

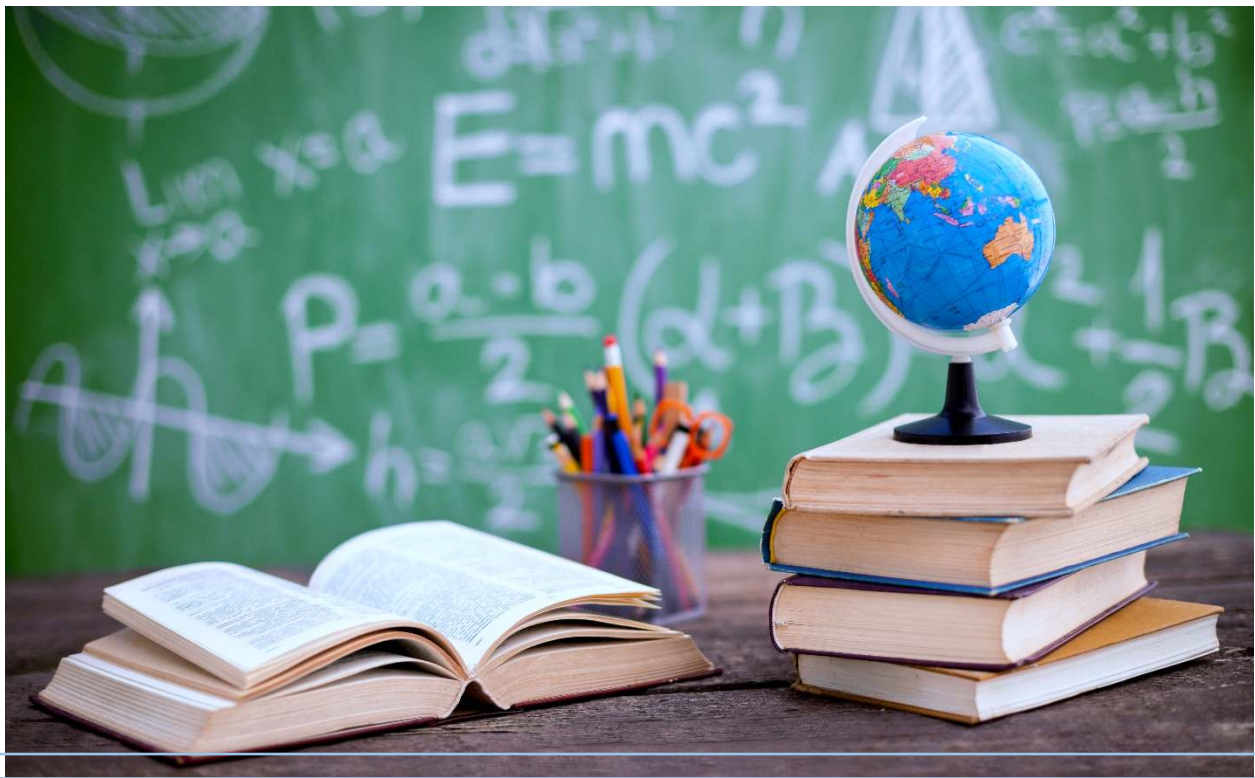
LUXERA

Emerging Researchers Conference 2023

8 - 9 November

*University of Luxembourg
Campus Belval-MSA*

Conference Booklet



Welcome Address

Dear participants of the LuxERA 2023 Emerging Researchers Conference,

Dear members of the Luxembourg Educational Research Association,

We are very happy to welcome you at the LuxERA Emerging Researchers Conference 2023, a conference organized by and for our emerging researchers and other interested parties. The conference is an important opportunity for researchers and stakeholders in and beyond Luxembourg to share their work with others, to gain feedback and to exchange interesting ideas.

This year, there is not only a focus on sharing research, but also on possible career pathways after receiving the PhD degree. In this regard, we are very happy to kick off the conference with a keynote from Bianca Simonsmeier-Martin, who received her PhD from the University of Trier in 2018. Her keynote will focus on (programming) skills for the 21st century and the implications for (early childhood) education. She will also attend “Meet and Eat” session beforehand, to share her experiences as a postdoc researcher. In addition, the conference incorporates for the first time a “fireside chat”, an informal panel talk, during which three selected researchers who were awarded their PhD by the University of Luxembourg in the last five years will share their experiences in pursuing their career within or outside academia.

The conference offers 20 paper presentations, comprised in six parallel sessions, in which researchers present their projects and (first) results in a traditional way. In addition, we have an interactive poster session in which researchers present their ideas and projects in a 2–3-minute pitch. The sessions are all conceived as to facilitate constructive discussions, where researchers and participants can exchange, inspire, and learn from one another.

Our LuxERA General Assembly will take place on Wednesday late-afternoon. Before (and after), we gather for a reception at the University premises, where participants can mingle in a less formal setting.

I would like to thank presenters and participants for their engagement in our association. I also would like to thank the organizing committee, Joanne Colling, Lena Kaufmann, Charlotte Keuler, and Sabrina Sattler, for their efforts to organize the conference. A big thank you also goes to the Luxembourg Center for Educational Testing (LUCET) for their financial support of all catered events. Last but not least, LuxERA also owes thanks to Carol Halpern, Sofie van Herzele and Andrea Klein for providing general organizational support.

I wish you an inspiring conference and especially look forward to meeting you all in person.

Ineke M. Pit-ten Cate

LuxERA president

University of Luxembourg, October 2023

Conference Schedule

Wednesday, 8 November 2023

12h30 – 13h00 **Registration**
in front of room 3.520, Maison du Savoir (MSA)

13h00 – 13h15 **Welcome & Opening words**
MSA 3.520

13h15 – 14h15 **Keynote by Bianca Simonsmeier-Martin, Trier University**
MSA 3.520 *Teaching and learning for the future: programming interventions in early childhood education*

Chaired by Lena Kaufmann

Parallel Sessions I and II

Session I **Fostering Literacy**
MSA 3.190

Chaired by Mila Marinova

14h30 – 16h30 *Video-based syntactic training and effects on French plural spelling*
Lisa Klasen, Carole Dording, Sonja Ugen,
Michel Fayol, Constanze Weth
Impact of the syntactic training on French plural spelling of different performance clusters in grade 4
Carole Dording, Sonja Ugen, Constanze Weth
Novel visual word learning tracked with FPVS-EEG
Amaury Barillon, Christine Schiltz, Alette Lochy
The relationship between children's vocabulary knowledge and reading in a multilingual education setting
Linda Romanovska, Ineke M. Pit-ten Cate,
Katharina A. M. Tremmel, Aurélie P. Wealer, Sonja Ugen

Session II Institutional Features in Education	
MSA 3.200	Chaired by Sabrina Sattler
14h30 – 16h30	<p><i>Managing Diversity in Luxembourg’s Public Education System (EPS): Different Schools for Different Pupils?</i></p> <p>Elif Tuğçe Gezer, Susanne Backes, Ulrich Keller, Thomas Lenz</p> <p><i>Stratification in the German education system – the role of Waldorf schools</i></p> <p>Barbara Marosváry</p> <p><i>Common issues, common perspectives? A research focusing on domain-specific antinomies in curricula and material of Education à la citoyenneté and Vie et société</i></p> <p>Charlotte Keuler</p> <p><i>Mathematics Achievement in Prim. and Sec. Schools: A Comparison Between Students in EPS and Students in Schools Following the Lux. Curriculum</i></p> <p>Joanne Colling, Axel Grund, Ulrich Keller, Pascale Esch, Antoine Fischbach, Sonja Ugen</p>
16h30 – 18h30	<p>Reception in front of MSA 3.520 & LuxERA General Assembly MSA 3.520</p>

Thursday, 9 November 2023

Interactive Poster Session

Chaired by Jennifer Dusdal

09h15 – 10h15	<i>Spotlight on ESG-VP students - a new approach to testing</i>
Open Space	Charlotte Krämer, Sylvie Gamo, Cécile Braun,
MSA 3 rd floor	Pamela Isabel Inostroza Fernandez, Philipp Sonnleitner
	<i>Can language skills in Luxembourgish be transferred to German? Evidence against the transfer assumption</i>
	Lena Maria Kaufmann, Constanze Weth,
	Antoine Fischbach, Caroline Hornung
	<i>PlayTops: Embodied Music Learning through Modular Digital Musical Instruments</i>
	Charles White
	<i>The Use of Movement in Instrumental Learning in the Early Years</i>
	Emma Shubin

Parallel Sessions III and IV

Session III Fostering Mathematics

MSA 3.190

Chaired by Philipp Sonnleitner

10h30 – 12h00

The Influence of Money as a Manipulative Material on 3rd-Graders' Math Performance in a Multilingual Context

Styliana Politi, Caroline Hornung, Christine Schiltz

Is the SNARC effect associated with pre-math. and spatial abilities in pre-school?

Tânia Ramos, Carrie Georges, Christine Schiltz

Diagnosing Specific Learning Disorder in Mathematics: Development of a Test Battery Tailored to Luxembourg

Vera Hilger, Sonja Ugen,
Linda Romanovska, Christine Schiltz

Session IV Language in different Student Populations

MSA 3.200

Chaired by Charlotte Keuler

10h30 – 12h00

Children's early literacy meaning-making: A qualitative study in crèches in Luxembourg

Valérie Kemp

Multilingual Experiences and Practices of Children in Digital Media: Mediatonal Repertoires and Translanguaging

Mahdi Mowlaei

Academic Performance in Autism: Multi-Perspective Research on Language, Socio-Emotional Skills, and Parent-Child Relationship

Maïte Franco, Andreia Costa

12h15 – 13h00 **ACADEMIA AND BEYOND: FIRESIDE CHAT** with
 MSA 3.520 Christina Haas, Research Scientist at Leibniz Institute for Educational Trajectories
 Jennifer Dusdal, Research Scientist & Head of the Institute of Education & Society at University of Luxembourg, Department of Social Sciences
 Sabrina Sattler, Collaboratrice scientifique at Observatoire national de l'enfance, de la jeunesse et de la qualité scolaire
Chaired by Ineke M. Pit-ten Cate

13h00 – 14h00 **Lunch Break**
 Open Space
 MSA 3rd floor

Parallel session V and VI

Session V **Teacher Relationships and Attitudes**
 MSA 3.190 **Chaired by Ineke M. Pit-ten Cate**

14h00 – 15h30 *What we can learn from Student-Teacher Relationship Research for Luxembourg: A Systematic Review of Meta-Analyses and Second-Order Meta-Analysis*
 Valentin Emslander, Doris Holzberger, Sverre Berg Ofstad,
 Antoine Fischbach, Ronny Scherer
Investigating pre-service teachers' attitudes towards lesbian, gay, and bisexual students in Luxembourg
 Dario Galano, Axel Grund, Valentin Emslander
Teachers' self-reported TPACK and their perceptions of Computer-Supported Collaborative Learning
 Margault Sacré

<p>Session VI</p> <p>MSA 3.200</p> <p>14h00 – 15h30</p>	<p>Current and Future Challenges</p> <p style="text-align: right;">Chaired by Sonja Ugen</p> <p><i>Way2ESD: Educating primary teachers for the future: Co-developing approaches to education for sustainable development with in-service teachers</i></p> <p style="text-align: right;">Doriana Sportelli</p> <p><i>AIG and student math assessment: Psychometric characteristics of automatically generated items</i></p> <p style="text-align: center;">Steve Bernard, Pamela Isabel Inostroza Fernandez, Sylvie Gamo, Michael Andreas Michels, Philipp Sonnleitner</p> <p><i>Understanding the Impact of Artificial Intelligence in Education (AIED) on Student and Teacher Agency through Post-digital Educational Spaces</i></p> <p style="text-align: right;">Lawrence Wilde</p>
<p>15h30 – 15h45</p> <p>MSA 3.520</p>	<p>Concluding Words</p>

Opening Keynote

Teaching and learning for the future: programming interventions in early childhood education

Dr. Bianca Simonsmeier-Martin, Trier University

Programming skills are key skills in the 21st century and have been considered a new literacy next to reading, writing, and other communication. It is argued that mastering a programming language will be as important for the current generations as learning Latin for scholars in the Middle Ages. Not surprisingly, governments, policymakers, educators, and scholars around the globe are devoted to understanding and supporting the teaching and learning of programming skills and computational literacy as well as possible transfer effects throughout all educational levels. Over the past decade, researchers and policymakers have brought to attention the special potential of integrating computer programming initiatives into the basic education curriculum. The keynote addresses this development by (1) summarizing the available empirical evidence on the effectiveness of programming interventions in early childhood, (2) discussing relevant instructional characteristics when teaching and learning programming, and (3) reviewing possible educational contexts suitable for the implementation of programming-based learning environments.

Notes:

Paper Abstracts

Session I: Fostering Literacy

Video-based syntactic training and effect on French plural spelling

*Lisa Klasen, Carole Dording, Sonja Ugen,
Michel Fayol, Constanze Weth*

French plural markers are systematically and consistently represented in orthography, but not in phonology, which makes them challenging to spell (Bosse et al., 2021; Weth, 2021). Although plural spelling acquisition starts early, it remains a persistent area of difficulty even for advanced French learners (Geoffre & Brissaud, 2012; Le Levier & Brissaud, 2020).

Studies have shown that syntactic training significantly improves plural spelling compared to a control group (Bilici et al., 2018; Thévenin et al., 1999). The current paper presents the effects of a syntactic training presented in class via teaching videos and gives insights into the training.

The training consisted of 10 videos of 15 min each, presented over a period of 2 weeks in the classroom. It included various phases of learner activation, where the pupils had to complete exercises embedded in and motivated by the videos. The training visually emphasized syntactic information using tools, previously tested successfully in syntactic training, and in line with the Luxembourgish curriculum. The training focused on plural inflection in the noun phrase and in subject-verb agreement. It aimed at automatizing the production of plural spelling using an increasing complexity of sentence contexts and short texts.

We analyzed French plural spelling of 193 fourth graders in 16 different classes across Luxembourg against a control group receiving German training, using a gap dictation test. Plural spelling was tested at four test points (T1 – T4) in the three word categories noun, verb, and adjective and analyzed using a GLMM. The results showed that the training significantly improved plural spelling in all three word categories compared to the active control group. The observed effects were similar to those from former studies on syntactic trainings and remained stable 10 weeks after the training.

Our findings indicate that fostering syntactic reasoning, emphasizing the syntactic information encoded in writing, indeed improves plural spelling. Furthermore, the results show that syntactic training in the classroom can be supported by teaching videos.

References

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Notes:

Impact of the syntactic training on French plural spelling of different performance clusters in grade 4

Carole Dording, Sonja Ugen, Constanze Weth

Written French relates to grammar, i.e., plural spelling. Spelling acquisition of this grammatical domain is difficult across schooling (Brissaud & Fayol, 2018). Studies in L1 and L2 contexts have presented significant positive results of syntactic training on plural spelling (Bilici et al., 2018; Thévenin et al., 1999).

In a pre-/posttest design, 171 grade 4 students of Luxembourg were tested in French plural spelling (FPS) and in German noun capitalization, in order to investigate the effects of a syntactic training on FPS within different student performance clusters.

Based on their pretest results in French and German, the students were grouped into five performance clusters. The clusters were ranging from low performers in both languages to high performers in both languages. Some cluster characteristics, related to several student background variables and to the student pretest results, will be presented at the conference.

After the pretest, all the students received a two-week syntactic training on FPS in a video-based learning environment. They took an active role in the learning process, by completing exercises along with the videos. A statistical model (GLMM), based on the students' results in the pre- and posttest in FPS, shows the effects the training had for each cluster in the different word categories (adjectives, nouns, verbs), leading to an overall significant improvement at cluster level. A different approach, namely the Normalized Learning Gains calculated for each cluster, demonstrates, that all the clusters increased their FPS skills and knowledge through the training: the clusters with low and medium performance in French, and medium performance in German on the pretest used the possible scopes for improvement best.

At the conference, the influence of the spelling skills in French and German (pretest) on the students' learning during the training will be discussed in-depth, effects shown through the posttest results.

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Novel visual word learning tracked with FPVS-EEG

Amaury Barillon, Christine Schiltz, Alette Lochy

Throughout life, we constantly learn novel written words that are integrated in neural circuits of our brain. Here, we investigate the impact of two learning methods on the emergence of novel neural representations for words in 32 monolingual adults. Half of the 32 rare French words were provided with orthographic and phonological information only (OP hereafter), the other half were also provided with explicit semantic information (OPS hereafter, with an associated image).

We used EEG recordings and fast periodic visual stimulation (FPVS) displaying base stimuli (pseudowords) at 10 Hz with deviant stimuli (words) every fifth item (at 2Hz) before/ after a learning task. This approach allows to measure the discrimination of words among pseudowords (thus, lexical access) implicitly. We contrasted 4 word-conditions: novel words OP, novel words OPS, unknown words, and known words. Every condition was repeated 4 times for a total of 16 sequences of 1 min.

EEG results show a significant learning effect ($p < 0.001$), with larger word-selective responses over the left occipital-temporal cortex at post-test with both methods, while no pre/post difference was seen for control conditions (known and unknown words). However, contrary to our hypothesis, larger amplitudes (suggesting stronger orthographic representations) were found with the OP rather than the OPS method ($p = 0.036$). Moreover, behavioral lexical decision results reveal that new lexical traces of the novel words induced significant increases in reaction times for novel words' orthographic neighbors and for 1-letter-close pseudowords, suggesting competition effects arising with new lexicalizations. Those effects were stronger for OP words, as in EEG responses. This unexpected greater benefit of learning without semantic will be discussed with regards to education methods, as it suggests that the simultaneous presentation of image and word (e.g., *Duolingo*, *Babel*) drags the participant's attention away from the orthographic form which is not an efficient strategy for the brain.

Notes:

The relationship between children’s vocabulary knowledge and reading in a multilingual education setting

Linda Romanovska, Ineke M. Pit-ten Cate,

Katharina A. M. Tremmel, Aurélie P. Wealer, Sonja Ugen

In the multilingual Luxembourgish public school system, Luxembourgish is the main language of instruction in kindergarten, switching to German in Grade 1, and as of Grade 3 gradually introducing French. Additionally, Luxembourg hosts a multi-cultural population representing 170 different nationalities, and, correspondingly, a variety of languages spoken across the country (The Government of the Grand Duchy of Luxembourg, 2023). Therefore, many children attending Luxembourgish public primary schools do not speak one of the three languages of instruction at home. Research has shown that children’s language background has a significant impact on their scholastic performance. More specifically, children who do not speak German or Luxembourgish at home score significantly lower in the German reading comprehension tests of the Luxembourg school monitoring programme “Épreuves Standardisées” in Grade 3 (Hoffmann et al., 2018). In this regard, to reliably diagnose a learning disorder in this multilingual context, it is important to distinguish difficulties resulting from lower (German) language proficiency from those resulting from an underlying (reading) disorder (Ugen et al., 2021).

In the current paper, we will present data of N~750 children aged 7-10 years. This data was collected as part of a project concerning the development of a test battery to diagnose specific learning disorders in a multilingual context (Romanovska et al., 2022). We will first present data on students’ performance on the reading tasks, distinguishing between different student groups based on the language spoken at home. Next, we will focus on the association between assessed German vocabulary knowledge and reading performance. Results will be discussed in relation to Luxembourg’s multilingual context and the implications of the interrelation of vocabulary knowledge and reading for diagnosing potential learning disorders.

References

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Session II: Institutional Features in Education

Managing Diversity in Luxembourg's Public Education System (EPS):

Different Schools for Different Pupils?

Elif Tuğçe Gezer, Susanne Backes,

Ulrich Keller, Thomas Lenz

Luxembourg has a diverse socioeconomic, cultural, and linguistic background among its inhabitants. Although it is considered an asset, this diversity accounts for a source of inequality (Eurydice, 2022; MENJE, 2020). As a possible solution, there have been initiatives to diversify schools' language offers, which encouraged the establishment of European public schools (EPS) (MENJE, 2020). Since 2016, Luxembourg has established six EPS, which is considered a significant change in the decades-old persistent Luxembourgish education system. Operating independently from Luxembourgish curriculum, these schools offer a multilingual public education in French, English, or German-speaking sections (MENJE, 2020; n.d.).

This study aims to investigate EPS's role in managing diversity and ensuring educational equality through the following research question: "*How do students in EPS differ from students in Luxembourgish curriculum regarding demographic composition and educational trajectories?*". To this end, it utilizes secondary analysis of administrative data and Luxembourgish School Monitoring Programme.

Preliminary analysis showed that since their establishment, the number of students in the European curriculum has continuously increased. Although students' distribution within language sections differs from one EPS to another, most students primarily speak French. Besides, EPS students' socio-economic status was higher than others, which is parallel to previous findings (ONQS, 2022). As for the educational trajectories, delayed careers were less common in the European curriculum. Furthermore, most 5th grade primary school EPS students moved towards secondary school education, and 3rd grade secondary school EPS students continued their education in EPS. Finally, it was observed that Luxembourgish/German speaking students had the highest survival rates, followed by French and English-speaking students. But Portuguese speaking students had a slightly lower survival rate, which could be related to the congruence between the section language and primarily spoken language at home. However, more data and longer observation periods are needed to report robust and longitudinal results.

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Stratification in the German education system – the role of Waldorf schools

Barbara Marosváry

The stratification of the German mainstream education system due to early tracking is often criticised. On the other hand, Waldorf schools are private institutions using alternative pedagogy, which can also cause educational inequalities if they implement differential selection. This study analyses the selection effects of Waldorf schools compared to mainstream German schools, using the students' socioeconomic background as an indicator.

The German microcensus data from years 2012-2019 are analysed (N=319,967). Ten school types are compared by the socioeconomic measures of parental education and occupation, income, and immigrant background. Families in Waldorf are first compared to all non-Waldorf families in logistic regressions. Then, OLS and multinomial regressions are used to determine the hierarchical position of each school type, in the whole country as well as in East and West Germany separately.

The results indicate that the mainstream school types form a clear hierarchical structure defined by both parental education and family income. Waldorf, on the other hand, is highly selective on parental education (and occupation), but not on family income, diverging from the mainstream hierarchy. This is especially pronounced in East Germany. In addition, students' immigrant background does not define the school types' status the same way as the other socioeconomic measures, and there are large differences in this regard between East and West: Waldorf has proportionally the least immigrant students in the West and the most in the East.

The results indicate that the difference between the selection in the mainstream education's tracking system based on performance on one hand and Waldorf's (self-)selection by parental norms and preferences on the other, contribute to educational stratification in qualitatively different ways: despite Waldorf being a private school with tuition fees, it appears to select more on a cultural rather than economic basis.

Notes:

Common issues, common perspectives? A research focusing on domain-specific antinomies in curricula and material of Education à la citoyenneté and Vie et société

Charlotte Keuler

Within the last thirteen years, the selection of Social Science subjects in Luxembourg has changed. With *Education à la citoyenneté* in the *Enseignement secondaire générale* (ESG) and *Vie et société* in primary and secondary education, new subjects have been introduced (European Commission/EACE/Eurydice 2017; Schilt 2012). The existence of *Instruction civique* in the *Enseignement secondaire classique* (ESC) thereby had a longer tradition, though the subject was retitled this school year (2023/24) in *Education à la citoyenneté*, too. *Vie et société* and both *Education à la citoyenneté* in ESC and ESG differ from each other: While for example for the *Education à la citoyenneté* in the ESG a textbook from 2016 is used, the subject in the ESC is still accompanied by the textbook named *Instruction civique* in its version from 2009 (Schreiber 2014, 337; MENJE 2023).

Despite many differences between the subjects, all of them include characteristics of civic or political and thus Social Science education content (MENJE 2023). Here, an antinomies-shaped perspective is one way of treating issues of this domain (e.g. Hidalgo 2014). Additionally, domain-specific chances and challenges for teachers, pupils and the class can be reflected using this special focus (for the German context e.g. May 2014). However, not every possible conflicting dualism of a content should be considered as treatable due to resources of school teaching (see for example the pedagogical antinomy regarding organisational processes (Helsper 2016, 115)). Are domain-related antinomies even addressed in the curricula or material?¹ And if so, to which extent differ the perspectives on the issues regarding the subjects? In the presentation, the results of an analysis of the subjects' curricula, textbooks and teaching material will be shown.

¹ Please note: Due to the languages of the analysed material, the presentation will be held in French and German.

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Mathematics Achievement in Prim. and Sec. Schools: A Comparison Between Students in EPS and Students in Schools Following the Lux. Curriculum

*Joanne Colling, Axel Grund, Ulrich Keller,
Pascale Esch, Antoine Fischbach, Sonja Ugen*

Luxembourg is a highly diverse country in terms of the socioeconomic, sociocultural, and linguistic composition of its population. To deal more adequately with the language diversity of the student population and to encounter educational inequalities that are assumed to result (at least partially) out of a curriculum with high language expectations, the Luxembourgish government has broadened the educational offer by introducing European public schools (EPS), which allow students to select one main language of instruction among the available language sections (i.e., German, French, and English).

By integrating EPS into the Luxembourg School Monitoring Programme “*Épreuves Standardisées*” (ÉpStan), the full-cohort data including primary and secondary school students collected in autumn of the school year 2022/23 was analysed to understand whether EPS students differ in their achievement in mathematics from students in schools following the Luxembourgish curriculum (LC).

Regarding mathematics achievement in primary school, EPS students were found to perform better (higher standardized test scores) than students in schools following the LC, and this particularly so in later school years. In secondary school, EPS students performed better in mathematics than their peers in the intermediary (ESG¹) and lowest (ESG-VP²) school track, while staying below the performance of students in the highest track (ESC³). Looking at student subgroups with specific background characteristics, the findings offer a preliminary indication that EPS students with a low SES and/or students speaking another language than Luxembourgish/German (i.e., Portuguese) perform better in mathematics than their respective peers in schools following the LC.

These preliminary findings will be discussed in light of important methodological limitations (e.g., small *Ns* in EPS, different tracking approaches) before presenting potential explanations (e.g., differences in student population, structural differences, assumed better linguistic fit in EPS) and implications (e.g., targeted diversification of the EPS student population, integration of EPS characteristics in schools following the LC).

¹*Enseignement Secondaire Général – Voie d’Orientation* (Intermediary school track)

²*Enseignement Secondaire Général – Voie de Préparation* (Lowest school track)

³*Enseignement Secondaire Classique* (Highest school track)

Session III: Fostering Mathematics

The Influence of Money as a Manipulative Material on 3rd-Graders' Math Performance in a Multilingual Context

Styliana Politi, Caroline Hornung, Christine Schiltz

The use of concrete objects as manipulative materials to enhance math performance has been widely discussed. However, previous research has indicated that perceptually rich objects may harm students' performance (McNeil et al., 2009). This project aims to examine the effect of using real money as a manipulative material on the math performance of 3rd-grade students in a multi-lingual context. To this end, students were introduced to money as a manipulative material during a 45-minute teaching session. Next, using a within-and-between group design we assessed students in math tasks (i.e., real-world problems in the context of money) with and without money. The study also investigated potential interactions between the use of manipulative material, students' overall math and language fluency, and socioeconomic status (SES), utilizing data from a standardized math assessment aligned with the national curriculum. The initial findings from the study revealed that the overall use of money did not significantly affect students' performance. However, boys outperformed girls in solving money-related problems, despite similar pre-established math skills. Additionally, a significant interaction was observed between students' pre-established language skills and the use of money, as money seems to harm the performance of students with high pre-established language skills. The ongoing follow-up study expands upon these findings by incorporating a teaching session focused on the deconstruction of money. This session includes three interactive in-classroom activities that utilize real-world problems. Furthermore, the study considers students' pre-established knowledge of money based on information gathered from teachers' and parents' questionnaires, as well as students' self-reports regarding their manipulative use. The present project aims to contribute to the existing literature on the effective integration of manipulatives in mathematics education. Findings' implications for educators and curriculum developers are discussed considering students' individual characteristics and abilities.

Notes:

Is the SNARC effect associated with pre-math. and spatial abilities in pre-school?

Tânia Ramos, Carrie Georges, Christine Schiltz

The SNARC (Spatial Numerical Association of Responses Codes) is a cognitive phenomenon describing the mental association between numbers and space, where small/large numbers are associated with the left/right side of space, respectively. This effect has been extensively studied over the last 30 years, and yet its functionality in mathematical and spatial abilities remains unclear. To date, some studies in typical children have shown that the presence of a strong SNARC is associated with better mathematical abilities (e.g., Hoffmann et al., 2013; Georges et al., 2017), while others did not report such a significant relation (e.g., Gibson & Maurer, 2016; Schneider et al., 2009). To better understand the functionality of number-space associations, we investigated the triangular relationship between SNARC, mathematical and spatial abilities in preschool children from Luxembourg (n=136, mean age=6.3 years). The SNARC was assessed using a magnitude classification task, where children gave left-/right-sided responses to judge whether centrally presented digits (1-9) were smaller/larger than 5, respectively, and vice-versa. Linear regressions between number magnitude and differences in left-right-sided responses were computed to index the SNARC effect, with negative regression slopes reflecting number-space associations in the left-to-right direction. Bootstrapping was then conducted to measure the consistency of individual SNARC regression slopes. 37% and 19% of children revealed consistent number-space associations in a left-to-right and right-to-left direction, respectively. 44% did not show consistent spatial-numerical mappings. Pre-mathematical and spatial abilities were measured using 7 numerical and 3 spatial tasks, respectively, reduced into two factors via two respective principal component analyses. A one-way ANOVA revealed no significant effect of SNARC consistency (left-to-right consistent, right-to-left consistent, inconsistent) on the numerical and spatial factors. Although some children show consistent spatial-numerical mappings at this developmental stage, it seems that they might not (yet) rely on these associations when performing numerical and spatial tasks.

Notes:

Diagnosing Specific Learning Disorder in Mathematics: Development of a Test Battery Tailored to Luxembourg

Vera Hilger, Sonja Ugen,

Linda Romanovska, Christine Schiltz

To diagnose specific learning disorder in mathematics, multidimensional assessment is required, which includes psychometric testing to identify children's individual weaknesses and strengths, particularly in mathematics. Most of these tools use language to give instructions and present tasks but test language proficiency is prone to impact student's test performance (Ugen et al., 2021). This is especially important for Luxembourg and its linguistically diverse school population, as results from the national school monitoring program *ÉpStan* showed school performance differences based on children's home language (Greisen et al., 2021; Martini et al., 2021). Even though currently used diagnostic tests generally have a good psychometric quality, they rarely consider linguistic heterogeneity, questioning their reliable and valid use in a multilingual setting. In fact, to reduce the risk of over- and under-identifying learning disorders, difficulties arising from lower language proficiency need to be disentangled from problems resulting from an underlying learning disorder, leading to situation-dependent adaptations in the diagnostic process (e.g., translation of test instructions or approximate interpretation of test results).

To optimize this, we have developed a test battery in mathematics for children in grade 3, specifically tailored to the multilingual education context in Luxembourg. Following diagnostic guidelines and neurocognitive models of number processing, we devised a total of 17 paper-pencil subtests assessing children's performance in basic numerical and arithmetic skills. The language in the instructions was kept simple and straightforward, and only eight subtests contained language directly within the items. The content was adapted to the national mathematics curriculum. To norm the test battery, we have collected data in 49 classes all over Luxembourg ($N \approx 650$ children). Preliminary findings of this data collection will be presented to show the tool's suitability for Luxembourg's multilingual education setting.

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Session IV: Language in different Student Populations

Children's early literacy meaning-making: A qualitative study in crèches in Luxembourg

Valérie Kemp

Literacy is generally understood as people's ways of using signs, such as printed text or images. Children's early encounters with literacy are crucial for their development and educational opportunities (Burchinal & Forestieri, 2011). An essential aspect of this learning is meaning-making, which describes the process of communicating and constructing meaning of experiences, practices, objects, or concepts. While literacy development has been broadly studied, we have limited understanding of the related meaning-making processes (Worthington & van Oers, 2017). With the rapid growth of the early childhood education (ECE) sector, which is particularly recent in Luxembourg (Bollig, Honig, & Nienhaus, 2016), it is ever more important to study literacy practices of young children. However, there is a lack of qualitative research on children's early literacy practices, specifically in non-formal and multilingual education settings.

In my PhD, I aim to address this gap. I conducted qualitative fieldwork in three crèches in Luxembourg, using video recordings and fieldnotes, and focusing on nine children between two and four years old. I observed a wide range of early literacy practices, that illustrate the educators' different pedagogical approaches and underlying understandings of literacy. These do not only influence early literacy practices, but also the ways in which children interacted and made meaning. My findings will help to promote researchers and practitioners understanding of early literacy in non-formal education and, therefore, enrich both conceptual and methodological knowledge and inform pedagogical practice.

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Multilingual Experiences and Practices of Children in Digital Media: Mediational Repertoires and Translanguaging

Mahdi Mowlaei

In the multilingual context of Luxembourg, children have diversified and complex linguistic resources which they draw on for their communication and making sense of their daily lives in school and outside. Home and digital media are major sites for children's communication and meaning making outside the school context. Previous studies show that children's use of their language resources in these spaces can be influenced by language policies and shared language knowledge in family and with peers, though children have also been shown to creatively draw on their resources to communicate and express themselves. The current study adopts the concept of mediational repertoires to capture and visualize children's language, modality, and media choices and habits. The study also draws on the translanguaging lens to explore children's actual practices and the ways in which they use their entire semiotic repertoires. The present study addresses this issue in the context of Luxembourg, focusing on three children from Iranian background. Data is being collected through observation of children at home, interviews, visualization of digital media practices through mediagrams and viewing the children's self-selected media practices. This presentation introduces the concepts of mediational repertoires and its visualization through mediagrams, as well as translanguaging and language ideologies and their application to study children's language practices in the contexts of home and digital. The poster also presents the data collection procedure for the current study. As the data collection and coding is ongoing, no results will be available for the presentation, though excerpts of data, early visualization and insights from data collection procedure will be included in the presentation.

Notes:

Academic Performance in Autism: Multi-Perspective Research on Language, Socio-Emotional Skills, and Parent-Child Relationship

Maïte Franco, Andreia Costa

Children on the autism spectrum tend to underperform in mainstream education (Manti et al., 2011). In line with previous research, this project analyzed autistic children's socio-emotional skills (American Psychiatric Association, 2013; Miller et al., 2017), academic inclusion (Brede et al., 2017; Humphrey & Lewis, 2008), their language use (Miller et al., 2017), and their parents' increased incidence for psychological difficulties (e.g. depression, anxiety, emotional distress; Mugno et al., 2007) to analyze their possible contribution to the children's underperformance in an integrative model.

The study is in the final phase of data collection and includes currently 19 autistic children and 16 neurotypical peers attending mainstream elementary schools in Luxembourg. For each child, one of their parents and their class teacher participated as well. Children were tested with a battery of different psychological tests regarding their cognitive (e.g. IQ, memory, inhibition), socio-emotional (e.g. emotion regulation, and language skills, as well as their perception of inclusion). Parents and teachers reported on children's language and socio-emotional skills, academic achievement, general behavior, academic inclusion, and their relationship with the child. Parents provided additional information on the family's socio-demographics, their child's ASD diagnosis and substance intake, and their own mental health.

Preliminary findings indicate that autistic children and their parents present significantly more difficulties than the neurotypical participants in the observed constructs of interest. Furthermore, children's socio-emotional skills, their autistic traits, as well as parents' mental health have been found to significantly predict children's academic performance. However, present analyses do not allow us to de-entangle the different relations between the constructs and academic performance in detail. For this reason, additional correlational, moderation/mediation, regression, and variance analyses are run. The findings of this study will be used for better support of (autistic) children in the academic environment and guidance of families living in a multilingual setting.

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Session V: Teacher Relationship and Attitudes

What we can learn from Student-Teacher Relationship Research for Luxembourg: A Systematic Review of Meta-Analyses and Second-Order Meta-Analysis

*Valentin Emslander, Doris Holzberger, Sverre Berg Ofstad,
Antoine Fischbach, Ronny Scherer*

Background: Teacher-student relationships (TSR) play a vital role in establishing a positive school climate and promoting positive student outcomes (Wang et al., 2020). Especially in a diverse context such as Luxembourg, it is vital to identify key student outcomes of TSR to best promote students' success and well-being. Several meta-analyses suggested significant associations between TSR and, for example, academic achievement, disruptive behavior, school engagement, peer relationships, motivation, executive functioning, and general well-being (e.g. Endedijk et al., 2021; Nurmi, 2012; Roorda et al., 2011; Vandenbroucke et al., 2018). However, these meta-analyses differ substantially in their TSR-outcome relation, moderators, and quality, thus complicating the application of their findings in general, and to the Luxembourgish context in specific.

Key Questions: In this preregistered systematic review of meta-analyses and second-order meta-analysis (Emslander et al., 2022), we aimed to (a) synthesize the meta-analytic evidence on the relations between TSR and student outcomes; and (b) map influential moderators of these relations to adapt their implications to the educational setting in Luxembourg.

Findings and Implications: We synthesized over 70 years of educational research on TSR with 24 meta-analyses on more than 2 million (pre-)school students from around the world. We conducted several second-order meta-analyses and found the strongest significant relations between TSR and academic achievement, academic emotions, appropriate student behavior, behavior problems, and student motivation. Teacher and student ethnicity as well as student age and gender showed to have moderating effects in prior research. To be mindful of ethnicity and age in building supportive TSR is crucial for culturally diverse educational settings. Our study maps the field of TSR research, presents their relations, and moderators, and points to possible ways in which TSR could contribute to improving outcomes in students via relationship building. Future research may use these findings to develop TSR interventions specifically for Luxembourgish schools.

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Teachers' self-reported TPACK and their perceptions of Computer-Supported Collaborative Learning

Margault Sacré

Computer-Supported Collaborative Learning (CSCL) queries how technology can facilitate collaborative learning and can occur in classroom, online, and hybrid contexts, both synchronously and asynchronously (Chen et al., 2018). The potential of CSCL has been shown at all levels of education, including in primary school (Chen et al., 2019). While the field recognizes the complexity and multiplicity of classroom realities (Wise & Schwarz, 2017), if and how teachers compose between technology and collaborative learning on a daily basis is not yet documented. Despite the recognition of CSCL as an effective pedagogical method, its adoption among teachers remains limited (Zhu, 2013). TALIS surveys reveal that only 30% of lower-secondary school teachers report adopting CL and ICTs in their teaching practices (OECD, 2017). Teachers' knowledge could be a lever to face this low level of implementation of CSCL; prior research has demonstrated that teachers' knowledge influences their instructional practices (Baumert & Kunter, 2013), and according to Schmid et al. (2021), the combination of "different knowledge dimensions [is needed] to effectively teach with technology" (p. 1). This study proposes (1) to investigate how teachers perceive and implement CSCL, and (2) how their technological, pedagogical, and content knowledge (TPACK) may influence their perceptions and decisions. A survey method, including questionnaires and interviews, was chosen to gather quantitative and qualitative insights from primary school teachers. The data collection is currently going on, targeting a convenience sample of French primary school teachers. We contribute by informing teacher practices and providing recommendations for CSCL implementation through the development of teacher knowledge.

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Session VI: Current and Future Challenges

Way2ESD: Educating primary teachers for the future: Co-developing approaches to education for sustainable development with in-service teachers

Doriana Sportelli

Since the UNESCO Decade for Education for Sustainable development (ESD), many efforts to implement ESD have been made in Luxembourg, including national committees, strategies, and online platforms. Despite those efforts, the current educational report states that there is a lack of policy frameworks for ESD in primary schools (LUCET et al., 2021). A study from Andersen et al. (2021) about teachers' needs to implement science topics related to ESD shows that only 40% of primary school teachers teach such topics. The study also reveals that they mostly ask for new ideas for activities and hands-on training.

Aiming for a greater implementation of ESD in primary schools, the Way2ESD project elaborates contextually responsive professional development (PD) offers *with* and *for* in-service teachers. The case study (Stake, 1995) that will be explored in the proposed presentation uses a sociocultural theoretical framework (Sewell, 1999; Tobin, 2005) to examine how a process of co-construction between teachers and researchers guides the development of PD workshops with a partner school. The analysis of ethnographic field notes (Emerson et al., 1995), audio-recordings and correspondence reveals two central foci that emerged in a participatory design process with the teacher participants. First is that a negotiation about what ESD is, consistently became one of the main topics of conversation. This implies a need for setting a common understanding of ESD in the development as well as in the implementation of the PD workshops. Second is that the holistic approach to ESD allowed for crossing formal/non-formal boundaries, leading to the opening of the PD workshops for the educators of the school. This was welcomed by the school committee and has led to negotiations with the involved institutions to facilitate the access to the PD for educators.

Through this example the proposed presentation will discuss the implications of emergent design processes.

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AIG and student math assessment: Psychometric characteristics of automatically generated items

*Steve Bernard, Pamela Isabel Inostroza Fernandez,
Sylvie Gamo, Michael Andreas Michels, Philipp Sonnleitner*

National school monitoring plans, like the Luxembourgish Épreuves Standardisées (ÉpStan), always call for psychometrically tested items which are costly and time-consuming (Gierl et al., 2012). The use of models and templates to automatically generate vast numbers of items is a method that is becoming increasingly popular and has the potential to quench the thirst for more items year after year. Mathematical evaluation frequently adopts a largely language free approach in extremely heterogeneous environments like Luxembourg, employing visuals rather than words to provide context for the mathematical problem (Sonnleitner et al., 2018). Yet research on utilizing images in text items indicates ambiguous results depending on their role and perception (Lindner et al. 2016; Lindner 2020). It is thus not entirely clear if template-based items that are image-based share the same item characteristics.

The pretests of ÉpStan 2021 included model-based generated items. By drawing on data of seventh graders, this study's main aim is to analyze, in an explorative way, the impact of construct-relevant (task or problem features) and construct-irrelevant (semantic embedding) variations in items on their empirical difficulty and psychometric characteristics. The ÉpStan quality standards, which are equivalent to common IRT quality criteria ($rit > .25$; $outfit > 1.2$), were met by all the created items.

Further examined and discussed will also be the impact of these variations on subgroup level and what this could imply for the fairness of the automatically generated items in this context.

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Poster Abstracts

Spotlight on ESG-VP students - a new approach to testing

Charlotte Krämer, Sylvie Gamo, Cécile Braun,

Pamela Isabel Inostroza Fernandez, Philipp Sonnleitner

Test results of the national school monitoring programme *Épreuves Standardisées* (ÉpStan) reveal a low level of reading and math competency for the majority of 9th-graders attending the *Enseignement Secondaire Générale – Voie de Préparation* (ESG-VP) school track: In 2022, 3 out of 4 ESG-VP students could not master ÉpStan Niveau 1 in French and German reading comprehension (vs. 2 out of 3 in math; <https://dashboard.epstan.lu>), meaning that they struggle to read simple and short texts, and to solve basic mathematical problems (MENFP 2008; Sonnleitner et al. 2018).

The aim of this pilot-study is to extend and adapt our test material to have a closer look at ESG-VP students' reading and math performances by using additional testing items that allow for more nuanced statistical analyses. Our first results for German reading comprehension are promising; they will be presented and discussed.

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Notes:

PlayTops: Embodied Music Learning through Modular Digital Musical Instruments

Charles White

This poster presentation introduces the *PlayTops* research project. *PlayTops* aims to develop a novel approach to early childhood music education through the use of a *laptop ensemble*. While laptop ensembles have primarily been utilized in higher education, this is one of the first projects to investigate the use of laptop ensembles in early childhood. *PlayTops* goes beyond the physicality of the laptop by employing a new modular digital musical instrument design – an Internet of Things (IoT) network of physical sensor-containing objects – to promote playful and embodied joint music learning. The project operationalizes the basic mechanisms of embodied interaction with music, employing sensor-based qualitative measurements to evaluate bodily engagement during music-making and learning. The research aims to contribute to the 5 ‘C’s: *critical thinking, creativity, communication, collaboration, and coding*, as outlined by Luxembourg’s Ministry of Education, Children, and Youth initiative: *Simply Digital skills of the future for strong children*.

Notes:

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Schedule overview

<u>Wednesday, 8 November 2023</u>		
12h30 – 13h00	in front of MSA 3.520	Registration
13h00 – 13h15	MSA 3.520	Welcome & Opening Words
13h15 – 14h15	MSA 3.520	KEYNOTE Bianca Simonsmeier-Martin
14h30 – 16h30	MSA 3.190 (I) MSA 3.200 (II)	Parallel Sessions I & II Session I: Fostering Literacy Session II: Institutional Features in Education
16h30 – 18h30	MSA 3.520	Reception and LuxERA General Assembly
<u>Thursday, 9 November 2023</u>		
09h15 – 10h15	Open Space MSA 3 rd floor	Interactive Poster Session and Coffee
10h30 – 12h00	MSA 3.190 (III) MSA 3.200 (IV)	Parallel Sessions III & IV Session III: Fostering Mathematics Session IV: Language in different Student Populations
12h15 – 13h00	MSA 3.520	Academia and Beyond: Fireside Chat
13h00 – 14h00	Open Space MSA 3 rd floor	Lunch Break
14h00 – 15h30	MSA 3.190 (V) MSA 3.200 (IV)	Parallel Sessions V & VI Session V: Teacher Relationships and Attitudes Session VI: Current and Future Challenges
15h30 – 15h45	MSA 3.520	Concluding Words