: SIG 11 - Teaching and Teacher Education, SIG 21 - Learning and Teaching in Culturally Diverse Settings

Chairperson: Marina Grgic, Pädagogische Hochschule Bern, Switzerland

The emotional intercultural meeting

Keywords: Case Studies, Culture, Multicultural Education, Teacher Professional Development

Presenting Author: Martin Sjøen, Department of Teacher Education, Norway

The article focuses on the role of emotions in Norwegian teacher education. Based on a qualitatively single-case study, the purpose is to explore and analyse how teacher training students from Norway describe their emotional experiences from a completed intercultural practicum in Tanzania. Drawing on semi-structured interviews and observations, a key finding is that intercultural practicums may help the students in their development of intercultural competence. Furthermore, the analysis indicates that emotions tend to mediate intercultural encounters for the students and, thus, regulating emotions is central for behaving and communicating appropriately in intercultural situations. The study shows that the students use different emotion regulating strategies. Support from social environments appears to be among the most important emotion regulation strategies. This article contributes by adding knowledge about emotional aspects of intercultural encounters, which can have positive benefits for students as individuals, for teacher education as a field and the students' future teacher roles.

Teachers' Understandings of Citizenship Education and Emotions in Culturally Diverse Classrooms

Keywords: Citizenship Education, Emotion and Affect, Secondary Education, Teaching Approaches

Presenting Author: Emma Brummer, University of Antwerp, Belgium; **Co-Author:** Noel Clycq, University of Antwerp, Belgium

This article aims to explore the meaning teachers give to the concept of citizenship and the way they enact citizenship education policies in their classrooms. Specific attention is paid to the way teachers manage and contain the emotions students express in class as well as their own emotions when working on citizenship education. To capture this, we expand on the notion of affective citizenship education, as this approach to citizenship identifies which emotional relationships between young people are recognised, supported, or rejected, and how young people are encouraged to feel about themselves and others. The data in this paper are drawn from interviews conducted with 20 secondary school teachers from three different schools in Flanders. We use a descriptive qualitative approach to investigate the following research questions: 1) How do teachers enact citizenship education policies in their classrooms? 2) In what ways do they understand, manage, and control the emotions of their students and themselves? The results show that all teachers are committed to socialising students into becoming 'good' citizens. Different strategies to enact citizenship education were identified, as well as different approaches to dealing with emotions in the classroom.

Session H 2

22 July 2022 11:30 - 13:00

Room 254

Single Paper

Instructional Design

Instructional Design for Computer-Assisted Learning

Keywords: Comprehension of Text and Graphics, Computer-assisted Learning, E-learning/Online Learning, Experimental Studies, Instructional Design, Metacognition, Student Learning

Interest group: SIG 06 - Instructional Design, SIG 16 - Metacognition and Self-Regulated Learning

Chairperson: Ana Isabel Bento Rodrigues, Portugal

Corrective vs. Interactive Computer-Based Feedback: Effects on Performance and Metacognition

Keywords: Computer-assisted Learning, Experimental Studies, Instructional Design, Metacognition

Presenting Author: Ute Mertens, IPN - Leibniz Institute for Science and Mathematics Education, Germany; **Co-Author:** Marlit Annalena Lindner, IPN - Leibniz

Institute for Science and Mathematics Education, Germany

This experimental study investigated how implementing different computer-based feedback types affects students' (a) recall performance, (b) error correction, and (c) metacognitive accuracy in a science test assessing factual knowledge. A final sample of $N = 335$ university students solved 36 computerized multiple-choice tasks covering topics regarding the domains physics, chemistry, and biology. We employed a within-subject design with a variation of three automated task feedback types (i.e., no feedback, knowledge of correct response [KCR] feedback, and answer-until-correct [AUC] feedback) that were provided in three blocks after solving 12 items per block. Subsequently, students completed a posttest consisting of the same 36 tasks. Results of linear mixed-effects models indicate that feedback enhanced recall performance and error correction in a posttest as compared to no feedback. Furthermore, our results suggest that feedback positively affects metacognitive accuracy. Pairwise comparisons of KCR and AUC did not clearly point towards one superior feedback type across all three outcomes. However, KCR seemed to be more beneficial for recall performance and metacognitive accuracy, whereas we did not find a significant difference between AUC and KCR for error correction. Overall, the findings provide empirical guidance regarding the implementation of computer-based feedback types in different assessment contexts.

Combining generative learning tasks and retrieval practice tasks in learning declarative concepts

Keywords: Computer-assisted Learning, Experimental Studies, Instructional Design, Student Learning

Presenting Author:Niklas Obergassel, Ruhr University Bochum, Germany; **Co-Author:**Alexander Renkl, University of Freiburg, Germany; **Co-Author:**Tino Endres, University of Freiburg, Germany; **Co-Author:**Matthias Nückles, University of Freiburg, Germany; **Co-Author:**Shana Carpenter, Iowa State University, United States; **Co-Author:**Julian Roelle, Ruhr University Bochum, Germany

Declarative concepts are crucial to learning in almost every domain. Concerning fostering their acquisition, both generative learning tasks and retrieval practice tasks have shown beneficial effects. Considering that both task types serve complementing functions for learning (*generative learning tasks*: improving the structure of learners' mental representations; *retrieval practice tasks*: consolidating existing mental representations), researchers have recently explored the potential of using them in combination. However, especially when it comes to investigating the possibility of sequentially combining both task types and examining the role that the type of sequence plays in this context, research is still at an early stage. Thus, the present study is designed to contribute to the literature by investigating (a) whether combining generative learning tasks and retrieval practice tasks sequentially will produce greater benefits for learning declarative concepts than using either type of tasks alone and (b) whether potential benefits of such sequential combination depend on the type of sequence. To address these research questions, we will conduct an experiment with $N = 269$ university students, using a 5x2-factorial design with *learning sequence* (generative-learning-only vs. retrieval-practice-only vs. generative-learning-first vs. retrieval-practice-first vs. restudy-only) and *posttest timing* (immediate vs. one-week-delayed) as factors. Results will be available at the conference.

Like it or learn from it: Effects of instructor presence in educational videos

Keywords: Comprehension of Text and Graphics, Computer-assisted Learning, E-learning/Online Learning, Instructional Design

Presenting Author:Christina Sondermann, German Institute for Adult Education, Germany; **Co-Author:**Martin Merkt, Deutsches Institut für Erwachsenenbildung, Germany

There are still some unanswered questions when it comes to the optimal design of educational videos, including whether it makes sense to present a visible instructor in addition to the actual learning content. Theory and prior research indicate both potential advantages and disadvantages of instructor presence. Therefore, we conducted an online experiment in which $N=112$ participants saw eight videos on different topics, using a within design to vary whether an instructor was present or absent, whether the video consisted of graphic or text slides, and whether the content appeared sequentially or statically all at once. We investigated the effects of these different design elements and their potential interactions on learning outcomes, learners' evaluation of the videos (e.g., perceived learning, satisfaction, situational interest), and on the selection of educational videos. Results indicated that videos with visible instructor led to worse learning outcomes, $p=.037$, while learners perceived to have learned better with a present instructor, $p=.003$ (knowledge illusion). In addition, participants rated their satisfaction higher for videos including an instructor, p

Session H 3

22 July 2022 11:30 - 13:00

Room 249

Single Paper

Motivational, Social and Affective Processes

Motivation and Secondary Education

Keywords: Educational Attainment, Educational Psychology, Motivation, Quantitative Methods, Secondary Education, Social and Educational Injustice

Interest group: SIG 08 - Motivation and Emotion

Chairperson: Leire Pinedo, Universidad de Deusto, Spain

Family background and educational attainment: The mediation role of malleable motivational factors

Keywords: Educational Attainment, Motivation, Secondary Education, Social and Educational Injustice

Presenting Author:Katharina Molitor, Center for Research on Education and School Development, TU Dortmund University, Germany; **Co-Author:**Paul Fabian, CENTER FOR RESEARCH ON EDUCATION AND SCHOOL DEVELOPMENT, Germany; **Co-Author:**Kathrin Thums, Center for Research on Education and School Development, Germany; **Co-Author:**Nele McElvany, Center for Research on Education and School Development, Germany

In the present study we investigated the relations between family background variables, motivational factors and educational attainment (measured as obtaining the general higher education entrance qualification; in Germany – the *Abitur*). Our analyses built upon the theoretical works of Boudon (1974) and Wigfield and Eccles (2000). To answer the research question whether the relation between family background and educational attainment is mediated by malleable motivational factors we applied a multifaceted concept of both family background variables (parental educational level, parental occupational status, family immigrant background) and motivational factors (expectation of success, value of education, effort, performance-oriented motivation). Furthermore, we controlled for math and reading test performance, basic cognitive skills, and gender. We estimated structural equation models using longitudinal data from the German National Educational Panel Study starting cohort Grade 9 (SC4) (NEPS; $N = 5,409$ students; 52.4 % female; $M = 14.6$ years, $SD = 0.65$). Parental educational level (family background) and expectation of success (motivation) emerged as central predictors of succeeding in acquiring the general higher education entrance qualification (German school leaving certificate *Abitur*). Expectation of success mediated the relation between parental education and obtaining *Abitur* partially. Thus, expectation of success should be focused when trying to reduce educational inequality.

Understanding the development of expectancy and value beliefs

Keywords: Educational Psychology, Motivation, Quantitative Methods, Secondary Education

Presenting Author:Matthias Mohr, Ludwig-Maximilians-Universität (LMU), Germany; **Co-Author:**Stefan Ufer, Ludwig-Maximilians-Universität (LMU), Germany

Identifying factors that influence the change in personality traits is an important step in understanding how students' beliefs develop and how they can be positively effected. This study examines the change in personality traits (expectancy and value beliefs) in the context of a student laboratory for mathematical data-based modeling. Situational experiences are identified as prerequisite, which should provide information about the change. We propose a model that examines the influence of personality traits (expectancy and value beliefs) and situational experience (experiencing the "basic needs") on the variation in personality traits. Latent change score models are estimated to reflect the variation. The results show that expectancy and value beliefs change positively to different extents and this change can be traced back to the basic needs. Looking at the influence of the different components of basic needs shows that expectation and cost have a similar effect pattern, influenced by competence and relatedness, and there is a tendency for the value components to be influenced by autonomy.

Dimensional comparison effects on math and Finnish self-concepts and value beliefs

Keywords: Educational Psychology, Motivation, Quantitative Methods, Secondary Education

Presenting Author:Kukka-Maaria Polso, University of Helsinki, Finland; **Co-Author:**Heta Tuominen, University of Helsinki, Finland; **Co-Author:**Petri Ihanntola, University of Helsinki, Finland; **Co-Author:**Markku Niemivirta, University of Eastern Finland, Finland

Achievement is known to predict self-perceptions of ability on not only the corresponding domain, but also other academic domains. Negative paths from achievement in one domain to motivational beliefs in another can be explained by intraindividual dimensional comparison processes. Recently, similar dynamics were found for students' valuing of different school subjects. More research is needed on these processes with respect to subject-specific expectancies and value beliefs students experience.

This study explored how students' achievements in five different subjects are associated with their self-concepts, values, and costs in math and native language. Data was collected in autumn 2021 from a nationally representative sample of Finnish lower secondary students ($N = 7745$).

Replicating the findings from previous studies, both positive within-domain effects and negative between-domain effects were found. As expected, consistent evidence for dimensional comparison processes was found for self-concepts and intrinsic values as well as math emotional cost and attainment value, but not for, for example, utility values. The findings contribute to our understanding of motivational development and offer interesting premises for further research. An important goal for future research is to clarify the longitudinal patterns of dimensional comparison processes.

Session H 4

22 July 2022 11:30 - 13:00

Courtyard (Ground Floor)

Poster Presentation

Assessment and Evaluation, Higher Education, Motivational, Social and Affective Processes

Assessment Methods and Tools

Keywords: Artificial Intelligence, Assessment Methods and Tools, Attitudes and Beliefs, Competencies, Higher Education, Knowledge Creation, Mathematics, Problem Solving, Psychometrics, Secondary Education, Student Learning, Survey Research, Teaching Approaches, Vocational Education

Interest group: SIG 01 - Assessment and Evaluation, SIG 04 - Higher Education, SIG 17 - Methods in Learning Research, SIG 28 - Play, Learning and Development

Chairperson: Leen Catrysse, Open Universiteit Nederland, Netherlands

Development and Validation of an Instrument for Measuring Paper Bases Concept Maps

Keywords: Assessment Methods and Tools, Knowledge Creation, Secondary Education, Teaching Approaches

Presenting Author:Kevin Ackermans, Open University, Netherlands

Concept maps on paper give students more freedom to illustrate their mental models. However, that freedom can make concept maps difficult to evaluate. In our previous work, we introduced a scoring instrument for paper-based concept maps based on a conceptual framework that values the width of the model, the depth of the model and the strength of the mental model (Ackermans et al., 2019). In this paper, we use two studies to improve our insight into the reliability of our scoring instrument. First, a study in secondary education scoring 1377 concept maps by 1 rater shows our scoring instrument proved reliable with a Omega Total of .81. Second, a study in higher education scoring 80 concept maps (1 round of 80 concept maps) by 1 rater shows our scoring instrument proved reliable with a Omega Total of .70. The amount of concepts that inform our model grow with the expected complexity of the models. In secondary education, we see four concepts of the conceptual model providing valuable information to calculate reliability. In higher education (bachelor), we see the mentioned eight concepts providing valuable information to calculate reliability.

The Validation of Attitude Toward Mathematics Questionnaire Among Indonesian Secondary School

Keywords: Assessment Methods and Tools, Attitudes and Beliefs, Mathematics, Secondary Education

Presenting Author:Suherman Suherman, University of Szeged, Doctoral School of Education, Hungary; **Co-Author:**Tibor Vidákovich, University of Szeged, Hungary

Several problems with the existing instruments for assessing mathematical attitudes were either too long, out of date, or based solely on western samples. We created a version of the attitudes toward mathematics in secondary education (ATMSE) tailored specifically for Indonesia to solve this issue. The ATMSE is divided into four subscales: self-perceptions, perceived value, perceived enjoyment, and perceived mathematics success, among others. Twenty-one hundred forty-one participants from an Indonesian secondary school were used to assess its factor structure, reliability, and validity. Confirmatory factor analyses were performed to evaluate the model's four-factor structure (CFA). The CFA results confirmed the validity of the four-factor model. In addition, Cronbach's alpha and omega coefficients confirmed the consistency of our variables, while convergent and discriminant validity revealed statistically significant correlations between them. Grade correlation analyses investigated relationships among the ATMSE. For students' attitudes toward mathematics in Indonesia, the ATMSE is a suitable instrument for examining their mathematics attitudes.

A Validation of Mathematical Problem-Solving as A Domain-Specific Prior Knowledge Test

Keywords: Assessment Methods and Tools, Mathematics, Problem Solving, Psychometrics

Presenting Author:Ijtihadi Kamilia Amalina, University of Szeged, Doctoral School of Education, Hungary; **Co-Author:**Tibor Vidákovich, University of Szeged, Hungary

Domain-specific prior knowledge in mathematics is an essential factor to be a success in STEM problem-solving tasks. Since the lack of assessment tools emphasizes every problem-solving phase, including conceptual and procedural knowledge, in several mathematics topics, it is necessary to develop a new assessment tool. However, validation becomes a crucial part of the development process. This study aims to examine the content and construct validity of the 30-multiple-choice mathematical problem-solving test, which serves as a domain-specific prior knowledge test in the Indonesian context. The content validity was rated by six experts and analyzed using the content validity index (CVI) and intraclass correlation coefficient (ICC). The construct validity was examined by using Rasch analysis from the data that was conducted on 175 7th grader students, 85 boys and 90 girls (Mage=12.55, SD=.55). The result of content validity revealed overall items were valid (CVI \geq .83) and reliable (α =.863; r_{xx} =.513). All items indicated fit (.90 \leq weighted MNSQ \leq 1.16) and were reliable (EAP/PV reliability=.706). The item difficulties were ranged between -1.063 (item 1) and 1.246 (item 30), with six low discrimination items. The recommendation for improvement is emphasized on language aspects. Administering on a large scale with different grade levels is necessary for further study.

Student engagement investigation in service-mathematics courses: A systematic literature review

Keywords: Assessment Methods and Tools, Higher Education, Mathematics, Student Learning

Presenting Author:Elissavet Papageorgiou, Delft University of Technology, Netherlands; **Co-Author:**Jacqueline Wong, Delft University of Technology, Netherlands; **Co-Author:**Annoesjka Cabo, Delft University of Technology, Netherlands

Mathematics education for non-mathematics majors, also known as service-mathematics, plays a critical role in building a strong foundation for academic and professional success. Therefore, facilitating student engagement in service-mathematics courses is considered an essential goal for researchers and educators. Yet, there is a lack of consensus on what constitutes student engagement and how it can be effectively assessed. This review explores how student engagement has been investigated in the field of service-mathematics. A systematic literature search resulted in 874 records, however, only 29 studies met the inclusion criteria. In-depth analyses revealed a great heterogeneity in the employed conceptualizations and measures, while only four studies provided a definition and theoretical framework for the construct. The findings suggest the need for theoretical grounding and the use of multiple data sources in student engagement research within the field of service mathematics. Implications for future research in assessing and facilitating student engagement are discussed.

Validating competency frameworks using an online Delphi survey: Lessons learned

Keywords: Assessment Methods and Tools, Competencies, Higher Education, Survey Research

Presenting Author:Sofie Van Ostaeyen, Ghent University, Belgium; **Co-Author:**Helena Demey, Artevelde University College, Belgium; **Co-Author:**Mieke Embo, Ghent University & Artevelde University College, Belgium; **Co-Author:**Tammy Schellens, Ghent University, Belgium; **Co-Author:**Martin Valcke, Ghent University, Belgium

Competency frameworks are the backbone of competency-based education. Much research has been done on the outcomes of competency frameworks, but the development process remains underexposed. There is a need for improved guidelines related to competency framework development. Therefore, the aim of this study was to uncover the advantages and challenges of a frequently used method: the validation of a competency framework by stakeholders using an online Delphi survey. Semi-structured interviews were conducted with three researchers who used an online Delphi survey to validate competency frameworks in different contexts: specialist medicine, general practice, and general healthcare professions. The interviews were transcribed verbatim and analysed in NVIVO using inductive thematic analysis. Six main advantages were identified including, among others, the anonymity, and the absence of time and geographical constraints. The challenges the researchers encountered while conducting their online Delphi studies were categorized into 3 themes: recruiting participants, informing participants and using an online survey format. Tips are provided to deal with these challenges. In this way, the researchers hope to support other developers in determining whether an online Delphi survey is an appropriate method for their competency framework development process.

Automated Essay Scoring Using Transformer Models

Keywords: Artificial Intelligence, Assessment Methods and Tools, Problem Solving, Vocational Education

Presenting Author:Chris Mayer, University of Mannheim, Germany; **Presenting Author:**Sabrina Ludwig, University of Mannheim, Germany

Automated Essay Scoring (AES) of open-ended text responses is becoming increasingly popular in the education sector since it significantly reduces the effort of human scoring. Natural language processing that relies on machine learning is particularly promising for text classification and AES. Previous AES approaches are mostly based on a bag-of-words (BOW) approach or recurrent neural networks (RNNs). However, with the introduction of "transformer" models by Vaswani et al. (2017), these models have taken a leading role in virtually all areas of language processing. We applied the latest transformer-based approaches for natural language processing (NLP) based on machine learning algorithms to assess student textual answers. For doing so, we used a dataset of 2,088 email responses written by learners to a problem-solving task and manually labeled in terms of politeness. We show that this approach outperforms a traditional bag of words (BOW) approach for politeness classification. We argue that for AES tasks such as politeness classification, the transformer-based approach has clear benefits, while a BOW approach suffers from the fact that it does not consider word order and reduces the words to their stem.

Session H 5

22 July 2022 11:30 - 13:00

Room 256

Roundtable

Higher Education, Motivational, Social and Affective Processes

Higher Education

Keywords: Educational Psychology, Higher Education, Language (Foreign and Second), Motivation and Emotion, Qualitative Methods, Quantitative Methods, Self-regulation, Student Learning, Survey Research, Teaching/Instruction

Interest group: SIG 07 - Technology-Enhanced Learning And Instruction, SIG 08 - Motivation and Emotion, SIG 16 - Metacognition and Self-Regulated Learning

Chairperson: Amina Rosenthal, University of Applied Sciences Northwestern Switzerland, Switzerland

Eliciting Expert Knowledge to Develop Three Interview Protocols

Keywords: Higher Education, Language (Foreign and Second), Survey Research, Teaching/Instruction

Presenting Author:Listiani Listiani, University of Szeged, Hungary

Providing feedback to students' writing in a second language (L2) has been considered necessary in writing pedagogy practice. Audio feedback (AF), incorporating audio files to teacher feedback, may respond to teaching challenges and educational technology development. However, giving feedback to students' written assignments does not always fulfill its potential due to factors influencing the feedback transfer, including tutor's practices and attitudes toward AF. Thus, developing and validating instruments for collecting evidence is required. I used expert judgment to implement content validation of three interview protocols exploring the changes in an instructor's experiences and attitudes towards AF over a semester in higher education. Three experts were asked to rate item relevance for content validity. They were also requested to provide improvement or deletion comments. The content judgment results were analyzed by the item level-content validity index (I-CVI). The I-CVIs values of the three instruments are ranged from .33 to 1.00. The findings showed that the first and second interviews had the medium quality of I-CVI, whereas the third interview had a high quality of I-CVI. The results suggest that several items should be deleted and improved, conducted the other round of expert judgment, and may, therefore, be applied.

University Students' Motivation and Emotions: Connections, Stability, and Change During a Semester

Keywords: Educational Psychology, Higher Education, Motivation and Emotion, Quantitative Methods

Presenting Author:Henriikka Juntunen, University of Helsinki, Finland; **Co-Author:**Heta Tuominen, University of Helsinki, Finland; **Co-Author:**Auli Toom, University of Helsinki, Finland; **Co-Author:**Markku Niemivirta, University of Eastern Finland, Finland

Motivation and emotion play a significant role in university students' learning, achievement behaviour, and well-being but, so far, the two widely utilised theories of control-value (Pekrun, 2006) and expectancy-value theories (Eccles et al., 1983) have not often been studied together despite their similar, yet complementary, approaches to motivation and affect. As the concerns regarding university students' motivation and emotional well-being have been further accentuated due to the abruptness caused by the pandemic, it is vital to address the qualitative differences in students' motivation and the development of motivation and emotions over time. This study examines i) university students' diverse motivational (expectancy-value-cost) patterns, ii) how the situational motivation and achievement emotions may vary as a function of the profiles, and iii) the development of motivational appraisals and achievement emotions (e.g., enjoyment, hope, anxiety, and boredom) over a course. We collect intensive state data from Finnish university students' (N ≈ 250) over ten weeks (i.e., ten repeated measurements). Using latent profile analysis, students are then classified into distinct motivational groups. The changes in the situational motivation and emotions are analysed using multilevel structural equation modeling. The findings offer valuable insights into university students' multidimensional expectancy-value-cost motivation and the individual changes in motivation and emotions over time.

Students' habitual use of effective learning strategies

Keywords: Higher Education, Qualitative Methods, Self-regulation, Student Learning

Presenting Author:Louise David, Maastricht University, Netherlands; **Co-Author:**Felicitas Biwer, Maastricht University, Netherlands; **Co-Author:**Anique de Bruin, Maastricht University, Netherlands

Habits drive a large portion of our daily behaviour and can either help or harm long-term achievement. More specifically, study habits are related to increased academic performance and lower motivational conflicts when studying. Nevertheless, many students have trouble to form and maintain beneficial habits and engage in less profitable ones. During self-study, students often rely on ineffective learning strategies, which require passive restudying of information. Using effective learning strategies is essential for high academic achievement but also effortful. Study habits could help students to incorporate these effective but effortful learning strategies consistently. To support students in forming new and breaking old habits, we need to understand whether students have study habits and what they look like. Therefore, in this study, we aim to explore university students study habits, and how they form new and break old study habits. To do so, participants will keep a pre-structured study diary for one week. Based on their study diary, we will ask students to reflect on their study behaviour in focus

group discussions. We will collect data in early summer and interpret it using a thematic analysis. We aim to present first results and interpretations hereof during a roundtable discussion.

Session I 1

22 July 2022 14:00 - 15:30

Room 256

Single Paper

Assessment and Evaluation, Instructional Design, Learning and Social Interaction

Learning Technologies and Multimedia Learning

Keywords: Higher Education, Instructional Design, Learning Technologies, Meta-Analysis, Multimedia Learning, Qualitative Methods, Quantitative Methods, Reflection, Social Aspects of Learning and Teaching, Technology, Video Analysis

Interest group: SIG 02 - Comprehension of Text and Graphics, SIG 10 - Social Interaction in Learning and Instruction, SIG 14 - Learning and Professional Development

Chairperson: Rui Maio, Faculty of Psychology and Educational Sciences of the University of Porto, Portugal

Social Aspects of Learning and Instruction in Simulation-based Learning: a Meta-analysis

Keywords: Higher Education, Learning Technologies, Meta-Analysis, Social Aspects of Learning and Teaching

Presenting Author: Sara Koivula, Ludwig-Maximilians-Universität (LMU), Germany; **Co-Author:** Fatma Sila Cakmak, Ludwig-Maximilians-Universität (LMU), Germany; **Co-Author:** Olga Chernikova, Ludwig Maximilian University, Germany

The importance of social interaction and collaboration for effective learning is supported by previous research (e.g. Hurst et al., 2013). However, an opportunity for interaction and collaboration alone does not necessarily lead to successful collaboration and learning gains (e.g. Nokes-Malach et al., 2015). The current meta-analysis on 78 empirical papers focuses on effective social interaction within simulation-based learning environments in higher education. Collaboration, feedback, scaffolding, and prior knowledge were included as moderators. Random effect model and RVE correction were applied (Borenstein et al., 2009). The results indicated that while collaboration did not show significant added value to enhancing complex skills, scaffolding and feedback were significant moderators based on learners' level of prior knowledge. Learners with high prior knowledge performed best when feedback was present ($g = 1.45$, $SE = .32$, $p < .01$, $N=13$). Groups of learners with low and mixed levels of prior knowledge performed best when scaffolding was present.

Comparison of Verbal and Video Assisted Debriefing: Perspectives of Participants and Facilitators

Keywords: Qualitative Methods, Reflection, Technology, Video Analysis

Presenting Author: Stefan Hanus, University of Regensburg, Germany; **Co-Author:** Helen Jossberger, University of Regensburg, Germany; **Co-Author:** Hans Gruber, University of Regensburg, Germany

Most debriefings after simulations are either conducted verbally or with the help of video playback. While a lot of research has concentrated on comparing both methods in terms of their learning outcome, the perspectives of participants and facilitators on these two types of debriefings are not fully explored. This study aims to combine the views of both groups on verbal debriefings (VD) versus video-assisted debriefings (VAD) during simulation training in the domain of mountain rescuing. A total of 42 mountain rescuers and five facilitators participated. As part of a within-subject design, participants experienced all three different debriefing modes: VAD, VD with advanced technical equipment and VD with simple technical equipment. Facilitators were assigned to one of the debriefing forms. A qualitative approach was used. Biographical information was collected and focus group interviews with the trainees as well as individual interviews with the facilitators were conducted to gain insights into their perspectives regarding the debriefing mode. Preliminary results indicate that participants favour the VAD, as the presented video were perceived as more objective. Facilitators were also in favour of the VAD. Higher cognitive demand as well as technical difficulties were mentioned as downsides of VAD.

Seductive Details Hamper Learning Even When They do Not Disrupt

Keywords: Higher Education, Instructional Design, Multimedia Learning, Quantitative Methods

Presenting Author: Anna Kienitz, Justus-Liebig-Universität Giessen, Germany; **Co-Author:** Marie-Christin Krebs, Justus-Liebig-Universität Giessen, Germany; **Co-Author:** Alexander Eitel, University of Giessen, Germany

Abstract. We investigated whether the detrimental effects of seductive details on multimedia learning are mainly mediated by the cognitive processes of diversion or disruption. In an online learning experiment, participants ($N=247$) learned with or without seductive details. Before learning, participants in conditions with seductive details received either a prompt informing them about the irrelevance of seductive details (irrelevance prompt), a prompt to process seductive details and pertinent content separately (separation prompt), or no prompt within their task instruction. Participants in a control condition received no seductive details. For recall, participants receiving the irrelevance prompt significantly outperformed participants with the separation prompt and no prompt. As expected, participants receiving the irrelevance prompt regarded seductive details as less relevant and spent less time processing them, which positively influenced their recall performance. Against our hypothesis, for participants receiving the separation prompt, the reported degree of integration avoidance mediated transfer performance negatively. In summary, our results suggest diversion, and not disruption, to be the main process behind the seductive details effect. Further research is necessary to investigate these processes in more depth.

Session I 2

22 July 2022 14:00 - 15:30

Room 248

Single Paper

Motivational, Social and Affective Processes

Motivation, Emotion and Affect

Keywords: Cultural Psychology, Educational Psychology, Emotion and Affect, Motivation and Emotion, Qualitative Methods, Secondary Education, Survey Research

Interest group: SIG 08 - Motivation and Emotion

Chairperson: Andres Araos, Norway

Social-Emotional Skills in Problem-Solving: Validating the Tool and Assessing Students' Competence

Keywords: Educational Psychology, Emotion and Affect, Motivation and Emotion, Survey Research

Presenting Author: Ijtihadi Kamilia Amalina, University of Szeged, Doctoral School of Education, Hungary; **Co-Author:** Tibor Vidákovich, University of Szeged, Hungary

The research in social-emotional (SE) increases because it correlates with problem-solving in evaluating and deciding processes. However, the main challenge is the lack of sources in SE assessment tools in the STEM area, specifically in Indonesia. This study aims to validate an adaptation of SE questionnaire in mathematical problem-solving to the Indonesian context and examine SE skills across grades. It was conducted on 322 7-9th graders students ($Mage=13.1$; $SD=.87$). The instrument was 20 items of the Emotional intelligence of Mathematics Achievement of Students (IEIMAS) with 21 items in the adaptation version. The data of 7th grader students were analyzed based on item fit, construct, and convergent validities by applying confirmatory factor analysis, average variance extracted (AVE), composite reliability (CR), and internal consistency by using Cronbach Alpha. ANOVA was performed to measure the differences across grades. The results revealed deleting a misfit item and moving three items into different sub-scales. The final version of adapted IEIMAS had an acceptable fit

($\chi^2=266.885$, $p.05$). For further study, it is needed to validate in a heterogeneous level of education.

Teachers' Emotions in Homework Practice and their Antecedents

Keywords: Emotion and Affect, Motivation and Emotion, Qualitative Methods, Secondary Education

Presenting Author:Christine Feiss, Universität Salzburg, Switzerland; **Co-Author:**Gerda Hagenauer, University of Salzburg, Austria; **Co-Author:**Sandra Moroni, University of teacher education Bern, Switzerland

Emotions are an important factor influencing teaching behaviour and teaching quality (Frenzel, 2014). Previous studies have primarily focused on teacher emotions in the classroom in general (e.g.Chen, 2019), rather than on a specific aspect of teaching such as homework practice. However, it can be assumed that homework practice also evokes a variety of emotions in teachers. Taking up this idea, this study examines teachers' perceived emotions in homework practice and their antecedents. In addition, it is explored what changes are necessary from the teachers' point of view to experience homework practice in a more emotionally positive way. The data are based on 23 semi-structured interviews with Swiss secondary school teachers. The interviews were analysed by structuring qualitative content analysis (Mayring, 2017) The results reveal that teachers experience a variety of positive and negative emotions related to the homework practice. The antecedents of teachers' emotions were manifold. They ranged from factors of students' parental home to factors concerning the behaviour of the teachers and that of the students. The two most important aspects that teachers would adjust regarding homework practice are the intensified collaboration within the teaching staff and the reduction of the amount of homework.

Socioemotional competences and student engagement in youth: a cross-cultural multilevel study

Keywords: Cultural Psychology, Educational Psychology, Emotion and Affect, Motivation and Emotion

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Academic engagement research in university students has been scarce, despite its major positive influence on performance, degree completion and mental health. Social and emotional competences, which are currently called 21st century skills, exert some influence on academic engagement in youth. Since engagement is cultural-sensitive, individual (social and emotional competences) and cross-cultural (human developmental index) characteristics were examined in association with student engagement in youth. This study included 2,092 participants from nine countries (Angola, Australia, Brazil, Cape Verde, Greece, Malta, Mozambique, Portugal, Taiwan), aged between 17 and 27 years ($M = 21.52$, $SD = 2.27$), mostly cisgender woman ($n = 1035$, 68.7%) and undergraduate ($n = 1401$, 96.2%), employed with successive nested models being tested using multilevel modelling (MLM). Data was collected through an online software including the Student Engagement Scale, the Emotional Skills and Competence Questionnaire and the subscale of Prosocial behaviour of the Strengths and Difficulties Questionnaire. Results showed that social and emotional competences were relevant predictors of student engagement independently of the country-level variables. Moreover, student engagement varied with country human development with students from higher developed countries reporting lower engagement. This study reinforces the need to implement social and emotional learning evidence-based programmes in universities worldwide.

Session I 3

22 July 2022 14:00 - 15:30

Room 250

Single Paper

Educational Policy and Systems

Educational Challenges

Keywords: Early Childhood Education, Educational Policy, Higher Education, Mixed-methods Research, Qualitative Methods, Quantitative Methods, Reflection, Secondary Education, Student Learning

Interest group: SIG 04 - Higher Education, SIG 14 - Learning and Professional Development

Chairperson: Carina Santos, Faculty of Psychology and Education Sciences of the University of Porto, Portugal

Students' Engagement in Reflective Learning and Its Relations with Professors' Conceptions

Keywords: Higher Education, Mixed-methods Research, Reflection, Student Learning

Presenting Author:Addisu Bailie, Simon Fraser University, Canada; **Co-Author:**Engida Gebre, Simon Fraser University, Canada

Reflection is one of the important skills that students need to develop in higher education. The purpose of this study was to determine dimensions of students' perceived engagement in reflective learning and its relations with professors' conceptions of reflective learning. Survey data were collected from 274 students taking education courses at a Canadian university. In addition, we used findings from a related study on professors' conceptions of reflective learning to examine its relations with students' engagement. Principal component analysis (PCA) with promax rotation was performed to determine dimensions of students' perceived engagement in reflective learning. Then, multivariate analysis of variance (MANOVA) was conducted using categories of professors' conceptions as an independent variable and the results of PCA as dependent variable. The results indicate four dimensions of student engagement in reflective learning: transformative, personal, metacognitive, and relational reflection. Subsequent analysis on extracted components showed significant differences in students' perceived engagement in reflective learning in relation to professors' conceptions of reflection. The findings have implications for professional development and learning design for reflective learning.

Advancement as a necessary reaction to changing challenges - Strategies of German KITA providers

Keywords: Early Childhood Education, Mixed-methods Research, Qualitative Methods, Quantitative Methods

Presenting Author:Janine Birkel-Barmsen, Universität Siegen, Germany

KITA providers are responsible for the framework conditions for quality in their day-care centres and take care to train their educators according to the challenges of educational work and are required to adapt their care and educational offers to the constantly changing legal and social framework conditions. Global challenges that have a significant influence on educational work in early childhood education include the increase in refugee and migration, the pandemic and the implementation of the UN Convention on the Rights of Persons with Disabilities, which have led to a more heterogeneous group of children in day care centres and to a more complex task of providing equal educational opportunities for all children. The challenges mentioned above can only be met if providers systematically train and develop their early childhood educators and thus make them competent for current and future challenges. The question arises as to how institutions manage the important task of personnel advancement: What advancement opportunities do the providers offer to the pedagogical staff? The mixed-methods project TrEiKo consists of a qualitative (N=126) and a quantitative sub-study (N=5702) and provides answers to these questions. The findings suggest that providers often do not systematically train or develop their professionals.

Pros and cons of applying registry data in research on transitions to educational sciences

Keywords: Educational Policy, Higher Education, Quantitative Methods, Secondary Education

Presenting Author:Jenni Kunnari, University of Oulu, Finland; **Co-Author:**Jouni Pursiainen, University of Oulu, Finland; **Co-Author:**Hanni Muukkonen, University of Oulu, Finland

This study offers an example of how to utilise longitudinal registry data from 13 years, from year 2007 to 2020, to understand the transitions from secondary education to educational sciences in university education in Finland. Crucial factors in transitions to universities are the educational choices in secondary

education (Eccles, 1983; Lent et al., 1994), the selection criteria and process applied in admission to universities (Noble & Sawyer, 2004; Stemler, 2012), and academic performance in university (Richardson et al., 2012). Hence, the transitions are multi-faceted including many phases and levels (Gale and Parker, 2014; Noyens et al. (2017). Registry data covering several years makes it possible to examine the phenomena at several time points. The theoretical research questions derived from educational choices in secondary education, admission to universities, and academic performance in bachelor's degree in university, and the relationship of these. In this single paper we concentrate on clarifying one way how to utilise and analyse registry data in educational research settings and to exemplify pros and cons, as well as ethical considerations.

Session I 4

22 July 2022 14:00 - 15:30

Courtyard (Ground Floor)

Poster Presentation

Assessment and Evaluation, Higher Education, Teaching and Teacher Education

Education during COVID-19

Keywords: Assessment Methods and Tools, Attitudes and Beliefs, Competencies, COVID-19, E-learning/Online Learning, Educational Challenges, Higher Education, Instructional Design, Misconceptions, Mixed-methods Research, Pre-service Teacher Education, Quantitative Methods, Science Education, Survey Research, Teaching/Instruction

Interest group: SIG 01 - Assessment and Evaluation, SIG 11 - Teaching and Teacher Education, SIG 26 - Argumentation, Dialogue and Reasoning

Chairperson: Erica Kamphorst, University of Groningen, Netherlands

Changes in assessment practices during emergency remote teaching due to COVID-19

Keywords: Assessment Methods and Tools, COVID-19, Instructional Design, Teaching/Instruction

Presenting Author: Leire Pinedo, Universidad de Deusto, Spain; **Co-Author:** Ernesto Panadero, Universidad Deusto, Spain; **Co-Author:** Juan Fraile, Universidad Francisco de Vitoria, Spain; **Co-Author:** Carlos Rodríguez-Hernández, Institute for the Future of Education, Mexico; **Co-Author:** Fernando Díez, Universidad de Deusto, Spain

The COVID pandemic transformed the face-to-face lessons into online, arising challenges for the teaching-learning activities. Particularly, the assessment was one of the major challenges that educational institutions and actors had to face. This study explores the effects of the shift to emergency remote teaching on classroom assessment practices. The sample included 936 Spanish teachers from all educational levels. Data was collected through a nationwide survey distributed via email and social media. We explored four research questions: 1) changes in the use of assessment instruments (i.e. exams); (2) changes in assessment criteria, standards, and grading; (3) changes in the delivery of feedback and use of rubrics; and (4) changes in students' involvement in assessment. The findings revealed that in some of those four teachers have changed their assessment practices –e.g. Primary education teachers lowered their expectations- while other assessment practices remained similar, especially in Higher Education. Additionally, some strong formative assessment practices have been decreased such as students' involvement in assessment (self- and peer-assessment).

Teachers' Grit and Burnout in the Pandemic: An African and Northern American Perspective

Keywords: Competencies, COVID-19, Educational Challenges, Quantitative Methods

Presenting Author: Kristin Moyer, Technical University of Munich, Germany; **Co-Author:** Angenita van den Berg, Technical University of Munich, Germany

We investigated the importance of grit within the teaching profession. Teachers from Africa and Northern America (N = 180) responded to a questionnaire about personal grit, classroom management grit, and burnout before and during the pandemic. The questionnaire consisted of Duckworth et al.'s Grit-S questionnaire and an adapted version to measure classroom management grit. The main findings suggest teachers have high grit levels compared to other populations. Personal grit and classroom management grit are strongly correlated. The responses also revealed that burnout significantly increased during the pandemic. Teachers from Africa reported higher personal grit, and Northern American teachers reported a higher level of pandemic burnout. Although grit was not a major predictor of burnout during the pandemic, the findings help highlight how teachers may have been able to deliver emergency teaching and manage uncertainty regardless of reported burnout; possibly explained by high levels of grit. The findings align with previous pandemic studies stating teachers overcame negative feelings towards their job to provide education for their students. Furthermore, findings suggest that teachers from Africa may have been able to mitigate the effects of burnout from the pandemic despite working with fewer resources than their Northern American colleagues.

Hybrid education in higher STEM education during the pandemic

Keywords: COVID-19, E-learning/Online Learning, Higher Education, Science Education

Presenting Author: Veele Ottenheim, Freudental Institute, Utrecht University, Netherlands; **Co-Author:** Rogier Bos, Freudental Institute, Utrecht University, Netherlands; **Co-Author:** Ralph Meulenbroeks, Freudental Institute, Utrecht University, Netherlands; **Co-Author:** Wouter R. van Joolingen, Utrecht University, Netherlands; **Co-Author:** Paul Drijvers, Utrecht University, Netherlands

As a result of the severe restrictions imposed on education during the pandemic, interest in hybrid education has soared. However, available research is usually related to the pre-pandemic period and little research has specifically focused on the challenges in hybrid STEM education, including scientific argumentation and discourse. Hybrid education can be defined as synchronous face-to-face and online education that takes place simultaneously. In literature, one finds three factors that play a key role within hybrid education: (1) technology, most notably audio, video, as well as the technical skills of the teacher; (2) interaction, between the teacher and the students, both online and face to face; (3) hybrid pedagogy. Our research question is: How do STEM-teachers and STEM-students report on their experiences with hybrid education during the COVID-19 pandemic? This question will be answered through conducting semi-structured interviews with science teachers and focus groups with science students. The interviews and focus group audio will be transcribed and open coded.

Home exams in a pandemic: Law students' perspectives on new assessment forms

Keywords: Assessment Methods and Tools, COVID-19, Higher Education, Mixed-methods Research

Presenting Author: Dan Uehara, University of Oslo, Faculty of Education, Norway; **Co-Author:** Øystein Kolstad Kvalø, University of Oslo, Norway; **Co-Author:** Malcolm Langford, University of Oslo, Norway; **Co-Author:** Bjørn Stensaker, University of Oslo, Faculty of Education, Norway; **Co-Author:** Mira Sofie Stokke, University of Oslo, Norway; **Co-Author:** Hilde Westbye, University of Oslo, Norway

Due to the COVID-19-related restrictions, law students at Norwegian universities had to undertake summative examinations at home, an assessment form that, until the pandemic, was highly controversial. The aim of this study was to understand the perceptions of law students regarding home exams. Using descriptive statistics and correlation measures on surveys undertaken in Autumn 2020, we found a transformation of student views during the pandemic, with most concluding home exams worked well given the circumstances, even when graded. Many students appreciated the opportunity to work with questions that demanded more independent analysis and demonstrate a wide variety of skills. However, qualitative findings indicated that some students were concerned about the traditional worry of cheating. There were also clear growing pains with students as they were subjected to severe time pressure in some subjects. These results underscore the disruptive effects of the pandemic on teaching and assessment forms and suggest that home exams could be as suitable as school exams to test student's knowledge and competences more broadly in European legal education. It was also clear that the faculty and teachers were able to adapt to significant changes without compromising fairness.

Exploring the Nature of Teachers' Math-Gender Stereotype

Keywords: Attitudes and Beliefs, Misconceptions, Pre-service Teacher Education, Survey Research

Presenting Author: Anna-Sophia Dersch, Justus-Liebig-Universität Gießen, Germany; **Co-Author:** Anke Heyder, Technical University Dortmund, Germany; **Co-Author:** Alexander Eitel, University of Giessen, Germany

Teachers, as powerful socializers, often hold math-gender stereotypes, which predict women's lesser representation in mathematics. Reducing math-gender

stereotypes in (student) teachers may thus alleviate the math-gender gap. We researched the underlying structure of math-gender stereotypes to prospectively reduce them: Do math-gender stereotypes reflect elaborate, disproven theories about gender differences in math, meaning *math-gender misconceptions*? If so, *which* math-gender misconceptions? Literature suggests three misconceptions: 1) empathizing-systemizing (“As girls think more empathically and boys think more systematically, boys are on average more talented in math than girls.”), 2) girls’ compensation (“For the same grades in math, boys, on average, work less hard than girls, as boys have more natural talent.”), and 3) girls’ non-compensability (“Despite their, on average, harder work, girls normally perform less well in math than boys.”). We assessed them in a student teacher sample (N = 303) using our newly developed Math-Gender Misconceptions Questionnaire. Results support the three-factor structure of math-gender misconceptions. All three scales showed good-to-acceptable reliabilities. Altogether, 48.2% of preservice teachers held at least one misconception (highest prevalence: empathizing-systemizing misconception; 32.0%). Descriptively, the empathizing-systemizing misconception correlated strongest with math-gender stereotypes. Thus, targeting this misconception may reduce math-gender stereotypes; further research should investigate to what degree.