University of Zurich[UZH] | n|w University of Applied Sciences and Arts Northwestern Switzerland School of Education | PH ZH Zurich University of Teacher Education | Earli

Programme & Book of Abstracts

EARLI SIG 16 Metacognition Conference 2018 | ZURICH

Impressum

Programme of the
8th International Biennial Conference of EARLI SIG 16 Metacognition
European Association for Research on Learning and Instruction (EARLI)

Zurich | 27 – 30 August 2018

Organising Committee

Yves Karlen (Conference Chair) | University of Applied Sciences and Arts Northwestern Switzerland

Katharina Maag Merki (Conference Co-Chair) | University of Zurich

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Regula Wysling | University of Zurich

Online Programme

http://EARLI.org/SIG16-programme

Book of Abstracts

An extended version of this booklet including all abstracts (PDF) can be found on the conference website: http://www.earli-sig16.uzh.ch/en/programme.html

Content

Welcome

Dear Participants,

Yves Karlen
Conference Chair

It's an honor and a privilege to welcome you in Zurich, Switzerland, for the 8th International Biennial Conference of EARLI SIG 16 Metacognition. The conference is organised by three partners, who cooperate closely with each other to offer you an excellent infrastructure: University of Zurich, School of Education of the University of Applied Sciences and Arts Northwestern Switzerland, and Zurich University of Teacher Education.

All previous EARLI SIG 16 Metacognition conferences have been very successful in contributing to a broad in-depth scientific exchange on metacognition. We are hoping to continue this tradition by bringing together researchers from all over the world, who will present and discuss a broad range of topics on metacognition. The scientific programme of the 8th International Biennial Conference of EARLI SIG 16 Metacognition reflects the diversity of our field with numerous sessions on different topics to stimulate lively discussions. The programme offers a rich coverage of new directions and long-standing, central questions throughout our field. Approximately 140 researchers from 26 countries examine and discuss significant questions of metacognitive research in 39 single paper presentations, 7 symposia and 22 poster presentations.

The EARLI SIG 16 Metacognition Conference has a long tradition in giving recognitions to the best contributions from junior researchers. There are two recognitions to win: the SIG Poster Recognition and the SIG Keynote Recognition. We are especially proud, that for the first time in EARLI SIG 16 history, we could invite and encourage young researchers to hold a JURE Keynote.

Welcome

We are delighted that the EARLI SIG 16 Metacognition conference is being held in Switzerland for the first time. We wish to thank the SIG 16 Coordinators, all sponsors and myriad volunteers that made it possible to organise this conference. In particular, we would like to thank the valiant efforts of all reviewers that made this dynamic and exciting programme possible. We will do everything possible to be good hosts. We wish you all a stimulating conference and a wonderful time in Zurich.

Thank you for being here with us!

Welcome

Dear Metacognition SIG conference participants,

It is another "even numbered" year where we have the pleasure of experiencing the biennial meeting of the EARLI Metacognition SIG. It is the 8th time this focused meeting is being held with a sustained variability in the theoretical approaches, methodological preferences and targeted audiences. Metacognition has been established as an extensive field of study within the EARLI community, having a prestigious journal, Metacognition and Learning, with a new, impressive impact factor of 3.706. The Metacognition SIG meetings provide opportunities for following strands of research in this field and discussing ground breaking studies. Metacognition SIG meetings have their character and this current meeting is introducing the new idea of the "JUnior REsearcher (JURE) keynote" to emphasise the importance given to the contributions of the young members of the community. We would like to thank the organizers, scientific committee and all participants for their varying roles in making this meeting happen. We hope you have a productive conference.

EARLI Metacognition SIG Coordinators

Engin Ader

Anique de Bruin

Michelle Taub

Conference Programme Overview

Monday, 27 August 2018		Day I
from 11.00	Registration	LAB-E014
12.30 – 13.00	Conference Opening	LAA-G001
13.00 – 14.00	**Keynote I: Claire Hughes**	**LAA-G001**
14.00 – 14.30	Coffee/Tea break	LAA
14.30 – 16.00	Parallel Session I	LAB
16.15 – 17.45	Parallel Session II	LAB
18.00 – 19.00	Poster Session with Apéro Opening Reception	LAA

Tuesday, 28 August 2018		Day II
09.00 – 10.30	Parallel Session III	LAB
10.30 – 11.00	Coffee/Tea break	LAA
11.00 – 12.00	**Keynote II: Markus Dresel**	**LAA-G001**
12.00 – 13.00	Lunch	LAA
13.00 – 13.50	Panel Discussion	LAA-G001
14.00 – 15.30	Parallel Session IV	LAB
15.30 – 16.00	Coffee/Tea break	LAB
16.00 – 17.30	Parallel Session V	LAB
17.45 – 18.45	Members meeting	LAA-G001
20.00 – 24.00	Conference dinner	Palavrion

Wednesday, 29 August 2018		Day III
09.00 – 10.30	Parallel Session VI	LAB
10.30 – 11.00	Coffee/Tea break	LAA
11.00 – 11.45	**JURE Keynote: Kim Gärtner**	**LAA-G001**
11.45 – 12.45	Lunch	LAA
12.45 – 14.15	Parallel Session VII	LAB
14.15 – 14.45	Coffee/Tea break	LAB
14.45 – 16.15	Parallel Session VIII	LAB
16.30 – 17.30	**Keynote III: Nancy Perry**	**LAA-G001**
17.30 – 17.45	Conference Closing	LAA-G001

Thursday, 30 August 2018 (Post Conference)		Day IV
08.30 – 10.30	Workshop	LAB
10.30 – 11.00	Coffee/Tea break	LAB
11.00 – 12.30	Workshop	LAB

Abstracts

The Book of Abstracts can be downloaded as PDF from the conference website:

http://www.earli-sig16.uzh.ch/en.html

Accessibility

There are wheelchair-accessible lifts at Credit Suisse, at the corner of Sihlpost and Lagerstrasse by the Teaching Materials Shop.

Catering

On-site catering is included in the registration fee.

Cloakroom

A small cloakroom is available at the conference registration desk at the Zurich University of Teacher Education in the building LAB. Look out for the signs indicating the registration desk. Our cloakroom will be staffed during the conference. However, neither EARLI nor the local organisers accept any liability for the loss of or damage to any items left in the cloakroom. Of course, we'll do our best to keep everything safe.

Coffee/Tea Breaks and Lunches

During the breaks in the morning and afternoon, we will serve different kinds of refreshments: water, coffee, tea, fruit, and cakes. At lunchtime, we will serve you a small meal (either with meat or vegetarian). All meals (coffee/tea breaks and lunch) served during the conference are included in the registration fee. In addition, you will find numerous cafés and restaurants around the campus.

Conference Dinner

On Tuesday evening, 28 August 2018, all participants of the conference are invited to an easy going, good time eating, drinking and dancing conference dinner at **Palavrion**, Beethovenstrasse 32 in 8002 Zürich. The trams number 5, 6, 7, 8, 13 and 17 all stopping at "Stockerstrasse" will take you to Palavrion. From the stop "Stockerstrasse" Palavrion is a few footsteps away. The winner of the Poster Recognition will be announced at the conference dinner.

Conference registration desk

The conference registration desk is located in the building LAB (room LAB-E014) on the campus of the Zurich University of Teacher Education. It is open daily during the conference. Further, conference assistants and members of the conference organisation committee are glad to help you. They are wearing a yellow lanyard.

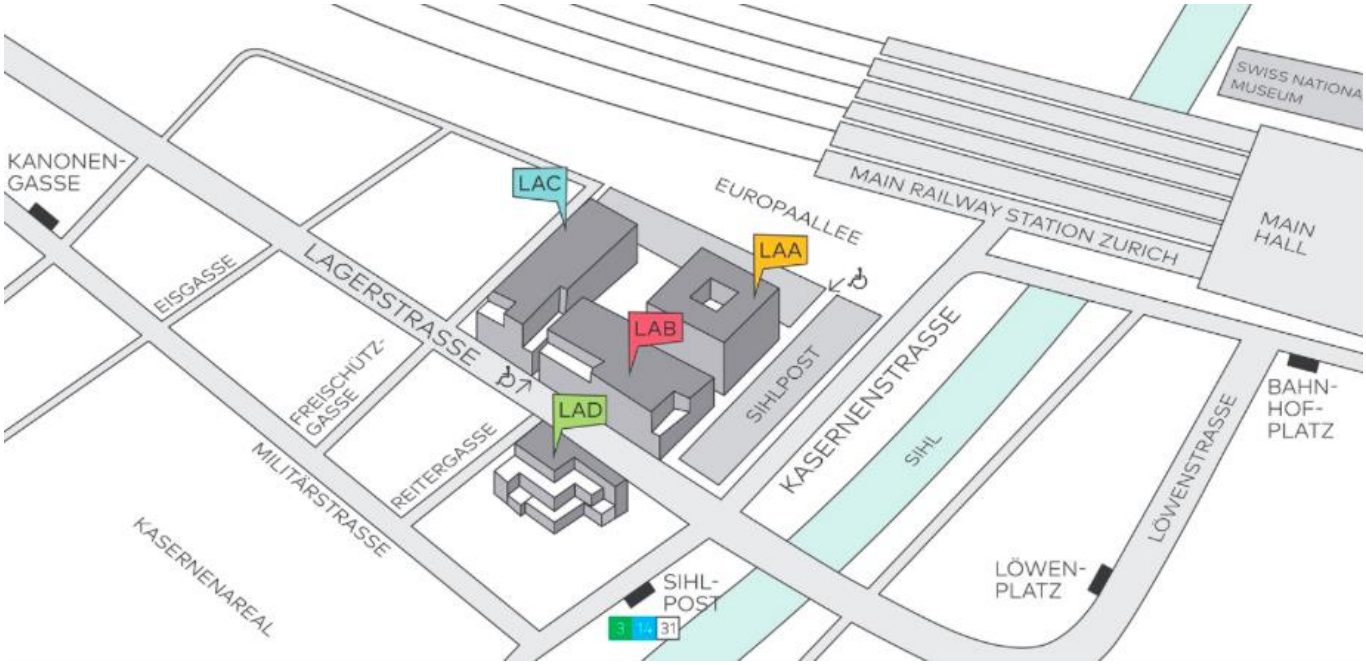
Conference venue

The conference is located on the campus of the Zurich University of Teacher Education next to the main station. The address is Lagerstrasse 2, 8090 Zürich.

Arriving by plane: From Zurich Airport the main station and city centre can be reached by train in 10 minutes (leaving at least every 15 minutes at a cost of 6.60 CHF). Get off at the main station marked as "Zürich HB". Within the main station please use the exit "Europaallee" for an easy access to the campus. From the main station, it will take you 3-5 minutes to get there. By taxi, the venue can be reached from Zurich Airport within 20 minutes at a cost of approximately 49 Euros or 60 CHF.

Arriving by tram: The trams number 3 and 14 or the bus number 31 will take you to the venue. Make sure to get off at the stop called "Sihlpost". From "Sihlpost" the campus of the Zurich University of Teacher Education is in walking distance.

Arriving by car: Please note that there are no parking spaces available. The nearest parking house from the conference venue is the city parking near Gessnerallee, about a 5 minutes walk away (30 minutes parking = 2 CHF).



Emergency

In case of a non-life threatening emergency, ask a conference assistant to contact the first aid personnel. In case of a life threatening medical emergency, dial the number **144**. In case of fire, call number **118**. If the police are needed, call the number **117**. These numbers can be dialled from any European mobile phone.

Internet Access

The following user name and password for the wireless network (PHZH-GUEST) is also printed on your name tag. The wireless network is accessible throughout the Zurich University of Teacher Education.

3840	zor532
Password:	2479
Wi-Fi:	PHZH-GUEST

The Zurich University of Teacher Education is part of the **eduroam** programme. Eduroam is the worldwide roaming access service developed for the international research and education community. Select the eduroam Wi-Fi network and log in using your home-university account.

Please note that depending on your phone company high costs may occur when using the data roaming on your phone. Most phone companies do not include Switzerland in their European roaming plan.

Keynote Presentations

The keynote presentations will be held in the building LAA (room: G001) on the campus of the Zurich University of Teacher Education. Please see the timetable for more information.

Leisure and Excursions

For more information about where to eat or what to do in Zurich, the organising committee has put together a list of its favourite restaurants, bars and places to go in Zurich. Please visit the conference website: http://www.earli-sig16.uzh.ch/en.html or the official Zurich Tourism website: https://www.zuerich.com/en

Lost Property

In case you lose something during the conference, please contact any of the conference assistants (recognizable by their yellow lanyards) or the conference registration desk.

Medical Service

You can find a small dispensary at the conference registration desk. In case of emergencies, call 144. Several pharmacies are located in the main station (ShopVille).

Members Meeting

The members meeting will take place on Tuesday, 28 August 2018, from 17.45 to 18.45 in LAA – G001.

Name Tags

Your name tag will be given to you with your conference materials upon registration. Please wear it at all times to guarantee entrance to all areas of the conference. In case of loss, please contact the registration desk. Further, we encourage you to return your lanyard and name tag upon at the end of the conference. You will find dedicated collection boxes dotted around the venue.

Parking

Please note that there are no parking spaces available at the conference venue. The nearest parking is the multi-storey car park near Gessnerallee (30 minutes parking = 2 CHF). Information about car parks in the city centre can be found here: https://parkingzuerich.ch. We highly recommend using the public transport system.

Photocopying

Photocopying is not available at the venue. In case of emergency, visit the copy shop situated in the main station (ShopVille) or contact the registration desk for further information.

Programme Changes

Please be aware of possible programme changes. Changes will be posted outside of the rooms, at the conference registration desk and in the online programme.

Public Transportation

Zurich has an excellent public transport system, the so-called ZVV. Tickets for busses and trams within Zurich (zone 110) can be bought at ZVV Customer Centre at Zurich main station (Zurich HB) or at any blue ticket booth at the tram stops. Tickets have to be **purchased before getting on** the tram, bus or urban railway. There is no possibility of buying tickets once on the public transport. If you wish to use the public transportation system several times within 24 hours, we recommend you to buy a ZVV day pass. For further information, please visit the ZVV website: https://www.zvv.ch/zvv/en/home.html

Registration

To register for the conference upon arrival in Zurich, please go to the conference registration desk located in the building LAB on the ground floor room E014. The conference registration desk is open as follows:

Monday, 27 August	11.00 – 19.30
Tuesday, 28 August	08.30 – 19.00
Wednesday, 29 August	08.30 – 18.30

Smoking

Smoking is prohibited at the conference venue. Indicated smoking areas can be found outside the buildings.

Social Events

On Monday evening, 27 August, we invite you to the opening reception at the conference venue.
On Tuesday evening, 28 August, the conference dinner with the announcement of the winner of the Poster Recognition will take place at the restaurant Palavrion.
On Wednesday evening, 29 August, we invite the conference participants to join a guided walking tour that offers insights into the city's history, or to have a picnic at the lakeside. (For more details and registration please visit the conference homepage, http://www.earli-sig16.uzh.ch/en/social-events.html)

Sustainability

Both EARLI and the organising institutions are committed to protecting the environment. In light of these efforts, abstract booklets have not been printed. You can find the Book of Abstracts on the conference website http://www.earli-sig16.uzh.ch/en/programme.html.

Tourist Information

Please have a look at the website of Zurich Tourism: https://www.zuerich.com/en. Further, you'll find some local favourites (e.g. restaurants, bars, outdoor activities) on the conference website.

Water

Switzerland's drinking water is of high quality. Tap water is the best drinking water you will find. Water bottles can be refilled at any tap or fountain in the city. Fountains with non drinkable water are marked accordingly.

Keynote I

Precursors and parental predictors of executive function in 14-month-olds – Early findings from the new fathers and mothers

Recent years have seen a remarkable growth of research interest in young children's 'executive function (EF), the cognitive processes that underpin flexible goal directed behaviour (e.g., inhibitory control, working memory and attentional set-shifting). In particular, striking associations have been reported between variation in EF and preschool children's social understanding, academic success and behavioral adjustment (for meta-analytic reviews, see Devine & Hughes; Jacob & Parkinson, 2015; Schoemaker, Mulder, Deković, & Matthys, 2013). Coupled with growing recognition that the first 1000 days of life provide a 'golden window' for intervention, these findings highlight the potential importance of investigating EF in infancy and early toddlerhood. With this goal in mind, we are currently completing an international longitudinal study of just over 400 expectant parents from Cambridge in the UK, New York, USA and the Netherlands. These families were all seen at home before the birth of their first child and again at 4, 14 and 24 months. Emerging findings related to infants' performance on a battery of EF tasks completed at 14 and 24 months, coupled with parallel dyadic observations of infants' interactions with mothers and fathers and parental EF performance enable us to examine: (i) the measurement, nature and precursors of EF in toddlerhood; (ii) intergenerational associations in EF performance; (iii) maternal and paternal social influences on individual differences in EF (e.g., exposure to parental depression, variability in parental autonomy support); and (iv) similarities and contrasts in the results from the three countries.

Claire Hughes, University of Cambridge, United Kingdom

Keynote II

Strategies to self-regulate achievement motivation: Different aspects of their effective use

Complex learning tasks – such as exam preparation, self-studying or preparation of a verbal presentation – are frequently demanding not only in terms of cognitive processing and meta-cognitive control, but also with regard to learners' motivation (e.g., when errors occur). Self-regulation of achievement motivation therefore is of great relevance. Building on this assumption, research on motivational regulation has been intensified in the last years. The present talk provides an overview of work addressing the use of motivational regulation strategies in different contexts. Particular emphasis is given on the situational specificity and the quality of strategy use. Empirical studies are presented addressing not only the consequences of the use of these strategies but also the evaluation of a training approach to enhance motivational regulation.

Markus Dresel, University of Augsburg, Germany

Keynote III

Partnering with teachers to design and implement assessments *for* SRL

Globally, school systems are charged with preparing learners for the 21st century—preparing them to be continuously learning and applying their learning meaningfully, creatively, and flexibly. Self-regulated learning (SRL), which involves, metacognition, motivation, and strategic action, is highly relevant to this task. My research focuses on classroom processes that support children's development as self-regulating learners, and ways teachers and researchers can collaborate to make SRL common in classrooms. In this presentation, I will describe collaborations between teachers and researchers, leading to the design and implementation of formative assessments of children's SRL—assessments *for* SRL. These collaborations raise critical questions about studying SRL in schools and standard ideas about control, fidelity, and evidence. I hope to stimulate constructive conversations about the value of teacher-researcher partnerships and how they can support SRL and 21st century learning.

Nancy Perry, University of British Columbia, Canada

Jure Keynote

The parent factor in child self-regulation – parental beliefs, parenting practices, and the effectiveness of training

Given the substantial role early self-regulation plays in academic, socio-emotional, and health-related outcomes (Moffitt et al., 2011), there is a growing interest in how these skills emerge and develop from infancy throughout childhood, including high-risk groups, such as preterm children who are at risk for adverse development (Aarnoudse-Moens, Weisglas-Kuperus, van Goudoever, & Oosterlaan, 2009).

Parental co-regulation is assumed to play a key role in this development by enabling the child to gradually internalize regulatory strategies and to become capable of self-regulating (Bernier, Carlson, & Whipple, 2010). Parental cognitions, such as self-efficacy beliefs, in turn may stimulate and motivate parenting practices (Bornstein, Putnick, & Suwalsky, 2017; Coleman & Karraker, 1998). Gaining a thorough picture of the underlying processes of this interplay during early childhood, has important implications for the theoretical development as well as the design of interventions.

In this talk, I will highlight the parent factor in child self-regulation. Empirical studies will be presented that address the role of parental self-efficacy beliefs and co-regulatory behaviours in the development of early child self-regulation, as well as the effectiveness of a parent training programme as a preventive approach to support this development at an early stage and to counteract adverse development in children at risk.

Kim A. Gärtner, Heidelberg University, Germany

Registration	from 11.00	LAB-E014

Conference Opening	Time: 12:30 - 13:00	Location: LAA-G001

WELCOMING WORDS

Conference Chair: Yves Karlen, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland
Rector of the host university: Heinz Rhyn, Zurich University of Teacher Education, Switzerland
EARLI Metacognition SIG Coordinator: Engin Ader, Bogazici University, Turkey

Keynote I	Time: 13:00 - 14:00	Location: LAA-G001

KEYNOTE SESSION

Precursors and Parental Predictors of Executive function in 14-month-olds – Early Findings from the New Fathers and Mothers
Claire Hughes, University of Cambridge, United Kingdom

CHAIR: Katharina Maag Merki, University of Zurich, Switzerland

Coffee/Tea break in building: LAA

Parallel Session I Time: 14:30 - 16:00 Location: LAB-F014

SINGLE PAPERS: COGNITIVE SKILLS, NEUROSCIENCE

The role of cognitive inhibition and metacognition on math performance of middle school students

Fatma Acar, Bogazici University, Turkey; Emine Erktin, Bogazici University, Turkey

Abstract:
The contribution of both fast and slow processes to mathematical performance was considered based on dual-process theories. The relationship between inhibition as an executive function and metacognition as a meta-level analytic process was studied with the aim to examine their relative predictive roles on students' mathematical performances. The study was conducted with two hundred and twelve middle school students in grades 7 and 8. They took the likert-type metacognitive skill inventory, and computerized measure of cognitive inhibition (i.e. numerical Stroop task). For mathematical performances of students, both a test of mathematics problems chosen as suitable for leading students to intuitive responses and their mathematics achievement scores in their report card were used. Calibration scores were calculated by prediction and post-diction judgement of the students before and after the math problem test. Preliminary findings indicate that there is not a significant relationship between metacognition and cognitive inhibition as hypothesized as distinct phenomena. Inhibition was found to be only related with the general mathematics achievement, but not with math problem test scores. Metacognition was significantly related with both mathematics performance and achievement. It was concluded after a regression analysis that metacognition has a greater role on mathematical performances than inhibition.

Who can get benefit from homework? The importance of deliberate use of learning strategies

Eriko Ota, University of Tokyo, Japan; Co-Author: Emmanuel Manalo, Kyoto University, Japan

Abstract:
Homework provides important learning opportunities for students to develop deeper knowledge of the contents of school learning, as well as competencies in learning strategy use. However, because of lack of external supervision, the quality of learning at home tends to be poor. The present study considered this problem and examined the characteristics of students who can get benefit from doing homework. 142 junior-high students completed a homework task to learn new vocabulary words and, based on written outputs for that task, the authors categorized the strategies students used. The students also answered a questionnaire to report strategies they think they used. Afterward, the students took a test of retention and correct use of the vocabulary words. Cluster analysis revealed 4 types of students based on two factors: depth of processing (deep or shallow) and congruence between behavior and self-report (congruent or incongruent). ANOVA results showed a significant interaction effect between these two factors ($F(1, 138)=4.47$, $p=.04$) and the effect of shallow learning strategy use on test scores was higher when the behavior and self-report were congruent. These results suggest the importance of deliberate use of strategies – aligning action with intention – especially when the depth of processing is shallow.

Neural Correlates of Feeling of Knowing and Judgment of Learning: An ERP Study

Metehan Irak, Bahcesehir University, Turkey; Can Soylu, Bahcesehir University, Turkey; Gözem Turan, Bahcesehir University, Turkey

Abstract:
Feeling of knowing (FOK) and Judgment of learning (JOL) are metacognitive judgments which allow people to control and monitor their memory performances. In general, FOK is a prediction about future performance on currently non-recallable items. JOL, on the other hand, refers to a people's estimation of how they learned something. Although given the paucity of studies about metacognitive judgments, the neurological basis of FOK and JOL remains unclear. The present study aimed to investigate event-related potentials (ERPs) correlates of FOK and JOL judgments under a face-name recognition task. Volunteer 72 university students participated to the study. Results showed that face-name processing produced N170 and P100 at occipital and parietal, and N100 at frontal and central electrodes. Parieto-occipital P200 and fronto-central N200 were recorded during JOL and FOK judgments. Additionally, although JOL judgments produced frontal and central P300 peak, this peak was not recorded during FOK judgments. We concluded that while FOK were related to 200 ms following stimulus presentation that may be associated with perceptual fluency and conflict processes, JOL emerged 300-550 ms activities that may be explained via memory monitoring processes.

Parallel Session I Time: 14:30 - 16:00 Location: LAB-F017

SINGLE PAPERS: META-ANALYSIS, RESEARCH REVIEW

Effects of self-assessment interventions on students' self-regulated learning and self-efficacy
Ernesto Panadero, Universidad Autónoma de Madrid, Spain; Anders Jonsson, Kristianstad University, Sweden; Juan Botella, Universidad Autonoma de Madrid, Spain

Abstract:
This meta-analytic review explores the effects of self-assessment on students' self-regulated learning (SRL) and self-efficacy. A total of 19 studies were included in the four different meta-analyses conducted with a total sample of 2305 students. The effects sizes from the three meta-analyses addressing effects on different measures of SRL were 0.23, 0.65, and 0.43. The effect size from the meta-analysis on self-efficacy was 0.73. In addition, it was found that gender (with girls benefiting more) and certain self-assessment components (such as self-monitoring) were significant moderators of the effects on self-efficacy. These results point to the importance of self-assessment interventions to promote students' use of learning strategies and its effects on motivational variables such as self-efficacy.

A Critical Review of Recent Literature on Self-regulated Learning, Calibration, and Performance
Linda Bol, Old Dominion University, United States; Douglas Hacker, University of Utah, United States

Abstract:
Calibration is a measure of the degree to which people's subjective judgments of performance correspond to their actual performance. In this review of the recent calibration research, we focused on studies establishing a link between calibration accuracy and academic performance. We review these studies in light of self-regulated learning theory and identify interventions leading to successful calibration and learning. We conclude that interventions designed to increase accuracy and learning will be more successful if all three elements of self-regulated learning are included (i.e., forethought, performance, and self-reflection). Successful interventions: (a) clearly target specific content, (b) provide explicit instruction in processes that aid in both monitoring and regulating learning of that content, and (c) consist of multiple procedures for monitoring and regulating learning.

What Interventions Best Improve Relative Metacomprehension Accuracy? Meta-Analytic Insights
Anja Prinz, University of Freiburg, Germany; Stefanie Golke, University of Freiburg, Germany; Joerg Wittwer, University of Freiburg, Germany

Abstract:
To improve learners' relative metacomprehension accuracy, that is, the ability to discriminate between more and less well understood texts, several interventions such as generating keywords, writing summaries, self-explaining, and rereading have been explored. However, to date, meta-analytic evidence on their effectiveness is missing. Therefore, we conducted several small-sized meta-analyses, with each focusing on one particular intervention and yielding an average effect size. This allowed for the comparison of the various average effect sizes to examine which of the interventions most effectively improve relative metacomprehension accuracy. The results indicated that delayed generative tasks, such as producing keywords or summaries after a time lag, are more effective in improving relative metacomprehension accuracy than immediate generative tasks, such as self-explaining during reading, or non-generative tasks, such as rereading. Hence, although delayed generative tasks require some extra effort on the side of the learners, the costs pay off by boosting their relative metacomprehension accuracy.

CHAIR: Esther Kaufmann, University of Zurich

Parallel Session I Time: 14:30 - 16:00 Location: LAB-F040

SINGLE PAPERS: SHARED REGULATION, COLLABORATIVE LEARNING

Monitoring in collaborative learning – Do students synchronize with each other during it?

Eetu Haataja, University of Oulu, Finland; Jonna Malmberg, University of Oulu, Finland; Sanna Järvelä, University of Oulu, Finland

Abstract:
Monitoring is a crucial part of successful collaborative learning since it makes group aware of their learning progress. Little is known about how students together share and attend to monitoring throughout the learning process and research has searched for new approaches to reveal this in depth. This study investigated how students (N = 24, Mean age 18) monitor their cognition, behavior and affect and how students together synchronize physiologically on those moments. Students' task was to design a healthy breakfast for a marathon athlete. The session was videotaped and students' physiological synchrony (PS) was determined from electrodermal activity measures. Three case groups (N=9) were chosen for deeper investigation. Temporal variation in the amount of monitoring and PS was analyzed. There seems to occur intense physiological synchrony during intense moments of monitoring which supports the view of shared monitoring processes. However, more research is needed to verify the meaning behind groups monitoring and synchronized bodily states.

Are variations in shared regulation equally beneficial for all collaborative learners' performance?

Liesje De Backer, Ghent University, Belgium; Hilde Van Keer, Ghent University, Belgium; Martin Valcke, Ghent University, Belgium

Abstract:
Socially shared metacognitive regulation (SSMR) occurs when multiple collaborative learners reciprocally operate on each other's regulative acts. The present study investigates whether qualitatively different types of SSMR can be distinguished and whether the latter have a differential impact on both collaborative learning groups' and individual group members' performance. The study was conducted in an authentic university setting and involved 64 freshmen collaborating in a face-to-face peer tutoring (PT) intervention. Units of SSMR (n=397) were identified adopting systematic observation of video data on students' regulation (70h). Both PT-groups' performance on weekly group assignments and individual PT-participants' final exam scores were integrated as performance measures. A two-step cluster analysis was adopted to identify quality variations in SSMR. Mann-Whitney U tests were conducted to verify the impact of qualitatively different types of SSMR on groups' and students' performance. Results revealed the presence of surface-level SSMR and in-depth SSMR. In-depth SSMR appeared moreover to be related to a significant higher performance at the group-level as compared to surface-level SSMR. No significant differences were revealed at the individual level.

Shared metacognitive regulation among high- and low-outcome groups in collaborative learning

Tuike Iiskala, University of Turku, Finland; Simone Volet, Murdoch University, Australia; Marja Vauras, University of Turku, Finland; Cheryl Jones, Murdoch University, Australia; Milo Koretsky, Oregon State University, United States; Erno Lehtinen, University of Turku, Finland

Abstract:
SSMR (socially shared metacognitive regulation) is known to be focused on different cognitive aspects during collaborative learning. Previous research (e.g. Khosa & Volet, 2014) has shown that high-performing group's SSMR takes place during high-level cognitive activity whereas low-performing group has more SSMR during low-level cognitive activity. Also, high-achieving groups' SSMR has been found to be focused more on understanding than on incidental issues (Iiskala et al., 2011). This paper investigates how the focus of SSMR is related to the small groups' learning outcome in different collaborative contexts. Two studies were conducted. Study 1 comprises one group with a low- and one with a high-quality outcome from the following research sites: high school (science) and universities (veterinary science and engineering).
SSMR's focus on low-and high-level cognitive activity during collaboration was analyzed. Study 2 comprises two low- and three high-outcome groups of 12-year-old students in science CSCL. The SSMR's focus on understanding, procedural, or incidental issues was analyzed. Findings from both studies revealed that high-outcome groups' SSMR focused more on high-level cognitive activity such as understanding opposed to low-outcome groups' SSMR. Opposite findings were found in university engineering. Tentative explanations for the findings are discussed.

CHAIR: Beat Rechsteiner, University of Zurich

Parallel Session I Time: 14:30 - 16:00 Location: LAB-F015

SYMPOSIUM: SELF-REGULATION AND PARENT CHILD BELIEFS IN EARLY CHILDHOOD

Early self-regulation is a key predictor for successful learning and adjustment to school. Ample evidence indicates that young children highly depend upon parents' and teachers' co-regulation to regulate internal states and behaviors. However, little is known about the role of children's and parents' beliefs in the development of early self-regulation. While some beliefs may be beneficial, such as high self-efficacy or a belief in attributes as malleable, others may be disadvantageous, such as overconfidence or a belief in attributes as fixed. Our symposium gives new insights into the development and interplay of self-regulation and beliefs in early childhood by building on cross-sectional and longitudinal research, taking into account the child and parent perspective, and combining different conceptual and methodological approaches for studying self-regulation and beliefs: Authors 1 examine the interplay of kindergarteners' beliefs about trait stability, goal orientation and behavioral self-regulation. Authors 2 investigate whether two types of feedback, performance feedback and metacognitive feedback, may be suitable to improve kindergartners' self-regulation strategies. Authors 3 explore the role of parental self-efficacy and parenting practices in two-year olds inhibitory control. Theoretical and practical implications can be derived to support children's self-regulation at an early stage.

Play it safe or play to learn: mindsets and behavioral self-regulation in kindergarten
Miriam Compagnoni, University of Zurich, Switzerland; Yves Karlen, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

Abstract:
Individuals hold different mindsets, encompassing beliefs about trait stability (stable vs. malleable) and goal orientation (performance vs. mastery). These mindsets create a meaning system that affects important predictors of school success, such as executive functions (EF) and self-regulation strategies (SRS). In this study, we examined the structure of mindsets in kindergarteners and the relations with EF and SRS by interviewing 147 kindergarteners (51% female) aged 5 to 7 years (M = 6.47, SD =.39). We used a multimethod approach with self-report and direct measures of behavioral self-regulation (EF and SRS), and a newly developed mindset scale. Exploratory and confirmatory factor analyses revealed that beliefs about trait stability and goal orientation represent two different but related mindsets. Hierarchical linear modeling indicated differential effects of beliefs about trait stability and goal orientation on EF and SRS: Children with a mastery (vs. performance) goal orientation showed better EF, whereas children with a belief in traits as malleable (vs. stable) showed better SRS. Structural equation modeling showed significant direct and indirect effects of mindsets on SRS, with EF as mediator. Findings suggest that mindsets are important in fostering behavioral self-regulation for successful adjustment to the demands of kindergarten.

Effects of Feedback on Kindergartners' Self-Monitoring and Self-Rewarding
Mariette van Loon, University of Bern, Switzerland; Claudia Roebers, University of Bern, Switzerland

Abstract:
Young children have problems accurately monitoring their performance; they are typically overconfident and not aware of errors. This is disadvantageous for their learning. The present study aimed to investigate whether two types of feedback, performance feedback and metacognitive feedback, may be suitable to improve kindergartners' monitoring accuracy and self-rewards. Kindergartners (n = 105, mean age 5.8 years) completed six analogical reasoning tasks, made monitoring judgments (indicating for each item whether they thought their response was correct or incorrect), and then gave themselves reward points for each completed task (indicating how many gold coins they deserved for their performance). Children were randomly assigned to performance feedback (PF), metacognitive feedback (MF), and no-feedback (NF) groups. Results show that kindergartners were overconfident, and did not recognize most of their errors. Importantly, feedback improved self-monitoring and self-reward judgments in comparison to the NF control group. The children who received PF or MF were better able to recognize their errors, and PF was most effective to improve kindergartners' self-rewarding. Findings indicate that feedback, and especially PF can improve monitoring accuracy, error detection, and realism of self-rewarding in the pre-school context.

Co- and Self-Regulation in Early Childhood – the Role of Parental Self-Efficacy Beliefs

Kim Gärtner, Heidelberg University, Germany; Verena Vetter, University Hospital Heidelberg, Centre for Child and Adolescent Medicine, Germany; Michaela Schäferling, University Hospital Heidelberg, Centre for Child and Adolescent Medicine, Germany; Gitta Reuner, University Hospital Heidelberg, Centre for Child and Adolescent Medicine, Germany; Silke Hertel, Heidelberg University, Germany

Abstract:
Parental self-efficacy represents a key correlate of parenting behaviors, and is associated with child outcomes. However, research on the interplay of parenting practices, parental self-efficacy and child's inhibitory control in early childhood is scarce. In this study we explore to what extent positive (PCR) and negative parenting practices (NCR) and parents' domain-specific (DSSE) and domain-general (DGSE) self-efficacy beliefs assessed at pretest (T1) predict toddler's inhibitory control six weeks later (T2). Furthermore, we examine whether parenting practices mediate the link between DSSE and parent-reported inhibitory control. Results are based on data from 90 parent-child dyads (children's age: 24 – 36 months).
Questionnaires and standardized behavioral tasks are applied to assess study variables. Data reveal that parents' NCR and DSSE significantly predict parent-reported inhibitory control at T2. The indirect effect from parents' DSSE on parent-reported inhibitory control via parenting practices is not confirmed by the data. No associations are observed regarding children's performance in a behavior-based inhibition task. The present study adds new and important evidence for a link between parental self-efficacy, parenting behaviors and (parent-reported) inhibitory control. Parenting interventions should thus not only address parenting practices but target parental self-efficacy beliefs as an important factor, too.

DISCUSSANT: Franziska Perels, Saarland University, Germany
CHAIR: Yves Karlen, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland
ORGANISERS: Miriam Compagnoni, University of Zurich, Switzerland; Kim Gärtner, Heidelberg University, Germany

Parallel Session II Time: 16:15 - 17:45 Location: LAB-F014

SINGLE PAPERS: HYPERMEDIA

Pre- & In-Service Teachers' Emotional and Motivational SRL Processes with Hypermedia-Based Learning
Michelle Taub, University of Central Florida, United States; Anila Asghar, McGill University, Canada; Vivek Venkatesh, Concor dia University, Canada; Roger Azevedo, University of Central Florida, United States; Ying-Syuan Huang, McGill University, Canada; Megan Price, North Carolina State University, United States; Wynnpauk Varela, Concordia University, Canada

Abstract:
The goal of this study was to compare how pre- and in-service teachers (n = 40) and non-education students (n = 40) used cognitive and metacognitive, affective, and motivational self-regulated learning strategies as they learned with MetaTutor, a hypermedia-based learning environment that teaches about the circulatory system. Results revealed no significant differences in the use of cognitive and metacognitive strategies between groups, however pre- and in-service teachers had significantly lower expressive suppression, performance-approach, and performance-avoidance scores than non-education students, revealing the important role emotions and motivation plays for teachers when engaging in self-regulated learning strategies. Implications for these results include developing teacher education programs that encourage teachers to foster these levels of emotions and motivation in their students during learning

Using Prospective Metacognitive Judgments to Predict Performance with Advanced Learning Technologies
Nicholas Mudrick, North Carolina State University, United States; Robert Sawyer, North Carolina State University, United States; Megan Price, North Carolina State University, United States; James Lester, North Carolina State University, United States

Abstract:
It is imperative for students to effectively judge the difficulty of learning materials to successfully self-regulate their learning with advanced learning technologies (ALTs). However, there exists a paucity of research examining how ease of learning (EOL) judgments can inform student performance during learning with advanced learning technologies. In this paper, we report on a study examining how students' EOL judgments can influence their multiple-choice performance and significantly predict their learning outcomes during learning with MetaTutorIVH (an intelligent virtual human-, multimedia-based learning environment). Specifically, we use machine learning techniques to identify how EOL judgments can significantly predict learning with an ALT. Our results provide important practical and design implications for incorporating these features in future learning environments as we consider scaling up to authentic learning contexts.

Supporting students' application of learning strategies
Tino Endres, University of Freiburg, Germany; Jasmin Leber, University of Freiburg, Germany; Alexander Renkl, University of Freiburg, Germany

Abstract:
To support students' application of their own learning strategies, we developed a computer-based online training for freshmen students in a developmental psychology course. This environment consists of two modules: 1) teaching declarative knowledge about learning strategies and 2) supporting students to apply these learning strategies when working for the university course. We conducted several experimental studies to optimize this learning environment with respect to how the declarative & meta-knowledge about learning strategies can be effectively consolidated and how the formation of prompts for applying the learning strategies can be sensibly supported. For consolidating students' knowledge about learning strategies, a retrieval practice-based arrangement is best that uses different types of test questions for learners with different levels of prior meta-knowledge. This meta-knowledge is automatically assessed in the learning environment. We found that it is important to support students to apply their recently learned strategies. We found two effective ways: the established way to provide them with instructional prompts or to support them in formulating Implementation Intentions on their own.

CHAIR: Sandra Degen, University of Zurich

Parallel Session II Time: 16:15 - 17:45 Location: LAB-F015

SINGLE PAPERS: METACOGNITIVE MONITORING ACCURACY

Monitoring and regulating learning from text: Steering learners towards diagnostic cues

Anique de Bruin, Maastricht University, Netherlands; Janneke van de Pol, Utrecht University, Netherlands; Mariette van Loon, University of Bern, Switzerland; Tamara Van Gog, Utrecht University, Netherlands

Abstract:
Students' monitoring and regulation of their learning from expository text is poor, which hinders academic achievement. The root of this problem lies in students' reliance on superficial information ('cues') when monitoring and regulating their learning, instead of cues that are truly diagnostic of their understanding, such as whether they can explain the causal relations in a text. Interventions to use more diagnostic cues (e.g., completing a causal diagram about the information in the text) have been shown to enhance monitoring and regulation to some extent, but leave room for improvement. Here, we examine the effect of an intervention adding to the diagram completion intervention that required secondary education students to identify the number of correct relations in their diagrams in order to steer use of diagnostic cues improving monitoring and regulation. Students read 6 causal relations texts, completed 6 causal diagrams, estimated how many relations were correct per diagram, monitored understanding of the texts, regulated further text study (chose which texts to restudy), and took a test of the texts. We expect that students who estimated how many relations were correct showed higher monitoring and regulation accuracy. Data collection is completed and analyses will be finished before the conference.

Debunking misconceptions – Inducing corrections, raising awareness, or fruitless exercise?

Stephanie Pieschl, University of Newcastle, Australia; Jennifer Archer, The University of Newcastle, Australia; Janene Budd, University of Newcastle, Australia

Abstract:
If teachers harbor misconceptions about educational psychology content, their teaching might suffer. Therefore, the effectiveness of an awareness raising intervention about misconceptions is investigated in an educational psychology course for student teachers (N = 100). In a 2x2 within-subject design, misconceptions are measured at the start and the end of the semester (factor: T1 vs. T2) regarding course content and educational psychology content not addressed in the course (factor: included vs. control). To capture misconceptions, participants are confronted with 20 pairs of correct and (fictitious) incorrect research reports extracts. They have to decide which one is true and make metacognitive confidence and knowledge judgments. The correct versions of research reports are disclosed after each data collection and at T1 the nature of lay theories, misconceptions, and confirmation bias are discussed. This intervention should result in more accurate metacognitive judgments (awareness) and fewer misconceptions (correction) at T2 than T1 in the included condition. Data will be collected from March-July 2018. The results will have research implications for misconceptions and metacognitive judgments and practical implications for psychology teaching.

CHAIR: Esther Kaufmann, University of Zurich

Parallel Session II Time: 16:15 - 17:45 Location: LAB-F040

SINGLE PAPERS: YOUNG CHILDREN

Do 7- to 10-year olds use retrieval fluency as a cue for their monitoring?

Claudia Roebers, University of Bern, Switzerland; Natalie Bayard-Guggisberg, University of Bern, Switzerland; Martina Steiner, University of Bern, Switzerland; Mariette van Loon, University of Bern, Switzerland

Abstract:
Cue utilization is currently being discussed as a driving force for children`s improvement in monitoring and monitoring accuracy. However, only very limited evidence exists and only very few cues have been researched in primary school children. The to-be-presented longitudinal study including over 290 7- to 10-year-old children investigated the emergence of cue use in this age range, with a special focus on retrieval fluency as a cue for monitoring that has been shown to be influential for adults` monitoring. Retrieval fluency was operationalized by recorded choice latencies in a 4-choice recognition test in a paired-associated learning task. These response time measures were then linked to the confidence ratings that children gave retrospectively in a 7-point scale. Results revealed relatively well developed monitoring skills in terms of monitoring discrimination, independent of age. Furthermore, there was the expected inverse relationship between choice latencies in the recognition test and confidence judgments (faster recognition was associated with higher confidence, regardless of correctness of the answer); but this association was stronger and more consistent in the older compared to the younger children, for whom this link only emerged at the second measurement point. Findings will be discussed against the background of the cue utilization framework.

Interrelations between executive function, metacognition and effortful control in preschool children

Sonja Kälin, University of Bern, Switzerland; Nike Tsalas, University of Bern, Switzerland; Claudia M. Roebers, University of Bern, Switzerland

Abstract:
The three constructs executive function (EF), metacognition (MC) and temperamental effortful control (EC) have been linked to children's self-regulation. Despite similarities and overlaps on a theoretical and conceptual level, the three constructs have rarely been investigated together. Using a latent variable approach, the present study aims to examine the interrelations between multiple measures of EF, MC and EC. A total of 150 children at the age of 4-6 years were assessed in terms of EF, MC and EC using an extensive test battery. Preliminary analyses suggest a closer link between EC and the EF measures of working memory and shifting than between EC and inhibition. Metacognitive control was positively correlated with EC and inhibition. Based on the theoretical similarities, different models of an overarching concept will be tested against each other to broaden our understanding about the underlying commonalities and differences of the three constructs.

Cultural differences in the self-regulatory and productive function of children's behaviours

Pablo Torres, University College London, United Kingdom; David Whitebread, University of Cambridge, United Kingdom; Ros McLellan, Cambridge University, United Kingdom

Abstract:
This study researched the relevance of culture for self-regulatory behaviours in 8 to 9 year-olds from Chile and England (n=49; Myrs=9.07; SDyrs=0.34). Children's planning, goal-checking, monitoring actions, awareness of errors, effective control of problems, learning from errors, evaluation, cognitive strategies, and persistence were studied. Each participant carried out 11-13 cube assembly tasks (300+ per country). Children behaviours and task achievement were rated using observational scales from the SBOS-II (Krippendorff alphas=0.70–0.91, inter-rater reliability). Factor Analysis and Multiple Regressions were conducted. Results evidenced important links between culture and behaviour functionality. Specifically, evaluation actions did not load as part of any self-regulation factor in Chile; goal-checking actions had non-strategic function only in Chile; and children's behaviours explained much more variance of a 'strategic approach' factor in England than in Chile (44% v. 17%). Furthermore, monitoring, evaluation and persistence accounted for the effects of effective control of problems on task achievement only in England. Considering the previously documented high emphasis on monitoring and strategy for learning in English relative to Chilean classrooms, results suggest children's behaviours are likely to gain their self-regulatory and productive functionality from culture-specific education practices.

CHAIR: Beat Rechsteiner, University of Zurich

Parallel Session II Time: 16:15 - 17:45 Location: LAB-F017

SYMPOSIUM: EFFECTS OF INDIVIDUAL FEEDBACK ON SELF-REGULATED LEARNING – ENHANCING INTERVENTIONS AND OUTCOMES

Self-regulated learning (SRL) is crucial for desirable learning outcomes in both school (Dignath & Büttner, 2008) and university (Richardson, Abraham, & Bond, 2012). In this symposium, we investigate whether SRL can be enhanced by different feedback approaches—including both human and automatized computer feedback on either questionnaires or learning diaries. Charlotte Dignath will present a meta-analysis on the effectiveness of learning diaries on learning-related variables. While the overall effect of learning diaries on achievement was only moderate, teacher feedback moderated this effect substantially. In her presentation, Maria Theobald investigates effects of an intensive use of longitudinal learning diaries. Study 1 showed positive effects of time- and effort-management strategies on daily learning satisfaction, study 2 additionally applies daily individual feedback as an intervention. Henrik Bellhäuser examines the enrolment in a voluntary web-based training on self-regulation strategies. While study 1 found that participation could be predicted by SRL competency and expectancies, study 2 experimentally tries to increase participation rates through the usage of individual feedback on an SRL questionnaire.

Does the Learning Diary Live up to Its Promise? A Meta Analysis on the Effectiveness of Diaries
Charlotte Dignath, Goethe-University Frankfurt, Germany; Sabine Fabriz, Goethe-University Frankfurt, Germany; Franziska Perels, Saarland University, Germany

Abstract:
The aim of the study was to examine the effectiveness of learning journals on learning-related variables (academic achievement, self-regulated learning, and motivation). The results of the overall meta-analysis, integrating 30 independent effect sizes with 4,478 participants from 18 studies, indicate that keeping a learning journal has only a moderate overall effect (d = .40). Three separate meta-analyses for each of the outcome variables revealed a medium effect on academic achievement (d =.47), and only low effects on motivation (d = .32) and self-regulated learning (d = .33). A range of included moderator variables were tested; however, teacher feedback was the only moderator found to influence the effectiveness of learning journals. This yields theoretical and methodological implications for research on the effects of learning journals as one specific tool to foster self-regulated learning in the scope of formative assessment.

Seizing the Opportunity for Self-Regulated Learning—Who Attends a Voluntary Web-Based Training?
Henrik Bellhäuser, Johannes Gutenberg-University Mainz, Germany; Maria Theobald, Johannes Gutenberg-Universität Mainz, Germany; Margarete Imhof, Johannes Gutenberg University, Germany

Abstract:
Trainings of self-regulated learning (SRL) have been shown to be effective interventions to improve performance. When large groups of students are targeted, a web-based training (WBT) is feasible. However, when participation in the WBT is voluntary, the training attendance already itself represents a self-regulatory challenge. We investigated questionnaires on SRL, motivation, and personality as predictors of training attendance. A sample of N=358 students (Biology, Chemistry, and Teacher Training) was randomly assigned to a treatment group with access to the WBT or a control group without access. Within the treatment group, 36% of participants enrolled in the WBT and 14% completed at least four of the six lessons. In a linear regression model, the number of completed lessons was predicted by higher conscientiousness, lower self-reported SRL competency, and higher positive expectations towards the WBT. When comparing participants that completed the WBT (n=26) with a subsample from the control group (selected to be equivalent in multiple pretest variables), we found beneficial effects of the WBT on SRL and performance. A follow-up study will investigate whether attendance rate can be improved through individual feedback on the SRL questionnaire.

A longitudinal study on daily self-regulated learning of University students

Maria Theobald, Johannes Gutenberg-University Mainz, Germany; Henrik Bellhäuser, Johannes Gutenberg-University Mainz, Germany; Patrick Liborius, Justus-Liebig-Universität Gießen, Germany

Abstract:
University students are required to self-organize their learning. However, which factors contribute to a higher satisfaction with the study day in the eyes of a student? The role of self-regulated learning strategies (SRL) on satisfaction are investigated by means of an intensive, longitudinal design using daily learning diaries over the course of a whole semester (n=105; 154 days). Results from a hierarchical linear model (days clustered in subjects) showed that effective time- and effort-management strategies predicted satisfaction on a daily basis. In a follow-up study, we investigate if providing daily individual feedback on learning diaries can foster daily SRL and satisfaction.

DISCUSSANT: Ernesto Panadero, Universidad Autónoma de Madrid, Spain
CHAIR: Henrik Bellhäuser, Germany
ORGANISER: Charlotte Dignath, Goethe-University Frankfurt, Germany

Poster Session with Opening Reception Time: 18:00 - 19:00 Location: LAA, floors H & J

POSTER PRESENTATION

Metacognitive reasoning and illusion of linearity (1)

Vanja Putarek, University of Zagreb, Faculty of Humanities and Socal Sciences, Croatia; Vesna Vlahovic-Stetic, Faculty of Humanities and Social Sciences, University of Zagreb, Croatia

Abstract:
According to the dual process theories, there are two ways of information processing, Type 1 (engages minimal working memory) and Type 2 (requires cognitive effort). Type 2 processing can modify or accept the response generated by Type 1 and this intervention depends on metacognition. The manifestation of Type 1 processing in the mathematical context is the illusion of linearity (i.e., a tendency to comprehend sizes as linearly related). The approaches that are focused on the improvement of students' mathematical knowledge (conceptual and procedural) are comparing method and productive fallacy, but their effectiveness in the reducing the illusion of linearity has not been examined. Therefore, in this research we examined whether students' metacognitive feelings and accuracy in solving the linear and non-linear tasks would differ, depending on the instructions, which emphasized the conceptual or procedural knowledge or problem-based learning. The participants were 113 high school students from Zagreb, Croatia. The instructions and 20 tasks were presented on the computer. The obtained results showed that students were inclined to give linear responses on non-linear tasks. Non-linear tasks were less familiar and have lower clarity than linear tasks. There were no differences in accuracy on linear and non-linear tasks, depending on the instructions.

A Cognitive Validity Study of the Motivated Strategies for Learning Questionnaire (2)

Daniel Dinsmore, University of North Florida, United States; Meghan Parkinson, University of North Florida, United States; Brian Zoellner, University of North Florida, United States

Abstract:
Retrospective self-report instruments for cognitive and metacognitive processing have been in use for quite some time, however, the cognitive validity (i.e., the basis upon which participants judge their responses to items) of these measures has not been tested. This investigation explores cognitive validity of these items along three aspects of cognitive and metacognitive processing – quantity, quality, and conditional use. 21 undergraduate students (with additional participants in Spring 2018) read a text, responded to items from the Motivated Strategies for Learning Questionnaire, responded to open-ended questions asking why they marked a particular item as they did, and answered outcome questions about the passage. Open-ended responses were then coded based on which aspects of processing were evident in their answer.
Results indicated that quantity was the most frequent aspect of processing mentioned, with quality being very infrequently mentioned. As quality of processing is a critical indicator of positive academic performance, evidence from this cognitive validity investigation suggest that measures such as the MSLQ might need to be reframed to better capture other aspects of cognitive and metacognitive processing, or at the very least the limitations of these measures should be acknowledged.

Exploring small-scale adaptation in socially shared regulation of learning (3)

Márta Sobocinski, University of Oulu, Finland; Jonna Malmberg, University of Oulu, Finland; Sanna Järvelä, University of Oulu, Finland

Abstract:
Adaptation is a key process in socially shared regulation of learning in order to change group learning activity. The aim of this study is to explore how small-scale adaptation happens during collaboration. Video and heart rate data has been collected from four groups of three students (aged 16-17) who worked together collaboratively during six advanced physics lessons. Video data were coded for instances of shared monitoring. The reaction to the monitoring was coded, and the moments when adaptation occurred were marked. Heart rate data was processed and periods of physiological synchrony were integrated with the video data coding. Descriptive statistics of the monitoring and adaptation events are provided, along with a description of when physiological synchrony occurs during the collaborative learning process in relation to adaptation. The results show that monitoring behavior and cognition during task enactment phase is the most common during the collaboration. Adaptation was recognized to occur to varying degrees between different groups and sessions and, finally, sequential analysis showed that adaptation was followed by physiological synchrony.

Prospective and retrospective control in elementary school children: A longitudinal study (4)

Natalie Bayard-Guggisberg, University of Bern, Switzerland; Martina Steiner, University of Bern, Switzerland; Mariette van Loon, University of Bern, Switzerland; Claudia Roebers, University of Bern, Switzerland

Abstract:
In elementary school children are more and more required to self-regulate their learning, and in order to do so effectively, they have to be able to recognize their errors and correct these to ensure effective learning and good performance. This longitudinal study examined different measures of metacognitive control in elementary school children, and addressed whether children are able to recognize their errors, and control learning (restudy selections and withdrawal of responses). Two age groups (2nd and 4th graders) were tested twice with six months delay. They learned the meaning of Japanese characters, and afterwards they could select items for restudy. After they took a recognition test. At the end the children had the possibility to control their own learning. On the basis of traffic lights, they could press the green traffic light to maintain their answer or the red traffic light to withdraw their answer. Findings show that both age groups were able to control their learning. However the probability inadequate prospective control decisions was still rather high and no progression over time was found for prospective control. On the contrary children made more adequate retrospective control decisions and there was a development over time in both age groups.

The Role of Metacognition in Low vs High Road Transfer of Complex Problem Solving Skills (5)

Ashley Johnson, University of Luxembourg, Luxembourg; Björn Nicolay, University of Luxembourg, Faculty of Language and Literature, Humanities, Arts and Educational Sciences (FLSHASE), Luxembourg; Florian Krieger, University of Luxembourg, Luxembourg; Samuel Greiff, University of Luxembourg, Luxembourg

Abstract:
Preparing students for life outside the classroom has been of utmost importance in education for centuries, yet skills learned in the classroom may be outdated by the time they enter the workforce. The transfer of skills learned has mostly been done by means of a pure repetition of skills (via low road transfer), but also another methods exists, through an adaptation of the skills into new situations (i.e. high road transfer), which is a more desirable result as it involves higher order thinking. In order to successfully facilitate this high road transfer, several studies have indicated that metacognitive awareness plays a crucial role. Hence, we propose a training scheme in the area of complex problem solving (CPS) that will utilise both low and high road transfer in order to promote the far transfer of complex problem solving skills via increased metacognition. We expect to find that high road transfer will indeed facilitate metacognitive awareness better than low road transfer and further promote far transfer of CPS skills. This training will help to better understand what training techniques can help maximise transfer in both CPS and related fields as well as preparedness for novel problems and situations.

Four- and six-year-old children's deployment of metacognition in multimodal number tasks (6)
Ana Clara Ventura, Universidad Nacional del Comahue and CONICET, Argentina; Flavia Irene Santamaria, Universidad Nacional del Comahue: sede Centro Regional Universitario Bariloche. Instituto de Formación Docente Continua de Bariloche, Argentina; Nora Scheuer, Universidad Nacional del Comahue and CONICET, Argentina

Abstract:
Previous studies indicate that numerical metacognition may emerge before number conventions and principles are fully mastered. Here we intend to contribute to this line of research, with the following aims: 1. To capture the arc of metacognitive processes deployed by children in early educational stages as they solve number tasks. 2. To analyse the influence of task features, numerical accuracy of children's proposed solutions, and children's educational level. Forty children attending K4 and Y1 were individually interviewed, based on a semi-structured script of open questions. Tasks required children to represent number forms, definite quantities and indefinite quantities of different magnitudes in various semiotic modes, in relation to a variety of referents and of cognitive-communicational demands. A repertoire of number-related metacognitive processes was constructed. Its main dimensions are Communication and Regulation. Results suggest that children's deployment of metacognition may be better understood in terms of fluid and situated sense-making than in terms of linear developmental trends, magnitude or modal constraints. Counting with a fine-grained repertoire of numerical metacognitive processes that integrates dimensions pertaining to communication and regulation might be a useful tool for researchers and teachers to capture children's developing metacognitive processes in the dynamics of situated numerical thinking.

Metacognitions meets Self-Concept: A Common Factor Of Self-Evaluation in First Grade Children? (7)
Laura Claude Dapp, Institute of Psychology, Switzerland

Abstract:
Metacognitive monitoring and self-concept reflect an individuals' knowledge, perceptions, and evaluations of his or her own abilities. While adults can assess their abilities relatively accurately, children tend to make strongly overconfident metacognitive judgements and have also strongly positively biased self-concepts. The common overestimation in metacognitive monitoring and in self-concept may reflect a more general mechanism in children's self-perception that may help better understanding cognitive development. Thus, the present study aimed to explore the relation between the accuracy in monitoring and the accuracy in self-concept in 155 first graders. The results confirmed the expected relation between metacognitive accuracy and self-concept accuracy. Indicating a shared mechanism in children's overconfident self-perception, the present findings open up to a wide variety of future research.

The Role of Feedback in Promoting Self-regulated Digital Learning (SRDL) (8)

Hsiu-Ling Chen, National Taiwan University of Science & Technology, Taiwan; Miao-Hsuan Yen, National Taiwan Normal University, Taiwan; Sufen Chen, National Taiwan University of Science and Technology, Taiwan; Chia-Yu Wang, National Chiao Tung University, Taiwan; Ying-Shao Hsu, National Taiwan Normal University, Taiwan; Tzu-Chien Liu, National Taiwan Normal University, Taiwan

Abstract:
This article discusses how SRL is promoted by giving feedback to peers and how adaptive feedback is provided by teachers and machines in the digital learning environment. The content of over 300 SRL-related articles from major journals (i.e., Journal of Computer Assisted Learning, Computers & Education, Educational Technology & Society, British Journal of Educational Technology, Educational Technology Research and Development, and Computers in Human Behavior) in digital learning was analyzed. A framework for self-regulated digital learning with feedback being the vital component was thus constructed through repeated panel discussions. Feedback, herein, is designed according to each individual student's learning plan and performance to suit the purpose of autonomous learning and promoting SRL capability. Consequently, this article concerns the role of feedback when it comes to promoting self-regulated digital learning (SRDL) as well as ways to combine new technology with adaptive learning.

Effects of age and question format on children's monitoring and regulation of text comprehension (9)

Martina Steiner, University of Bern, Switzerland; Natalie Bayard-Guggisberg, University of Bern, Switzerland; Mariette van Loon, University of Bern, Switzerland; Claudia Roebers, University of Bern, Switzerland

Abstract:
Monitoring and regulation of text comprehension is important in daily school life and improves over the elementary school years. The longitudinal and cross-sectional design of the present study with two measurement points and two age groups allowed a detailed investigation of developmental effects on metacognitive accuracy. Additionally, the study examined effects of question format on metacognition of text comprehension. Second and 4th graders read texts, answered open-ended and true-false questions, gave Confidence Judgments (CJs) and regulated their performance with a maintaining/withdrawal of answers procedure. Children from both age groups showed adequate monitoring skills. They discriminated between correct and incorrect answers, as indicated by lower CJs for incorrect answers compared to correct answers. They also maintained less incorrect answers than correct answers, demonstrating adequate regulation of performance. Importantly, when it comes to monitoring and regulation of incorrect answers, both age groups showed more accurate metacognition at T2 compared to T1. Additionally, 4th graders showed higher metacognitive accuracy than 2nd graders for open-ended questions, but not for true-false questions. Findings indicate an age related improvement of metacognitive skills, however, only when monitoring and regulating answers to open-ended questions.

Monitoring as an overlap of executive functioning and procedural metacognition in 10 to 14 year olds (10)

Qendresa Thaqi, University of Bern, Switzerland; Claudia Roebers, University of Bern, Switzerland

Abstract:
Executive functions (EF) and metacognition (MC) are conceptualized as higher-order cognitive processes that belong to children's self-regulating behavior and mental processing. Traditionally, monitoring has been investigated primarily in the context of procedural metacognition (Nelson & Narens, 1994), but what about monitoring in EF? Post-error slowing (PES), that is, slowing down after realizing making an error, presents an empirical regularity that has rarely been used as a measurement of error detection in EF (Lyons & Zelazo, 2011), especially in children. It is considered as the behavioral correlate of the brain's processing of errors, in EEG studies operationalized as N300. The current study aims to investigate the association between both monitoring processes in late childhood and early adolescence. The current study includes 30 children of three different age groups (10-, 12-, 14-year olds). PES was assessed in two classical inhibition EF tasks (Simon task, Stroop task) and metacognitive monitoring was measured with confidence judgments within a paired associate learning task. Our results will shed light on developmental similarities and differences such as the (in)dependence of the two higher-order processes in the age groups under study. Similarities and differences with respect to their links to performance and to age related changes will be discussed.

Sad but true: Negative affect leads to more accurate metacomprehension than positive affect (11)

Anja Prinz, University of Freiburg, Germany; Viktoria Bergmann, University of Freiburg, Germany; Joerg Wittwer, University of Freiburg, Germany

Abstract:
To effectively learn from reading, it is important that learners accurately monitor and judge their own text comprehension, which is known as metacomprehension accuracy. However, learners' metacomprehension is often inaccurate. According to the cue-utilization framework (Griffin, Jee, & Wiley, 2009), this inaccuracy occurs because learners frequently use inappropriate cues to judge their comprehension. We investigated to what extent learners use their affective state as such a cue. To do so, we conducted an experiment with N = 41 university students in which we induced positive and negative affect and examined metacomprehension accuracy before (prediction) and after (postdiction) completing comprehension questions. Concerning prediction accuracy, the results showed that positive affect resulted in more overconfident judgments, whereas negative affect produced more accurate and underconfident judgments. This finding indicates that, when predicting their text comprehension, positive affect serves as a salient cue for learners, resulting in overly confident judgments. Concerning postdiction accuracy, independent of their affective state, learners rather produced accurate and underconfident judgments. Hence, practice tests seem to be an effective instructional method to counteract the detrimental impact of positive affect and, thus, to promote learners in accurately judging their text comprehension.

Metacognitive Knowledge: Effects on Navigation and Performance in Hypertext Reading (12)

Liene Pucite, Goethe-University Frankfurt, Germany; Johannes Naumann, Goethe-University Frankfurt, Germany

Abstract:
Hypertexts, which are organized in a non-linear manner, require readers not only to process the information but also to navigate in terms of selecting nodes according to their learning goals. This can be challenging for readers. However, metacognition is considered to support these processes. Using PISA 2009 (N = 32324) data, we analyzed the role of declarative metacognitive knowledge in hypertext reading. The results showed that metacognitive knowledge explained performance in hypertext reading above and beyond reading comprehension and that navigation behavior mediated the relation between metacognitive knowledge and performance in hypertext reading. Moreover, we found a direct effect of metacognitive knowledge on hypertext reading.

How to study smart - students' knowledge and application of learning strategies (13)

Felicitas Biwer, Maastricht University, FHML, Dept. of Educational Research and Development, Netherlands; Anique de Bruin, Maastricht University, Netherlands; Pauline Aalten, Maastricht University, Netherlands; Mirjam Oude-Egbrink, Maastricht University, Netherlands

Abstract:
Self-study skills are crucial for academic achievement in higher education. Entering university, students are expected to self-regulate their learning and apply learning strategies during self-study. Due to a lack of formal training, students develop learning strategies by themselves and often engage in rather ineffective strategies. The aim of the present study is to determine whether students' competences about effective learning strategies can be enhanced by a formal training and to examine the mediators and barriers of applying effective learning strategies during self-study. First- and second year university students will be randomly assigned to either a training condition or a control condition. Participants of the training condition will attend three training sessions and fill out a weekly learning strategy survey. Participants of the control condition will fill out the weekly learning strategy survey only. Pre-post and process measures of SRL are used to evaluate the training effects. The reasons, barriers, and mediators for applying effective learning strategies will be examined via focus group interviews. The training is expected to improve students' metacognitive knowledge about effective learning strategies. Furthermore, we expect to gain insights into the barriers and mediators of applying learning strategies during self-study and the discrepancy between knowledge and practice.

Learning strategies of regular primary and special-needs students (14)

Ricarda Isaak, Bielefeld University, Germany; Joachim Wirth, Ruhr-University Bochum, Germany; Matthias Wilde, Universität Bielefeld, Germany

Abstract:
Learning strategies are powerful learning tools. Some studies show that even primary school students use learning strategies. However, there is hardly any study investigating special-needs students' use of learning strategies in primary schools. Thus, in a first step, we were interested whether special-needs students use learning strategies and whether they differ from regular primary school students. Therefore, we conducted a study with 106 second, third, and fourth grade students (Mage=8.83; SD=1.25; 72% male). Forty-five were primary school students and 61 were special-needs students with focus on emotional and behavioral disorders (EBD). We measured learning strategy use with a questionnaire based on validated tests, i.e. the questionnaire "How do you learn?"(Souvignier & Gold, 2004) and the Kiel Learning Strategies Inventory (Baumert, Heyn & Köller, 1992). Results revealed significant differences in elaboration, effort management, monitoring and regulation in favor of students with EBD. Future research is needed to investigate whether special-needs students profit from their learning strategy use.

Effect Of Overt Practice on 6th Graders Metacognitive Monitoring Accuracy in the Classroom Context (15)

Julyet Koronel, Bahcesehir University, Turkey; seda saraç, Bahcesehir University, Turkey

Abstract:
The aim of this study was to investigate how overt metacognitive monitoring practice would change 6th graders (11-12 year-olds) postdiction accuracy as measured locally, globally and in terms of bias. Additionally we wanted to investigate whether monitoring accuracy and the effects of repeated practice vary with performance, self regulated learning level and attitudes towards Maths. All the 6th graders from an urban school (N= 154) participated in the study. We are still in the process of data collection. 7 consecutive tests will give the students the chance to practice making monitoring judgements repeatedly. To date, the students took 5 tests. In each test, the students were required to answer the questions from the content covered so far in the course and also made local (for each test item) and global monitoring judgements (for all the test items). Till the end of the semester, the students will take another 2 tests as well as a comprehensive final exam.
Students' self-regulated learning and attitudes towards Maths will also be assessed. For each student, absolute monitoring accuracy and judgement bias will be calculated and a series of Repeated ANCOVAs will be conducted to investigate the research questions mentioned above.

Development and Validation of A Scale on Self-regulation in Science Learning (16)

Shu-Sheng Lin, Graduate Institute of Mathematics and Science Education, National Chiayi University, Taiwan; Jia-Hua Sie, Department of Education, National Chiayi University, Taiwan; Jia-An Chen, Department of Education, National Chiayi University, Taiwan

Abstract:
Self-regulation is the ability that one person actively regulates and monitors his own behavior and thoughts. It can be applied to science learning for a student to perceive and control his learning process. The purpose of this study was to develop and validate a Chinese version Scale on Self-Regulation in Science Learning (SSRSL) for elementary school students. The validity and reliability studies of the scale were examined on responses of 205 elementary students. It showed that principal component analysis of SSRSL yielded a four-factor structure: awareness, planning, monitoring, and reflection. The scale has 16 five-point Likert-type items. The factor loadings are ranging from 0.81 to 0.57. Internal consistency (Cronbach's alpha) for the overall SSRSL is 0.92, with the subscales ranging from 0.80 to 0.90. The whole items could explain 66.84% of the variance. SSRSL can be considered a reliable and valid instrument for the measurement of self-regulation in science learning for elementary school students. Keywords: Science learning, Self-regulation, Elementary school students

The role of monitoring and control decisions in superficial and deep comprehension of texts (17)
Marta Minguela, University of Barcelona, Spain

Abstract:
Learning, it is believed, requires active and conscious regulation, through learners monitoring their own learning and making control decisions accordingly. However, the empirical support for some of these assumptions comes mainly from the field of metamemory, but is scarce when deep comprehension is required. The aim of this study is to test the link between monitoring and control decisions in skilled and less-skilled readers, and to explore the differential impact of these variables in superficial and deep comprehension questions. The monitoring, control decisions and reading comprehension of 53 secondary school students were examined. Participants read an expository text, answered superficial and deep comprehension questions and made confidence judgments about them. Afterwards, they could decide whether they needed to reread the text to improve any of their answers. The confidence judgments were taken as a monitoring measure, and the students' choices to reread the text (or not) were taken as the control decision measure. Results show that control decisions were related to the previous judgments only in skilled readers, and that these decisions were better for superficial questions than for deep comprehension questions in both kinds of readers. Furthermore, these variables contributed to performance only when deep comprehension was required.

The Hemingway effect: The closer to finishing a task, the higher the motivation to finish it (18)
Yoshinori Oyama, Chiba University, Japan; Emmanuel Manalo, Kyoto University, Japan; Yoshihide Nakatani, RCS Advertising, Japan

Abstract:
This study examined evidence for the Hemingway effect (i.e., motivation to complete an incomplete task would be higher when one is closer to finishing it), which is based on the metacognitive processes of self-observation, self-judgment, and self-reaction. In Study 1, 260 undergraduate students were asked to copy newspaper text, but they were interrupted in the process so that the majority failed to complete. When their reported motivation to re-engage in the task to complete or continue it was analysed, the results revealed that those who had fewer remaining text to copy were significantly higher in such motivation compared to those with more text remaining or even those who were able to finish the task – thus, confirming the occurrence of the Hemingway effect. In Study 2, 131 students were administered a short writing task that was either structured or unstructured. Again, they were interrupted so that the majority could not finish. The results revealed that only the participants given the structured task evidenced the Hemingway effect. This finding suggests that a necessary condition for the effect to manifest is being able to anticipate what more needs to be done to complete an unfinished task (which the presence of structure facilitated).

Response confidence and study medium: Does touch-based interaction affect metacognitive accuracy? (19)
Franz Wortha, Eberhard Karls University Tübingen, Germany; Birgit Brucker, Leibniz-Institut für Wissensmedien (IWM), Germany; Peter Gerjets, Leibniz-Institut für Wissensmedien (IWM), Germany

Abstract:
Accurate metacognitive judgments are essential for learning, particularly when learning with multimedia-learning environments. While studies have shown that touch-based interactions have significant impact on learning and related processes, the interplay between touch interactions and metacognitive processes has not been considered. The present study aims to address this research gap by investigating the relation between metacognitive accuracy and touch interactions while learning about arts with a hypermedia learning environment. 200 undergraduate students will participate in an experimental study comparing metacognitive accuracy between touch- and mouse-based interaction. We expect differential effects of touch-based interaction depending on the question type (text vs. pictorial questions).

Investigating 7th graders' collaborative tutoring process based on metacognition in a science center (20)
Gamze Türkmen, Middle East Technical University, Turkey; Zahide Yıldırım, Middle East Technical University, Turkey

Abstract:
The purpose of this pilot study was to investigate 7th graders' collaborative tutoring process in an interactive learning environment for force and energy unit. The qualitative data was collected under three phases. First phase, school to science center visit, included 39 students with a separate two groups and pre-defined sequence of instruction are held in the scheduled lesson time durations. Second phase, collaborative activity, consisted of 16 students who are assigned to a group of two students with pre-designed activities and third phase, video editing, these 16 students were given own eye-tracking videos generated during the second phase for editing purposes. In the oral presentation, qualitative analysis of the video data for each phase of the educational process will be elaborated based on metacognitive aspects of learning.

Ace Your Self-study: Using A Mobile Device App to Support Self-regulated Learning (21)
Martine Baars, Erasmus University Rotterdam, Netherlands; Fred Paas, Department of Psychology, Education and Child Studies, Erasmus University Rotterdam, Netherlands

Abstract:
Without instructional support, students overestimate their understanding and memory of learning materials, which can have detrimental effects on the learning process. However, most students do not get instruction about how to study and students are largely unaware of learning strategies to help them to study effectively. Research has shown that prompting both cognitive and metacognitive strategies is effective to support self-regulated learning (SRL). In the current study a mobile application, the study app, was used to prompt both cognitive and metacognitive strategies in order to support student's SRL activities while learning. It was expected that participants in the study app condition would be more motivated, show higher satisfaction ratings and higher learning outcomes than participants in a condition with website support, who were expected to score higher on these measure than participants in the control condition (study app > website support > no support). Results will be available well before the conference.

What? Where? When? How much? The search for help when writing a school-leaving certificate paper (22)
Francesca Suter, University of Zurich, Switzerland; Carmen Hirt, University of Zurich, Switzerland; Yves Karlen, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland; Katharina Maag Merki, University of Zurich, Switzerland

Abstract:
In this study, we examine in which subject areas pupils seek whose help during the writing of a school-leaving certificate paper on upper secondary level. In addition, we investigate to what extent this search for help changes throughout the writing process. Over the course of one year N = 781 students (MAge=17.4 years, 59.9 % female) were asked about their search for help in three out of five questionnaires. Plus, some of the pupils (N = 217, 61% female) documented their entire work and learning process in a learning diary. Based on theoretical criteria, a subsample of approximately N = 15 learning diaries will be analysed according to Kuckartz's (2012) content analysis. Quantitative data shows that seeking help from the family increases throughout the writing process. The family's help is particularly required when it comes to motivation or getting over a crisis. In contrast, the supervisor's help is primarily needed when it comes to thematic issue and diminishes over time. The upcoming content-analytical evaluation of the learning diaries shall validate these results and allows gaining deeper insights into the process of help-seeking. The findings will be discussed with regard to the optimisation of school support processes.

Parallel Session III Time: 09:00 - 10:30 Location: LAB-F014

SINGLE PAPERS: TEACHERS' METACOGNITION

The relation between pre-service teachers' epistemic cognition, metacognition, and performance
Daniel Dinsmore, University of North Florida, United States; Jaclyn Glosson, University of North Florida, United States

Abstract:
Contemporary research is beginning to look at the complex interrelations of epistemic, metacognitive, and cognitive factors in individuals' performance. However, these interrelations have not been investigated with pre-service teacher populations. This study investigates the complex relations between pre-service teachers beliefs about teaching (i.e., innate versus learned), their metacognitive activity (i.e., calibration), and their performance. 47 pre-service teachers from the southeastern United States were surveyed with regard to their beliefs about teaching ability using the Teaching Ability Beliefs Scale, their confidence in providing theoretically justified instruction, and their performance in actually justifying instructional approaches through a teaching vignette. Data is collection is ongoing, however, initial analyses indicates that these participants were overconfident and may be driven in part by their beliefs in teaching ability as being innate. This study is an important first step into understanding the reciprocal relations between epistemic and metacognitive elements that may help pre-service teachers better monitor, and improve, their performance.

Teachers' self-efficacy and self-regulation at different stages of their professional career
Manuela Benick, Saarland University, Germany; Laura Dörrenbächer, Saarland University, Germany; Franziska Perels, Saarland University, Germany

Abstract:
The construct of teacher self-efficacy (TSE) based on Bandura's (1977) social cognitive theory and like self-efficacy it includes perceptions of capability to learn or perform actions at designated levels. Concerning the genesis of teacher self-efficacy, less is known about the impact of individual factors like self-regulated learning (SRL). First studies speak in favour of a positive relationship between teachers' metacognition and the development of TSE (Senler & Sungur-Vural, 2013). The present study aimed at analysing the relationship between SRL and TSE at different stages of teacher's professional career.
Based on the instrument developed by Pfitzner-Eden, Thiel, and Horsley (2014), we askedn = 250 pre-service (MAge = 24.24, SD = 4.29, 70% female) and n = 120 in-service teachers (MAge = 36.58, SD = 11.75, 69% female) to estimate their TSE while SRL was assessed by a questionnaire based on Zimmerman's process model (2000). Using structural equation modeling, we found a latent correlation of TSE and SRL in pre-service teachers orf = .18 (p >.05) and of r = .59 (p < .001) in in-service teachers which speaks in favour of a professional development hypothesis.

Teacher Metacognition in Classroom Practices
Gursu Asik, Bahcesehir University, Turkey

Abstract:
Research studies indicate that teaching metacognition to students gives them the key to understand their own learning and thus increase academic performance. A necessary condition for teaching for student metacognition is teacher's pedagogical understanding of how to teach metacognition. Pedagogical understanding refers to teachers' knowledge regarding effective instructional design for helping students to have metacognitive knowledge and skills in learning. Thus, students' becoming metacognitive learners appears to be strongly related to teachers' instructional strategies which assist students in becoming metacognitive. The present study aims to investigate teachers' metacognition during mathematics instruction.The methodology of the study is based on a mixed research method which involves both quantitative and qualitative techniques. Teachers' opinions (n=94) about their use of metacognition in their instruction were gathered through a four-point Likert-type instrument. On the other hand, teachers' metacognitive performance (n=29) were examined through an observation tool. The statistical results showed that there is a significant difference in the assessment of teachers' metacognition between the observers' and teachers' evaluations. The qualitative analyses of the findings reported by the observers will also be shared in the presentation. The results seems to be important to improve our ability to plan teacher development and in-service training programs.

CHAIR: Beat Rechsteiner, University of Zurich

Parallel Session III Time: 09:00 - 10:30 Location: LAB-F013

SINGLE PAPERS: EFFECTS OF FEEDBACK

Kindergartners' performance evaluation: Effects of feedback and task experience

Kamila Urban, Institute for Research in Social Communication, Slovak Academy of Sciences, Slovakia

Abstract:
The main goal of the proposed study was to explore the effects of performance feedback and experience with performance evaluation on kindergartners' (ages 5-6) ability to evaluate their own performance. The children were assigned to one of research design - one day testing or repeated testing and solved the analogical-reasoning tasks either on the first day or on the fifth day. Plus they were randomly assigned to one of the feedback group (no feedback or performance feedback). They solved tasks based on the same principle of solving and after each solved task received or not (depending on feedback group) feedback about the correctness of their answer. At the end, the children were asked to self-evaluate their overall performance on five-point scale. Results showed that the performance feedback improved self-evaluation of kindergartners who more accurately monitored and evaluated their performance. Moreover, the children who had previous experience with evaluation of their performance were more accurate in self-evaluation. The results contribute to our understanding of kindergartners' self-evaluation and particularly the importance of experience or feedback on development of children's self-evaluation.

Using and benefiting from test feedback in foreign language vocabulary learning

Emmanuel Manalo, Kyoto University, Japan; Yoshinori Oyama, Chiba University, Japan; Ayaka Kanetsuna, The Faculty of Education of Chiba University Affiliated Junior High School, Japan

Abstract:
Using test feedback is a metacognitive strategy generally considered to be beneficial for learning. However, prior research evidence suggests that many students do not or cannot use test feedback effectively. The present study examined whether instruction in use of test feedback would benefit Japanese students' test performance in English vocabulary learning. The participants were 66 8th-grade students in two classes which were randomly designated as experimental and control groups. In both, students were asked to learn English words and their Japanese meanings. Experimental participants were also provided brief instruction on how to make use of test feedback. Despite this, their reports of strategies they employed revealed only a minority actually used test feedback, which may explain a lack of significant difference found in overall test performance between the experimental and control groups. However, further analysis revealed that experimental participants who reported using test feedback performed significantly better than experimental participants who did not use test feedback. In contrast, control participants who used test feedback evidenced no such advantage. These results suggest that students need instruction about effective use of test feedback to benefit from it, and more comprehensive instruction may be necessary to encourage more students to use this strategy.

Exploring the Effects of Generating Peer- and Internal Feedback on Monitoring and Error Correction

Olaf Peters, Technische Universität Dresden, Germany; Mareike Bockholt, Technische Universität Kaiserslautern - Graphentheorie, Germany; Hermann Koerndle, Technische Universitaet Dresden - Psychology of Learning and Instruction, Germany; Susanne Narciss, TU Dresden, Germany

Abstract:
This study investigates the effects of generating feedback to ones own or another student's solution of a problem-solving task on revision performance and monitoring accuracy. 115 students were randomly assigned to the following feedback conditions: (a) generating feedback to another student's solution and to their own solution (peer-feedback + internal feedback), (b) generating only internal feedback. In the four phases of the experiment, all students firstly had to solve a moderately difficult task of the block puzzle game "Rush Hour, then assessed globally their performance by rating their response confidence and the percentage of non-optimal steps. Secondly, they were asked to structure and describe their solution path. Thirdly, students in the internal feedback condition were asked to assess their own solutions and generate formative feedback, while students in the peer- and internal-feedback-condition were additionally provided with a peer's solution, and had firstly to generate formative peer-feedback then internal feedback. Finally, students had another attempt with the experimental task, and afterwards judged their performance again. Findings reveal that absolute monitoring accuracy increased significantly under both conditions, and correlated positively with performance. Generating peer-feedback in addition to internal feedback had an added value on performance, particularly for low performing students.

CHAIR: Esther Kaufmann, University of Zurich

Parallel Session III Time: 09:00 - 10:30 Location: LAB-F017

SYMPOSIUM: ADVANCED MEASUREMENT AND SUPPORT OF S(S)RL IN ALTS

The increased use of advanced learning technologies (ALTs) is not only an opportunity for supporting learning, but also new source for data collection. Measurement of multiple data channels provides a fundamentally new approach to the measurement of SRL during learning. The goal of this symposium is to show: a) How we gather and analyze trace data to measure students' SRL during learning and b) How these measurements are used to supporting learners' self-regulated learning in ALTs. The four contributors of this symposium collaborate in the Earli Center of Innovative Research to address these issues from a multi-disciplinary perspective. In this symposium four research teams present their empirical work. The first two contributions focus on measurement of SRL. Azevedo and colleagues specifies temporal characteristics of log data and Dindar and colleagues discuss the meaning of breakpoints in electro dermal activity data. The last two contributions focus on supporting SRL in ALTs. Hormann & Bannert discuss the effect real-time dashboards on students learning and Molenaar & Horvers elaborate on how moment-by moment learning curves can be used to scaffold students' SRL.
Discussant Dragan Gasevic will discuss the contributions from a machine learning and learning analytics perspective.

Measuring self-regulatory processes using multimodal multichannel trace with ALTs
Roger Azevedo, University of Central Florida, United States; Michelle Taub, University of Central Florida, United States; Nicholas Mudrick, North Carolina State University, United States; Amanda Bradbury, North Carolina State University, United States; Megan Price, North Carolina State University, United States; Elizabeth Cloude, North Carolina State University, United States

Abstract:
Understanding the complex nature of cognitive, affective, metacognitive, and motivational (CAMM) processes during learning with advanced learning technologies (ALTs) is key to understanding how these processes impact learning about complex topics. Current methodological and analytical approaches to studying SRL processes (e.g., self-reports) have several weaknesses compared to capturing real-time deployment of SRL processes. Our approach has been to use MetaTutor (an intelligent, hypermedia multi-agent ALT) to collect rich multimodal multichannel trace data of CAMM processes during learning (e.g., eye tracking, facial expressions of emotion). In this presentation, we focus on the challenges in measuring, analyzing, and inferring temporally unfolding CAMM self-regulatory processes using multichannel, multimodal data (collected from several studies with undergraduates) during human-machine interactions with MetaTutor.

What do electro dermal activity breakpoints tell about monitoring during collaboration?
Muhterem Dindar, University of Oulu, Finland; Sanna Järvelä, University of Oulu, Finland; Ming Ming Chiu, The University of Hong Kong, Hong Kong; Jonna Malmberg, University of Oulu, Finland; Sara Ahola, University of Oulu, Finland

Abstract:
This study aims to investigate the interactions between temporal breakpoints in electro dermal activity (EDA) and monitoring of learning progress during collaborative learning. With this aim, two groups of students (6 participants in total) were investigated over two sessions of collaborative learning activities. The multimodal data set in the current study is comprised of video and EDA recordings of participants. The EDA breakpoints were identified with Statistical Discourse Analysis (SDA) which showed that EDA breakpoints occur at different times for different group members. Further, a qualitative video analysis was conducted around each EDA breakpoint to investigate how and in what way monitoring events precede or follow the EDA breakpoints. Findings of the current study contribute to the growing body of research on applying process-oriented methodologies in order to investigate the temporal changes in self-, and socially-shared regulation of learning processes in collaborative settings.

Equipping learning dashboards with real-time data: can they foster learning?
Markus Hörmann, Technical University of Munich (TUM), Germany; Maria Bannert, Technical University of Munich (TUM), Germany

Abstract:
Research on learning dashboards lacks both empirical evidence of effects on learning and a coherent theoretical basis. Moreover, current studies are not using real-time data. In this study, we provide 120 learners with either 1) a dashboard that uses real-time web-trace data (i.e. data available at the very moment), 2) metacognitive prompts, 3) a combination of both, or 4) no intervention. Our hypothesis, i.e. the boosting of prompts through dashboards, is based on self-regulated learning frameworks that address metacognition. We measure effects on learning and evaluate dashboard usage through self-reports and trace data. Results will be presented in the symposium and discussed by the discussant.

What can Moments-by-Moments Learning Curves tell about Students' Self-Regulated Learning?
Inge Molenaar, Radboud University Nijmegen, Netherlands; Anne Horvers, Radboud University Nijmegen, Netherlands

Abstract:
This contribution explores what "moment-by-moment learning curves" reveal about students' Self-regulated learning. Students learning in adaptive educational technologies (AET) on tablets leave rich traces of data that capture many details of their learning process. Moment-by-moment learning curves indicate a student' learning at each practice opportunity for a specific skill. In this study, we found that different forms of learning curves are associated differently with student accuracy and learning. Immediate drop are related to prior knowledge and immediate peak are related with to learning gains and separate multiples spikes are associated with lower learner accuracy. As such moment-by-moment learning curves provide a powerful tool to advance our understanding of how students regulate their learning.

DISCUSSANT: Dragan Gašević, University of Edinburgh, United Kingdom
CHAIR: Inge Molenaar, Radboud University Nijmegen, Netherlands

Parallel Session III Time: 09:00 - 10:30 Location: LAB-F015

SYMPOSIUM: TEACHING METACOGNITION TO YOUNG LEARNERS: MONITORING ACCURACY, BELIEFS, AND CLASSROOM PRACTICE

Many students do not have sufficient skills to self-monitor and self-regulate their learning. To improve metacognition and learning, they need teacher support. This symposium consists of three studies investigating whether and how teachers can support student monitoring and regulation. Study 1 investigated what cues help teachers to accurately monitor their students' text comprehension. Secondary school students studied texts, teachers either had access to (a) student names; (b) only knowledge cues (students' diagrams about texts); or (c) names and knowledge cues. Teachers' monitoring was most accurate when they knew students' names. Study 2 addresses the relations between teachers' instructions and elementary school children's metacognition. Children showed ineffective self-regulation, but importantly, teachers' instructions for strategy use and self-monitoring were beneficial for children's metacognition and learning. Study 3 investigated effects of an SRL teacher training on teacher's concepts of SRL and elementary school students' perceptions. The training improved teachers' concepts of SRL, however, these effects were moderated by teachers' prior beliefs. Teachers' promotion of self-regulation in the classroom affected students' self-regulation. Teacher's cue-utilization, monitoring accuracy, their instructions for metacognition, and their beliefs about SRL affect learners' metacognition and learning in the classroom.

Do I Know What You Know? Teachers' Cue-Utilization when Monitoring Students' Text Comprehension

Janneke van de Pol, Utrecht University, Netherlands; Elske Muilenburg, University Utrecht, Netherlands; Tamara Van Gog, Utrecht University, Netherlands

Abstract:
Teachers' monitoring of students' text comprehension should be as accurate as possible, to enable the provision of high quality, adaptive, instruction. However, there is much room for improvement in monitoring accuracy, and one promising avenue might lie in providing teachers with cues that are diagnostic (i.e., predictive) of their students' comprehension of a text. In this study, we manipulated the availability of cues to investigate to what extent this would affect teachers' monitoring accuracy, using three conditions: (1) student cues only (name-only condition), (2) student cues + knowledge cues (name+ diagrams of causal relations completed by the student: name+diagram condition), and (3) knowledge cues only (diagram-only condition). Secondary school teachers (n = 21) judged the comprehension of six texts for five students under each condition, while thinking aloud. In contrast to our hypothesis, teachers' relative and absolute monitoring accuracy did not significantly differ between the name-only and the name+diagram conditions, and was significantly higher in the name-only than the diagram-only condition and in the name+diagram condition than in the diagram-only condition. In the diagram-only condition, teachers were found to use fabricated student cues (i.e., guessed student characteristics, e.g., gender), which may have hampered their monitoring accuracy.

The Relation Between Teachers' Classroom Instructions and Children's Monitoring and Regulation
Mariette van Loon, University of Bern, Switzerland; Natalie Bayard-Guggisberg, University of Bern, Switzerland; Martina Steiner, University of Bern, Switzerland; Claudia Roebers, University of Bern, Switzerland

Abstract:
Children should monitor their learning; they need to know what they 'know' and 'don't know' in order to take appropriate learning actions. However, many children lack the ability to monitor and regulate learning, and need support with this in the classroom. In this study, we investigated children's ability to monitor and regulate learning after their teachers instructed a cryptography task. Children (2nd and 4th grade, n= 287) took a test, monitored performance, and selected items for restudy. Restudy selections were more effective for 4th than for 2nd graders. Moreover, teachers' (n = 21) were observed when teaching the cryptography task, to investigate how their instructions were related to children's learning. Data analyses using the observation checklists indicate that teachers' instructions to associate, use lists, and planning instructions benefitted children's performance. Focusing on task goals improved children's monitoring. Instructions to search information, evaluate strategies, and correct errors had beneficial effects on monitoring as well as regulation. These findings suggest that teacher instructions influence children's learning, self-monitoring, and self-regulation. Currently, we are conducting further qualitative analyses of the audio recordings, to explain how teachers' instructions for strategy use and self-monitoring affect children's cognitive and metacognitive outcomes.

How is conceptual change in teachers' beliefs toward promoting SRL changing their classrooms?
Charlotte Dignath, Goethe-University Frankfurt, Germany

Abstract:
We investigated teachers' conceptual change regarding the promotion of self-regulated learning (SRL) in the scope of different one-day teacher training with different foci in two quasi-experimental studies. In study 1 we compare teacher beliefs prior to and after the training with a control group without training. The results indicated that teachers changed their concepts of the promotion of SRL as a result of the training. This effect was moderated by teachers' prior beliefs that acted as a filter for conceptual change. In study 2, we compared teachers' conceptual change from a teacher training that focused on metacognitive reflection of SRL compared to a SRL training without this focus on metacognition. With regard to teachers' self-report, the same pattern was found like in study 1. No effects were found on students' perception of teachers' promotion of SRL or metacognition. However, the results revealed that students' SRL varied as a function of their teachers' promotion of SRL.

DISCUSSANT: Linda Bol, Old Dominion University, United States
CHAIR: Mariette van Loon, University of Bern, Switzerland

Coffee/Tea break in building: LAA

Keynote II Time: 11:00 - 12:00 Location: LAA-G001

KEYNOTE SESSION

Strategies to self-regulate achievement motivation: Different aspects of their effective use
Markus Dresel, University of Augsburg, Germany.

CHAIR: Yves Karlen, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

Lunch in building: LAA

PANEL DISCUSSION Time: 13:00 - 13:50 Location: LAA-G001

MEASURING AND SUPPORTING STUDENTS' SELF-REGULATED LEARNING IN ADAPTIVE EDUCATIONAL TECHNOLOGIES

Inge Molenaar, Radboud University Nijmegen, Netherlands; Roger Azevedo, University of Central Florida, United States; Sanna Järvelä, University of Oulu, Finland; Maria Bannert, Technical University of Munich (TUM), Germany; Dragan Gašević, University of Edinburgh, United Kingdom

CHAIR: Inge Molenaar, Radboud University Nijmegen, Netherlands

Parallel Session IV Time: 14:00 - 15:30 Location: LAB-F013

SINGLE PAPERS: CREATIVITY, READING

Exploring the Metacomprehension Abilities of Students with Intellectual Disabilities

Antonio Gutierrez de Blume, Georgia Southern University, United States; Christian Soto, Facultad de Educación, Universidad de Concepción, Chile; Fernanda Rodriguez, Facultad de Educación, Universidad de Concepción, Chile

Abstract:
The purpose of this investigation was to explore the importance of different metacomprehension aspects in students with intellectual disabilities, and to determine which one of them can best explain their performance on reading comprehension. For this purpose, metacognitive measurement instruments, an inconsistency detection tasks, and confidence in performance judgments on reading performance were applied together with a reading comprehension standardized test (LECTUM). By means of regression analyses of the data, results revealed that the detection of inconsistencies as a metacomprehension monitoring measure, more specifically the detection of internal inconsistencies, some dimensions of the metacomprehension inventory as a measure of metacognitive skills (planning , evaluation of the reading process , regulation of the comprehension/incomprehension) and absolute calibration accuracy were the best predictors of performance of the participants on reading comprehension. It is of importance to understand the nature of the problems presented by the students when facing a text in order to develop adequate approaches to reading comprehension according to the needs of learners with intellectual disabilities. According to the results, we concluded that theoretically-relevant metacognitive elements significantly predicted the performance on reading comprehension. Implications for learning and instruction are discussed.

Mind wandering, creativity and well-being: What are the connections?

David Preiss, Pontificia Universidad Catolica de Chile, Chile; Natalia Molina, Pontificia Universidad Católica de Chile, Chile

Abstract:
Mind wandering (MW) has been linked to different negative consequences, including low metacognitive control, weakened performance on several tasks and dysphoria. On the other hand, it has also been linked to problem solving, future planning and creativity. In order to better understand its consequences, this study explored in 228 tertiary education students the relationship between MW, psychological well-being and creativity, exploring gender differences. Both the frequency of MW in daily life and its contents (positive constructive; guilt/fear of failure and poor attentional control) were assessed. Results showed a positive relationship between MW frequency, its positive contents and creativity, and a positive relationship between the negative contents of MW and psychological discomfort. Differences in self-reflective rumination, creative performance and MW were observed between vocational and university students. Finally, the effect of the frequency of MW on some measures of well-being and creativity was mediated by the nature of the contents of daydreaming. As many educational initiatives intend to diminish mind wandering by fostering metacognition, we argue that these interventions have to take into consideration not only the negative but also the positive consequences of mind wandering as well as the diversity of its contents.

Does metacogntive reflection foster creativity in small children?

Violeta Vainer, FLACSO, Argentina

Abstract:
This is both an inquiry research and a qualitative research, aiming to investigate the impact of metacognitive reflection on creative productions and consciousness of own creative process. Children aged 5, 9 and 11 will be interviewed after and before the experiment about their thoughts on their own creative process. Then there will be a control group which will receive normal indications towards a creative activity and an experimental group that will receive indications that will guide to reflect metacognitively about their working process. Both the works, paintings and poems and the interviews will be analyzed with the Torrance Creativity test and compared. The results will be analyzed and conclusions will be drawn from this information.

CHAIR: Esther Kaufmann, University of Zurich

Parallel Session IV Time: 14:00 - 15:30 Location: LAB-F014

SINGLE PAPERS: GAME-BASED LEARNING

How does eye tracking demonstrate students' metacognitive monitoring during game-based learning?
Michelle Taub, University of Central Florida, United States; Roger Azevedo, University of Central Florida, United States; James Lester, North Carolina State University, United States

Abstract:
Game-Based Learning Environments were developed to foster students' self-regulated learning while maintaining high levels of engagement and motivation. Although research has evidenced game-based learning does foster engagement and motivation for students, there is limited research using multichannel data to investigate how students' metacognitive monitoring processes and cognitive learning strategies unfold over time during game-based learning. The goal of this study was to use eye-tracking and log-file data to assess how 60 undergraduate students metacognitive monitoring during knowledge acquisition while reading books and completing the assessments impacted learning while trying to solve the microbiology mystery on Crystal Island. Results revealed that only eye-tracking variables, not log-file variables were associated with learning. Specifically, students with the highest proportional learning gain had high fixation durations on the book content and assessment, while students with the lowest proportional learning gain had high fixation durations on the book content, but low fixation durations on the assessment. Implications from these findings reveal the importance of students spending time fixating on the books, as opposed to just having the books opened, demonstrating how using multichannel data can reveal specific details regarding how students are self-regulating during game-based learning.

The Impact of Agency, Motivation, and Emotions on Learning in a Game-Based Learning Environment
Amanda Bradbury, North Carolina State University,United States; Robert Sawyer, North Carolina State University, United States; Roger Azevedo, University of Central Florida, United States; James Lester, North Carolina State University, United States

Abstract:
We examined the effects of agency on proportional learning gain, perceived presence, intrinsic motivation, interest in the game, and emotions while learning about microbiology in the game-based learning environment (GBLE), Crystal Island.
131 undergraduates participated in the study and were randomly assigned to one of three groups: full, partial, or no agency. Additionally, we used D'Mello and Graesser's (2012) model of affective dynamics as our theoretical framing. Our results contribute to interdisciplinary research on the science on learning with GBLEs and inform the design of intelligent, adaptive GBLEs that provide real-time scaffolding to support learners' cognitive, affective, and metacognitive processes during STEM learning.

Dynamic Scenario-based Assessment: Findings and Implications to Metacognition and Cognition

Sabina Kleitman, The University of Sydney, Australia; Matthew Blanchard, The University of Sydney, Australia; Simon Jackson, The University of Sydney, Australia; Nikzad Babaii Rizvandi, The University of Sydney, Australia; Eugene Aidman, Defence Science and Technology Group, Australia

Abstract:
Recent models link metacognition to adaptability and resilience. This talk will summarise the findings of a novel simulation-based assessment and scoring method developed to assess adaptability and resilience. The sim-embedded metrics and features extracted were used to predict metacognitive and cognitive performance/judgements assessed outside of the simulation. Metacognitive judgments within the simulation were also examined. 194 participants (UG students) were randomly allocated to two-person teams: as a driver (N=109) or Unmanned Aerial Vehicle (UAV; N=85) operator. The driver's goal was to drive through a city as quickly and as safely as possible while being exposed to many challenging events which were planted during simulation. The UAV operator had a birds-eye view of the driver and city, which allowed them to assist the driver. After the task, all participants evaluated their own and each other's performance. Participants also completed a battery of psychometric tests assessing metacognition, intelligence, personality, and resilience. Participants' behaviours within the simulated environment was summarised by traditional and novel features. These features predicted a variety of psychometric variables, most importantly metacognitive confidence but not accuracy of the relevant performance, resilience and personality. Driver-Operator metacognitive evaluation judgments are also discussed. Insights for the metacognitive paradigm are offered.

CHAIR: Beat Rechsteiner, University of Zurich

Parallel Session IV Time: 14:00 - 15:30 Location: LAB-F015

SYMPOSIUM: DETERMINANTS INFLUENCING THE EFFECTIVENESS OF TRAININGS ON SELF-REGULATED LEARNING

In self-regulated learning (SRL), learners monitor, regulate, and control their cognition, their motivation, and their behavior in relation to their learning goals and contextual conditions (Pintrich, 2000). Research postulated the relevance of trainings of SRL competence (e.g., Artelt, 2003). Although there are numerous training concepts which were evaluated in laboratory setting (vgl. Dignath & Büttner, 2008), there is a lack of research focusing on factors determining the training effectiveness in real-life settings (Masui & DeCorte, 2005). This symposium attends to present relevant factors influencing the effectiveness of SRL trainings in real-life learning settings such as schools or universities. The contributions investigate factors that vary on the following three dimensions: (1) training format (web-based vs. classroom trainings), (2) relation of factors to SRL (proximal vs. distal), and (3) learners (school pupils vs. university students). The discussion will evaluate the relevance of the investigated factors and dimensions for the effectiveness of both, the presented trainings as well as future research on SRL trainings.

Effects of a self-regulation training – does the socio-economic status matter?

Ferdinand Stebner, Ruhr University Bochum, Germany; Corinna Schuster, Ruhr University Bochum, Germany; Theresa Dicke, Australian Catholic University, Australia; Yves Karlen, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland; Joachim Wirth, Ruhr-University Bochum, Germany; Detlev Leutner, University of Duisburg-Essen, Germany

Abstract:
In this paper, we investigate whether the effects of a self-regulation training are affected by the students' socio-economic status (SES). Due to the strong relation between SES and academic success, one could anticipate a Matthew effect: students from families with high SES profit more from such trainings than students from families with low SES. In two studies, fifth and six graders were trained in SRL over one school term. Students received a training in how to read science texts and how to conduct science experiments in a self-regulated manner. Furthermore, the training included units on how to regulate motivation and emotions, and how to set goals. The results of both studies show consistently (1) no prior differences between SES high and SES low students in terms of self-regulation competence and cognitive load, (2) positive effects of the training in the way that self-regulation increases and cognitive load decreases, and (3) no Matthew effect: both, students from families with high and low SES profit equally from this training.

Do university students' individual characteristics influence the gain in self-regulated learning?

Silke Hertel, Heidelberg University, Germany; Sophie Butz, Heidelberg University, Germany; Henrik Bellhäuser, Johannes Gutenberg-University Mainz, Germany; Birgit Spinath, Heidelberg University, Germany; Katharina Maag Merki, University of Zurich, Switzerland; Bernhard Schmitz, TU Darmstadt, Germany

Abstract:
Certain students have little self-regulated learning competencies (SRL), which is a problem because SRL is highly relevant for learning success. This is also true for university students. Thus fostering students' SRL in university education is important. The question, if particular students profit from a SRL-training, has not been answered yet. There is evidence that the success of SRL is influenced by personality and motivational traits. In a randomized intervention study (N = 218 university students) with two different treatments (attendance-based and web-based course) we investigated which individual factors (motivation, personality, gender, study time, course of study, knowledge) influence the students' gain in SRL. The intervention consisted of five lectures focusing on SRL-strategies. Data on students' SRL (self-ratings, knowledge-test) and metacognitive knowledge were collected at three measurement points (pre/post/follow-up) throughout the semester. Hierarchical regression analyses revealed that university-entrance-degree, gender, declarative knowledge and motivation do not predict the gain of SRL. Personality, study time and the learning environment do predict the gain of SRL significantly. The findings lead to the conclusion that SRL can be trained in students and are dependent of personality, study time and the learning environment.

Differential effects of a self-regulated learning intervention within a process-analytical approach

Laura Dörrenbächer, Saarland University, Germany; Franziska Perels, Saarland University, Germany

Abstract:
Self-regulated learning (SRL) describes a process of strategic learning referring to reflective goal attainment which is especially relevant for college students. Although direct strategy trainings and their combination with learning diaries show positive effects on college students' SRL, authors demand for a person-centred approach to analyse differential effects when evaluating SRL interventions. With regard to baseline SRL, previous findings indicate a compensation effect. The present study analysed differential effects of an SRL intervention as a function of SRL baseline level within a process analytical approach. The intervention comprised seven weekly training sessions and a learning diary that allowed for time series analyses of differential training effects. Latent profile analysis of SRL questionnaire values (N=337 college students, Mage=23.48, SD=4.08, f=71%) indicate four SRL profiles (low SRL with moderate motivation, moderate SRL, inconsistent SRL with high motivation, high SRL). Time series analyses with n=27 students, who took part in the training and completed a learning diary, showed a positive linear trend for all profile groups except for the group with inconsistent SRL baseline values. The results do not speak in favour of a compensation effect because students with high baseline values also benefit from the intervention.

DISCUSSANT: Charlotte Dignath, Goethe-University Frankfurt, Germany
CHAIRS: Ferdinand Stebner, Ruhr University Bochum, Germany; Joachim Wirth, Ruhr-University Bochum, Germany

Parallel Session IV Time: 14:00 - 15:30 Location: LAB-F017

SYMPOSIUM: HOW TO SUPPORT STUDENT REGULATION BY MANIPULATING TASK CONDITIONS

Regulated learning is an important skill in the 21st century and task characteristics in education provide multiple ways to support regulation during learning. Self-regulated learning is the ability to successfully create a task representation to decide on actions that support progress towards learners goals. Consequently learners analyse learning situations based on task characteristics before establishing meaningful (sub)goals and deciding on which strategies to use. The contributions of this symposium aim to discuss how different task characteristics influence the process of self- and shared regulated learning. The task characteristics manipulated in this symposium are instructional cues and social context. Instructional cues seem to provide more guidance in navigation activities during self-regulation. While the social context of the task can be influenced by using macro scripts that structure the way students engage in regulation in co- and shared regulation. Moreover all contributions use process and trace data to better understand the SRL processes students engage in and how task characteristics influences these processes during learning.

The influence of task structure on children's navigation activities during hypermedia learning

Cindy Klompmaker-Paans, Radboud University Nijmegen, Netherlands; Inge Molenaar, Radboud University Nijmegen, Netherlands; Eliane Segers, Radboud University Nijmegen / University of Twente, Netherlands; Ludo Verhoeven, Radboud University Nijmegen, Netherlands

Abstract:
Research on self-regulated learning emphasizes the importance of context. This suggests a relation between regulation and task characteristics, such as task complexity, or the amount of structure it provides. So far, however, very little research has focused on how task characteristics affect variation of regulation activities. Therefore, the aim of the current study was to investigate the variation in children's navigation activities during a hypermedia assignment and to what extent task structure affected the observed variation. For this purpose, 110 5th and 6th grade children participated in a WebQuest hypermedia assignment about the heart and living a healthy lifestyle. Participants were assigned to one of two conditions: a more structured or less structured hypermedia environment. Preliminary results show that participants in the less structured environment spent more time on regulation activities that are not followed by other regulation activities. In addition, for children in the more structured environment, the amount of time spent on regulation activities was negatively related to declarative knowledge posttest scores, whereas for participants in the less structured condition it was not. Further analyses will investigate to what extent the variation in activities can be clustered, and to what extent clusters differ for the two conditions.

How to support shared regulation during face-to-face collaborative learning?

Liesje De Backer, Ghent University, Belgium; Hilde Van Keer, Ghent University, Belgium; Martin Valcke, Ghent University, Belgium

Abstract:
This study investigates the impact of two types of macro scripts on collaborative learners' adoption of socially shared metacognitive regulation (SSMR). SSMR refers to the regulative engagement of multiple collaborative learners reciprocally operating on each other's contributions when regulating cognitive processes. Although SSMR can advance successful collaborative learning, sharing regulation appears challenging for students. The present study therefore investigates how university students' SSMR can be fostered while they collaborate in a face-to-face peer tutoring (PT) intervention. A quasi-experimental design was adopted, involving 58 freshmen in the Educational Sciences programme, who were randomly assigned to PT-groups of six. Each PT-group was randomly provided with either a macro script directed at instructing PT-groups to adopt particular regulation skills (instructive condition) or a macro script aimed at stimulating reflection about the adoption of regulation skills (reflection-provoking condition). The starting, middle, and closing PT-session of four PT-groups in each macro script condition were videotaped (48h). Mann Whitney U tests were used to investigate the differential impact of both macro scripts on PT-groups' adoption of SSMR. Results revealed that PT-groups using a macro script eliciting reflection upon regulation demonstrated significantly more SSMR as compared to PT-groups provided with a structuring macro script.

Supporting shared regulation during task-oriented reading

Jolique Kielstra, Radboud University Nijmegen, Netherlands; Inge Molenaar, Radboud University Nijmegen, Netherlands; Roel Van Steensel, Erasmus University Rotterdam / University of Twente, Netherlands; Ludo Verhoeven, Radboud University Nijmegen, Netherlands

Abstract:
This study examines how promoting reciprocal peer tutoring (RPT) through an ICT-tool supports the development of correct task representations, strategy selection and awareness of reading strategies during task-oriented reading. Task-oriented reading encompasses reading and information processing to answer a specific task, which is given to students in advance. Previous studies suggest students can benefit from collaborative learning supported by ICT-tools, therefore this study examines the influence of an ICT-tool on RPT in perspective of the development of correct task representations, strategy selection and awareness of reading strategies among 44 vocational secondary school students. The ICT-tool supports the students with a macro script that aims to enhance RPT through interdependency. Preliminary results from logfile data indicate a great diversity in self- and shared regulation. Whereas audio data indicates that macro scripts indeed support engagement in collaboration during task-oriented reading.

DISCUSSANT: Lenka Schnaubert, University of Duisburg-Essen, Germany
CHAIR: Jolique Kielstra, Radboud University Nijmegen, Netherlands
ORGANISER: Jolique Kielstra, Radboud University Nijmegen, Netherlands

Coffee/Tea break in building: LAB

Parallel Session V Time: 16:00 - 17:30 Location: LAB-F015

SINGLE PAPERS: ASSESSMENT METHODS

A Deeper Understanding of Metacomprehension: Development of a New Multidimensional Tool

Antonio Gutierrez de Blume, Georgia Southern University, United States; Christian Soto, Facultad de Educación, Universidad de Concepción, Chile; Rodrigo Asun, Universidad de Chile, Chile; Matthew Jacovina, Arizona State University, United States; Claudio Vasquez, Universidad Autonoma de Chile, Chile

Abstract:
The purpose of this research endeavor was to develop and validate a new measurement tool predicated on previous research to assess learners' metacomprehension during reading. In two separate studies (N = 923) with Chilean undergraduate students, we demonstrate the versatility and utility of our proposed Metacomprehension Inventory (MI). In Study 1, we provide empirical support for the psychometric soundness and construct validity of the MI. In Study 2, we provide evidence of the measurement invariance of the MI between males and females. Results of Study 1 revealed the hypothesized factor structure of the MI is consistent, with high factor loadings, excellent model fit, and moderate-to-strong inter-factor correlations. Study 2 results indicated that the MI is interpreted similarly by both males and females, as factor loadings were largely statistically identical across the two groups. We discuss implications of our proposed MI for theory and applied research.

Effects of assessing rehearsal strategies via think aloud protocols or trial-by-trial self-reports

Sebastian Poloczek, University of Bristol, United Kingdom; Chris Jarrold, University of Bristol, United Kingdom

Abstract:
Think aloud protocols and picture supported trial-by-trial self-reports to assess cognitive strategies are likely associated with a set of certain strengths and shortcomings. However, the effects of these different assessment methods on strategy choices, strategic behaviour during the task and performance in the task are rarely studied in a systematic, experimental way. The data of 91 10-11-year-olds were analysed using mixed-effects models with crossed subject and item random intercepts. Results showed that with both explicit assessment methods, cumulative rehearsal was the most often reported strategy, followed by simple listening and single rehearsal. Children adjusted their strategic behaviour to the task difficulty, but the degree of adjustment varied between methods. Time patterns of self-paced word presentation associated with a certain strategy were as expected and in general similar for the picture self-report and think aloud conditions. No differences in self-paced presentation patterns or recall accuracy were observed between trials without explicit strategy assessment and those with picture assessment. However, with think aloud instruction, children proceeded significantly slower through the task and were impeded in their recall. Implications concerning the question which method is better suited for which type of research question will be discussed.

What we learn from learning diaries: Structured activities as metacognitive tools

Heather Branigan, University of Stirling, United Kingdom

Abstract:
Structured activities such as learning diaries are commonly used to support metacognition in Scottish primary school classrooms. Despite their popularity, very little research has investigated their use. The current study aims to provide 'thick descriptions' of structured activities as metacognitive tools, asking: How do students engage with structured metacognitive activities? And what aspects of pedagogy related to structured activities support or inhibit metacognition? Drawing on ethnographic methods, this case study was conducted in one P4 classroom in Scotland throughout a school year. The research followed two eight-year old students, Amy and Laura. Data were collected through observations, interviews and analysis of written work. Narrative analysis supported the presentation of vignettes. Findings suggest that students' engagement with structured activities was similar beyond that suggested by written evidence. Whereas Amy used 'stock' responses that she knew she could spell, Laura used 'bare minimum' responses for teacher expectations. As such, both students acted strategically in response to their metacognitive assessments of the activities. This research highlights barriers to structured activities as metacognitive tools; namely the predominance of written activities, and the timings of activities. At a wider level, rich descriptions have implications for theory by 'bringing to life' metacognition within the applied setting.

CHAIR: Francesca Suter, University of Zurich

Parallel Session V Time: 16:00 - 17:30 Location: LAB-F014

SINGLE PAPERS: IMPLEMENTATION, TEACHER EDUCATION

Simulation-based self-regulation with real actors: A model for teachers' professional vision

Bracha Kramarski, Bar-Ilan University, Israel; yafit Moradoff, Bar-Ilan University, Israel

Abstract:
The study suggests a model for enhancing professional vision (PV) and self-regulation (SRL) of 120 math/science elementary school teachers, by implementing unique role-play training simulations performed by professional actors as students. These simulations are innovative in the context of teacher education. The study examined whether helping teachers to apply SRL to the PV model in unique simulations supported with self-questions (SIM + SRL group) is more effective than PV training in a simulation alone (SIM group), as compared to a control group without PV and SRL. This study was tested for: Developing PV for lesson analysis and lesson design; SRL and beliefs in student learning approach, and; Transfer ability of PV and SRL expertise to real-time teaching settings immediately in class, and 3 months later. A mixed methods analysis indicated that the SIM+SRL group manifested the highest level on the PV and SRL as emerged in the video lesson, designing lesson and actual real time teaching (transfer). The SIM group improved achievements in some tested dimensions (e.g., noticing skills), while the control group's achievements were inferior to those of the two simulation groups. This study makes valuable theoretical, methodological, and practical contributions to developing teacher expertise in classroom practice.

The implementation of self-regulated learning in primary schools: A qualitative study

Mona De Smul, University of Ghent, Belgium; Sofie Heirweg, Ghent University, Belgium; Geert Devos, Ghent University, Belgium; Hilde Van Keer, Ghent University, Belgium

Abstract:
Teachers play a key role in the implementation of self-regulated learning (SRL). Nevertheless, research found that SRL implementation in primary schools remains limited and that teachers experience several challenges in fostering students' SRL. In this respect, the present study will focus on the role of the school culture, and more specifically the school leader. The present study suggests that the school environment has the capacity to foster or hamper school-wide SRL implementation. Therefore, this study investigates two successful and two less successful schools as to the implementation of SRL from a qualitative perspective. Interviews were administered with 15 school members in total. The results reveal that school conditions such as a shared vision, opportunities for professional development, and collaboration and communication among colleagues are important conditions fostering SRL implementation. Moreover, it appears that the school leader plays an important role in establishing this. These results underline the need for more school-wide interventions regarding SRL implementation.

The coverage of distributed practice and retrieval practice in teacher education textbooks

Tim Surma, Open University of the Netherlands, Netherlands; Gino Camp, Open University of the Netherlands, Netherlands; Paul A. Kirschner, Open University of the Netherlands, Netherlands

Abstract:
The benefits of learning strategies as distributed practice and retrieval practice on long-term retention have been repeatedly established across many populations, domains and subjects and are supported by robust evidence from hundreds of lab experiments and classroom studies. Teachers could greatly benefit from learning about these strategies, their purposes, and how to use them in their teaching. Examining the topical coverage of distributed and retrieval practice in introductory teacher education textbooks and syllabi is an important way to understand how teacher candidates are being educated about these strategies. We assessed if Dutch and Flemish teacher training programs adequately cover study strategies such as retrieval practice and distributed practice in their written learning materials. We examined 61 textbooks and syllabi by inventorying descriptive and prescriptive information on the strategies. Also, we analysed whether the coverage referred to research from the field of the strategy. The results indicated that, for the greatest part, textbooks and syllabi do not adequately discuss and accurately represent distributed practice and retrieval practice. Accurate textbooks are used in a small minority of teacher education programmes. Possible implications and challenges for authors, teacher education programmes and policy-makers are discussed.

CHAIR: Beat Rechsteiner, University of Zurich

Parallel Session V Time: 16:00 - 17:30 Location: LAB-F013

SINGLE PAPERS: COLLABORATIVE LEARNING, SOCIO-COGNITIVE INFORMATION

Socio-cognitive information as trigger for metacognitive re-evaluation processes

Lenka Schnaubert, University of Duisburg-Essen, Germany; Simon Krukowski, University of Duisburg-Essen, Germany; Daniel Bodemer, University of Duisburg-Essen, Germany

Abstract:
To efficiently regulate their learning processes, learners need to metacognitively monitor their learning and memory and base study decisions on the outcome. For example, they use information on confidence in their assumptions to identify a need for further study. Previous research has shown that apart from such metacognitive judgments, learners also use socio-cognitive information on other learners' assumptions to guide individual study decisions by comparing the assumptions and identifying conflicts. To investigate if these conflicts guide study decisions directly or if learners merely use the information to re-evaluate their cognitive status, we conducted a study with N = 60 participants in a within-subjects design. We found that, confronted with socio-cognitive information, learners converged towards the assumptions presented and used the resulting confidence to regulate their learning rather than the information on socio-cognitive conflict itself. This research illustrates the complex nature of metacognitive self-regulation in social settings and gives some insight into the mechanisms involved in dealing with socio-cognitive information contradicting personal assumptions.

Effects of informing students in individual and cooperative learning conditions about overconfidence

Barbara Roncevic, University of Rijeka, Faculty of Phylosopy, Croatia; Pahljina-Reinic Rosanda, University of Rijeka, Croatia; Svjetlana Kolic-Vehovec, University of Rijeka, Faculty of Humanities and Social Sciences, Croatia

Abstract:
The present study aimed to examine whether learning in individual or cooperative condition, and informing or not informing students about human tendency to make overconfident judgments have effects on students' achievement on tasks assessing knowledge about key concepts in operant conditioning, as well as on students' confidence in accuracy of their answers. The study was conducted on a sample of first-year graduate students enrolled in teacher education program (N=223). Preliminary analysis (on about half of the sample) indicated that students who participated in cooperative learning condition performed significantly better on learning task compared to students in individual learning condition. Generally, students reported higher confidence in the accuracy of their correct than in the accuracy of their partially correct and incorrect answers. A significant interaction effect of learning and informing condition for students' confidence in the accuracy of their correct recognition answers was found. Compared to students in the individual learning condition who reported similar levels of confidence in both informing conditions, students who learned cooperatively reported lower confidence in the intervention condition. Finally, lower students' confidence in the accuracy of their partially correct explanation answers was found in the intervention condition regardless of the learning condition.

The Effect of Collaborative Learning and Metacognitive support on Monitoring and Performance

Martine Baars, Erasmus University Rotterdam, Netherlands; Lisette Wijnia, Erasmus University Rotterdam, Netherlands; Fred Paas, Erasmus University Rotterdam/University of Wollongong, Netherlands

Abstract:
Metacognitive monitoring and regulation of learning activities is positively related to learning outcomes. Yet, metacognitive processes like monitoring and regulation use limited cognitive resources which means that when learning complex tasks there might not be enough capacity for these metacognitive processes. Research has shown that collaborative learning leads to a collective cognitive capacity. This could be used to monitor and regulate learning and lead to a more effective and efficient way of learning. The effectiveness of a team of students learning collaboratively would depend on their team cognition. In addition, metacognitive support was found to support collaboratively monitoring and regulating learning processes. Therefore, this study investigated the effect of collaborative learning with metacognitive support on monitoring and performance when learning from a complex animation. Results will be available well before the conference.

CHAIR: Esther Kaufmann, University of Zurich

Parallel Session V Time: 16:00 - 17:30 Location: LAB-F017

SYMPOSIUM: THE ROLE OF INDIVIDUAL DIFFERENCES IN JUDGMENT ACCURACY ACROSS DOMAINS

Judgment bias, especially overestimation, is a major concern in the field of metacognition as it can hamper self-regulated learning and therefore future performance. To understand why metacognitive judgments are biased, the symposium comprises three contributions that empirically investigated the impact of cognitive, motivational as well as personality variables simultaneously on judgment bias. The studies were conducted in different domains (mathematics, psychology, text comprehension, and education) and covered a diverse range of settings (laboratory, final exam, and field). In all studies, participants provided global predictions, postdictions, and/or local judgments (i.e., response confidence).
Consistently across the three studies, the cognitive variable under investigation (performance on the criterion test, domain-specific skill, or cognitive ability) was the strongest predictor for judgment bias with lower performing participants resulting in stronger overestimation. The papers furthermore add substantial empirical support for the influence of personality traits as the studies investigated the effect of these variables over and above the influence of performance. Interestingly, across the domains under investigation, different learner characteristics seem to be relevant. Hence, we suggest that future intervention studies with the aim to lower judgment bias should consider individual differences.

The influence of test performance and personality on judgment bias
Marion Händel, University of Erlangen-Nuremberg, Germany; Markus Dresel, University of Augsburg, Germany

Abstract:
Students vary in the accuracy of their metacognitive judgments what indicates different levels of students' metacognitive monitoring ability. To understand why some students over- and others underestimate personal performance, previous research focused either on performance (unskilled and unaware effect) or on personality traits. Two studies investigated the influence of both of them simultaneously on judgment bias. Judgment bias was calculated in terms of the signed difference of performance and metacognitive judgment after test taking (so-called global post-diction). Metacognitive judgments were assessed in a laboratory setting with 201 students (Study 1) or in a real exam setting with 128 students (Study 2). Regression analyses with judgment bias as dependent variable revealed prior performance as the strongest predictor in both studies. Above and beyond the influence of performance, domain-specific self-concept and optimism (Study 1) and academic self-concept and consciousness (Study 2) were significant predictors of judgment bias. Other personality factors did not explain the criterion variance further. Hence, the influence of personality variables might have been overestimated in previous research that did not consider performance as a predictor variable. Nevertheless, our results indicate that (training) studies need to take individual differences in general into account.

What makes an overoptimistic learner? Individual differences in judgment bias of text comprehension
Stefanie Golke, University of Freiburg, Germany; Joerg Wittwer, University of Freiburg, Germany

Abstract:
Judgment bias of comprehension, especially overestimation, is a major problem in self-regulated learning because it hampers regulation of study and can produce underachievement. Although individual differences are widely assumed to account for judgment bias, there is a lack of studies that address several individual differences simultaneously. In the present study (N = 172 university students), we, therefore, investigated judgment bias as a function of individual differences regarding cognitive, metacognitive, and motivational characteristics, as well as personality traits. Results from hierarchical regressions showed that higher overestimation of factual questions was significantly associated with lower reading skill, higher self-perception of monitoring ability, self-perceptions of prior knowledge, as well as self-enhancement and status-enhancement. For inference questions, higher overestimation was also linked to lower reading skill and, moreover, to a higher amount of knowledge of general monitoring strategies, higher values for openness as a personality trait, and lower values for neuroticism. Findings generally suggest that learners' overestimations of text comprehension result from low insight into their abilities and a lack of understanding of what comprehension means. Moreover, results indicate that individual differences in judgment bias of comprehension are not limited to reading skill and prior knowledge.

Individual differences in teacher candidates' judgment accuracy regarding professional knowledge

Helen Ernst, University of Freiburg, Germany; Joerg Wittwer, University of Freiburg, Germany; Thamar Voss, University of Freiburg, Germany

Abstract:
Although professional competence is crucial in teachers' classroom performance, their actual professional competence is only weakly related to their judgment of competence. However, little is known about the size and direction of this judgment bias and how it is related to teachers' personal characteristics. We investigated teacher candidates' (N = 628) absolute judgment accuracy and judgment bias as the (squared) difference between self-rated and tested knowledge in three domains: mathematical content knowledge, pedagogical content knowledge and pedagogical knowledge. We further computed their relative judgment accuracy across the domains through gamma correlations. These judgment accuracy scores were then predicted by participants' cognitive ability test scores as well as self-ratings in personality traits (i.e., the Big Five), and teacher self-efficacy, via regression analyses. Whereas teacher candidates' absolute and relative judgment accuracy were unaffected by personal characteristics, the direction of judgment bias was negatively predicted by teacher candidates' cognitive abilities and positively predicted by their rating of self-efficacy, but not by the Big Five personality traits. These findings applied for all three knowledge domains and indicate that lower cognitive abilities and higher self-efficacy are related to overconfidence in teacher candidates' self-perceived knowledge.

DISCUSSANT: Anique de Bruin, Maastricht University, Netherlands
CHAIR: Marion Händel, University of Erlangen-Nuremberg, Germany; Stefanie Golke, University of Freiburg, Germany
ORGANISERS: Marion Händel, University of Erlangen-Nuremberg, Germany; Stefanie Golke, University of Freiburg, Germany

Members meeting	Time: 17:45 - 18:45	Location: LAA-G001

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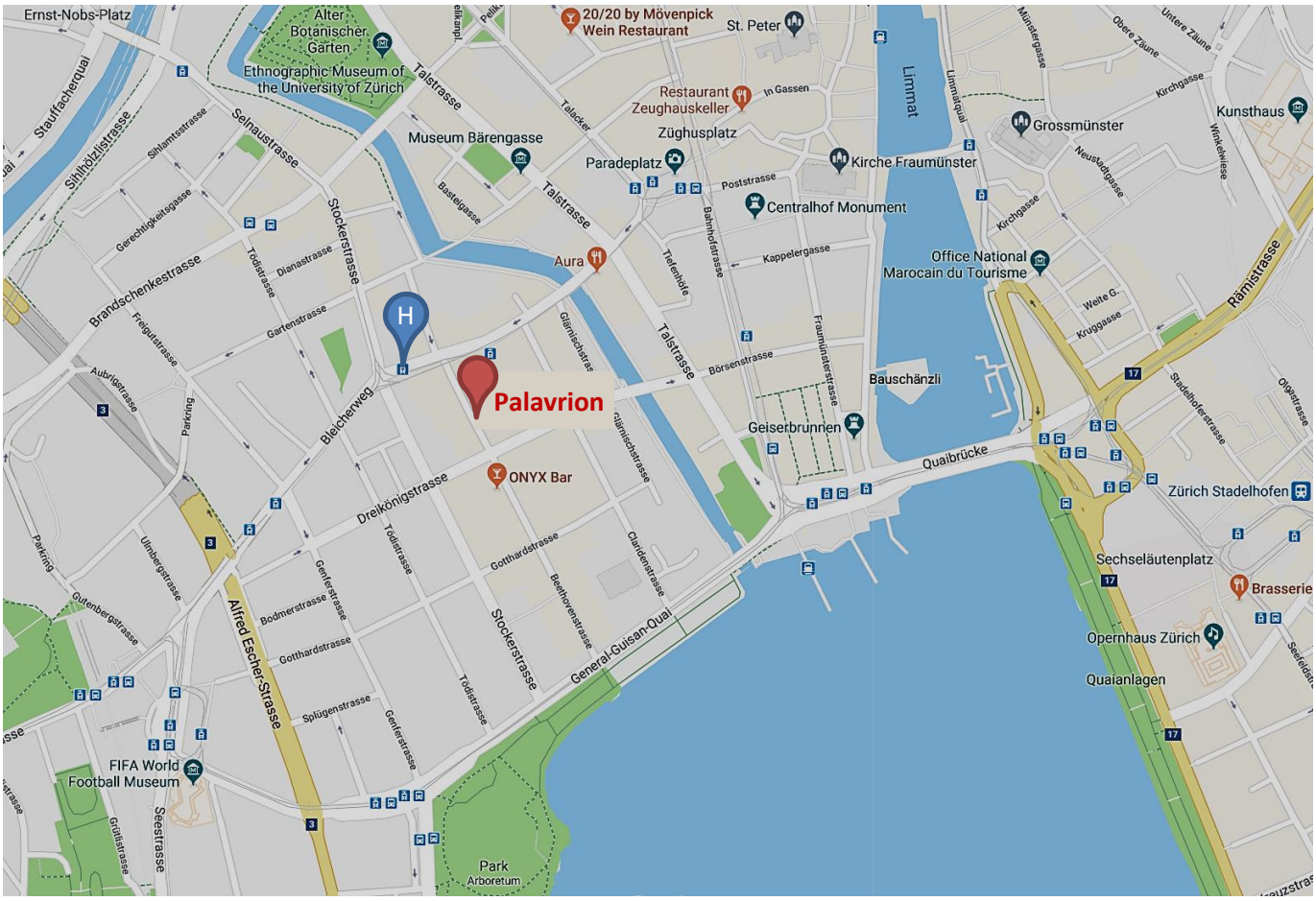

Parallel Session VI Time: 09:00 - 10:30 Location: LAB-F015

SINGLE PAPERS: DECISION MAKING, DECISION MAKING ABILITY, JUDGEMENT ACCURACY

The effect of metacognitive prompts on students' decision-making ability

Wen-Xin Zhang, National Taiwan Normal University, Taiwan; Ying-Shao Hsu, National Taiwan Normal Univeristy, Taiwan

Abstract:
This study aimed to develop a decision-making learning task for a socio-scientific issue (SSI) with metacognitive prompts and to explore the effect of the prompts on the students' decision-making ability for an SSI. Sixteen students in northern Taiwan participated in this study. Two parallel tests were used as pre- and post-tests to assess the students' decision-making ability. Moreover, students' responses on the worksheets were collected to investigate their reasoning using the content analysis method. In sum, the results of the Wilcoxon signed rank test indicated that the students showed significant improvement in their decision-making ability after participating in the decision-making learning task with metacognitive prompts. The results of the content analysis demonstrated that the students could consider the SSI from more viewpoints, most students (68.7 %) could successfully identify the dilemma in the SSI, cutoff and compensatory methods were two major strategies students used, and they usually made their decisions using evidence-based reasoning (58.49 % reasons with evidence). Keywords: socio-scientific issue, metacognitive prompt, decision making.

Reasons for and confidence in performance judgments: The unskilled and unaware effect revisited

Marion Händel, University of Erlangen-Nuremberg, Germany; Markus Dresel, University of Augsburg, Germany

Abstract:
Since its publication end of the 1990s, the unskilled and unaware effect entailed several further studies. As it stands, low-performing students seem inaccurate and overconfident in their performance judgments but obviously have some metacognitive awareness about that. The current study with 266 undergraduate students aimed to provide in-depth insights into the reasons for (in)accurate performance judgments and into the appropriateness of second-order judgments (SOJs). We implemented a general linear mixed model (GLMM) approach to study item-specific performance judgments in the domain of mathematics under consideration of person and item level. The analyses replicated the well-known effects.
However, the GLMM analyses revealed that low-performing students' lower SOJs seem not to indicate subjective awareness as these students provided SOJs quite unreasonably (lower SOJs for accurate than for inaccurate judgments). In addition, students' self-generated explanations for the provided judgments indicated that low-performing students have difficulties in recognizing that they possess topic knowledge to solve an item. In sum, our results indicate that students of all performance levels have some metacognitive weaknesses, which, however, occur subject to different judgment accuracy.

Dyads are more decisive and reckless than individuals and the role of metacognitive confidence

Sabina Kleitman, University of Sydney, Australia; Matthew Blanchard, University of Sydney, Australia; Simon Jackson, University of Sydney, Australia

Abstract:
Metacognition is a vital component of decision-making and self-regulated learning. While much is known about how metacognitive monitoring captured by confidence and its calibration affects individual performance and decision-making, relatively little is known about how working in a group affects confidence and its subsequent effects on decision-making. The aim of this research was to investigate the changes in metacognitive confidence, cognitive performance, and decision outcomes when people act in two-person groups (dyads) compared to when they act individually. Using a within-person design, undergraduate psychology students (N=116) completed a general-knowledge test as individuals and then together with a dyad partner. Each item was accompanied by a confidence rating and a decision to bet $10 on the answer. Real dyads were significantly more confident, decisive, and reckless than when working alone. This pattern of results was consistent with those of the virtual dyads suggesting that metacognitive confidence was responsible for the increased decisiveness and recklessness experienced by groups. The results also demonstrated the important role of individual differences: higher trait-confidence individuals became even more confident and decisive when working together than lower trait-confidence individuals working together. These findings have important theoretical and applied implications for decision-making.

CHAIR: Esther Kaufmann, University of Zurich

Parallel Session VI Time: 09:00 - 10:30 Location: LAB-F040

SINGLE PAPERS: MULTI- AND HYPERMEDIA

The Role of Emotion Regulation on Self-Regulated Learning with MetaTutor

Megan Price, North Carolina State University, United States; Michelle Taub, University of Central Florida, United States; Nicholas Mudrick, North Carolina State University, United States; Roger Azevedo, University of Central Florida, United States

Abstract:
Self-regulated learning (SRL) and emotion regulation have been studied as separate constructs which impact students' learning. SRL includes the deployment of various cognitive, affective, metacognitive, and motivational processes which have been shown to increase overall learning outcomes. Emotion regulation is typically divided into adaptive or maladaptive strategies. Adaptive emotion regulation has been proven to reduce negative emotions and increase overall learning outcomes. There is a general assumption that students who are proficient self-regulators are also proficient emotion regulators. This study examined the possible relationship between self-regulation and emotion regulation by dividing students into four different emotion regulation strategy groups (based on their ERQ scores) and comparing the frequency of metacognitive and cognitive strategy use between these groups as they interacted with MetaTutor, an intelligent tutoring system (ITS). Results showed significant differences between the emotion regulation groups and their use of cognitive and metacognitive processes. Our results emphasize the need to better understand how emotion regulation interplays with SRL during learning and can be used to provide tailored scaffolding and feedback to enhance learning outcomes during learning with ITSs by developing artificial agents to encourage students to engage in adaptive emotion regulation strategies before emotions can negatively impact their overall learning.

How do Students' Facial Expressions Predict Metacognitive Judgments during Multimedia Learning?

Nicholas Mudrick, North Carolina State University, United States; Michelle Taub, University of Central Florida, United States; Megan Price, North Carolina State University, United States

Abstract:
Using a metacomprehension-type paradigm, we investigated if undergraduates' (N = 46) facial expressions of an action unit correlated with confusion (AU4; brow lowerer) was related to their ease of learning (EOL) judgments, retrospective confidence judgments (RCJs), and multiple-choice responses during learning with the MetaTutor Learning Environment over 9 trials. We also examined how other metacognitive judgments (content evaluations; CEs) were predictive of multiple-choice responses and RCJs during multimedia learning. Multi-level modeling results indicated that expressions of AU4 differentially influenced students' EOL judgments and RCJs. Additionally, while EOL judgments and CEs were predictive of RCJs, only CEs for diagrams (and not text) were predictive of performance. Implications for augmenting theories of metamemory and multimedia learning and designing advanced learning technologies (ALTs) are discussed.

An Exploratory Mixed-Method Study about Conditions of the Overestimation-with-Internet Phenomenon
Stephanie Pieschl, University of Newcastle, Australia

Abstract:
Learners generally overestimate their own knowledge and performance and this bias is amplified when they use the Internet to answer questions. Given the ubiquitous use of the Internet in education, further research regarding the conditions of this Overestimation-with-Internet (OI) phenomenon is mandated. This mixed-method study (N = 30) combines a two-by-three within-subject experiment with a structured interview to investigate the conditions and limits of the OI phenomenon regarding types of questions and metacognitive judgments. In the Experimental Part I, learners answer six knowledge questions according to the experimental conditions (Type of Question: Factual vs. Explanatory vs. Socio-Scientific x Internet Access: Internet vs. No Internet) and make multiple Predictive and Retrospective Metacognitive Judgments, for example about their ability to answer the question. In theInterview Part II, a structured interview elicits learners' subjective theories about the conditions, mechanisms, and effects of the OI phenomenon. Currently, data collection is in progress. The results will have implications for future research, for example regarding the most parsimonious paradigm for investigating and potential mechanisms underlying the OI phenomenon, and for educational practice, for example regarding disseminating the results and giving advice regarding countermeasures to the educational community.

CHAIR: Francesca Suter, University of Zurich

Parallel Session VI Time: 09:00 - 10:30 Location: LAB-F017

SINGLE PAPERS: SUPPORTING SRL

Fixed vs. Faded Self-regulation Scaffolds – Effects on Students' SRL in Mathematics Context
Bracha Kramarski, Bar-Ilan University, Israel; Stella Gidalevich, Bar Ilan University; Oranim Academic College, Israel

Abstract:
Research has indicated that students can be taught SRL (self-regulated learning) in scaffolding programs; however, the fading role of that scaffolding is often an overlooked component. A unique approach for fading was adapted that offers a graduated reduction model of scaffolding according to the aspects involved in the program. This study of fourth-graders (n = 126) examines the effectiveness of IMPROVE metacognitive self-question prompts in a fixed (continuous) vs. faded (graduated reduction) scaffolds model during planning, monitoring and reflection phases, on the facilitation of students' SRL (metacognition, motivation), and mathematical problem solving at the end of the program. Findings indicated that the faded group performed best in metacognition (knowledge of cognition), motivation (mastery goal increase, avoidance goal decrease) and problem solving compared to the fixed group. The contribution of the study is discussed.

SRL-supported, guided-inquiry learning to promote self-efficacy and interest in STEM: does it works?
Marion Crauwels, KU Leuven, Belgium; Daan Moechars, KU Leuven, Belgium; Ilya Lebeau, KU Leuven,Belgium; Geert Van De Water, KU Leuven, Belgium; Carla Schramme, KU Leuven, Belgium

Abstract:
The aim of this study is to explore whether a holistic and innovative didactic model, called GILB-MIXP, that incorporates cognitive and metacognitive prompts to scaffold students' progress throughout the entire scientific enterprise, can be used as a framework to develop scientific guided-inquiry learning environments that enhance students' self-efficacy in scientific inquiry and students' interest in STEM-subjects and -careers. A scientific guided-inquiry learning environment according this innovative didactic for the topic of Alzheimer's Disease (AD) was developed and implemented. To investigate the effectiveness of the model, four learning groups were created by pairwise combining two elements: (a) the use of cognitive and metacognitive prompts (+MIXP or -MIXP) to scaffold guidance and (b) the degree of students' ownership with respect to the scientific practices (structured-inquiry versus guided-inquiry). We applied a quasi-experimental pre-posttest design. Participants were 12th-grade senior high school students with the subject science as a major part of their curriculum. The survey included questions concerning students' self-efficacy in executing scientific domain-general skills, interest and job preference. Results suggest that STEM education and STEM innovative-driven societies at short and at long term might benefit from the implementation of SRL-supported, guided-inquiry learning environments.

Instructing teachers to train metacognitive skills in students: Effects of informed training.
Marcel V. J. Veenman, Institute for Metacognition Research, Netherlands

Abstract:
Effects of metacognitive-skills training by teachers in schools are often less pronounced, relative to training in research settings. In this study, teachers received instruction for metacognitive-skills training and subsequently trained their primary-school students for two months during math and reading lessons. The emphasis was on informed training, addressing the benefits of using metacognitive skills, and on extended practice by students. Participants were 52 trained and 56 control primary-school students (11-12 yrs.). Control teachers and participants received no instruction or training. Metacognitive skillfulness of participants was assessed in a pretest-posttest design with logfile registration from computer tasks, which tasks differed in nature and content from the original training tasks. ANCOVA on metacognition data revealed that trained participants significantly outperformed control participants on metacognitive skillfulness. This effect of metacognition training on math and reading tasks to metacognitive skills on a transfer task proves that informed training and extended practice are powerful instruments for schoolteachers training metacognitive skills in students.

CHAIR: Clarissa Janousch, University of Zurich

Coffee/Tea break in building: LAA

JURE Keynote Time: 11:00 - 11:45 Location: LAA-G001

JURE KEYNOTE RECOGNITION

The parent factor in child self-regulation – parental beliefs, parenting practices, and the effectiveness of training
Kim Gärtner, Heidelberg University, Germany

CHAIR: Michelle Taub, EARLI Metacognition SIG Coordinator, University of Central Florida, United States

Lunch in building: LAA

Parallel Session VII Time: 12:45 - 14:15 Location: LAB-F040

SINGLE PAPERS: READING, READING COMPREHENSION

Reading Comprehension and Metacognition: The Importance of Inferential Skills

Antonio Gutierrez de Blume, Georgia Southern University, United States; Christian Soto, Facultad de Educación, Universidad de Concepción, Chile; Matthew Jacovina, Arizona State University, United States; Danielle McNamara, Arizona State University, United States; Nicholas Benson, Baylor University, United States; Bernardo Riffo, Facultad de Educación, Universidad de Concepción, Chile

Abstract:
Although metacognition is widely accepted as a crucial component of learning, its role in reading comprehension is not fully understood. In this project, we explored how reading comprehension measures related to components of metacognition. In Study 1, middle school students completed both a comprehension test and a self-reported measure of metacognitive knowledge and strategy use. A significant correlation emerged between students' evaluative reading knowledge and their performance on inferential reasoning questions. In Study 2, middle school students read a science text then made predictions about how they would perform on a comprehension test. Students' metacomprehension accuracy was related to their performance at different levels of understanding. Students who performed well on inferential questions had higher metacomprehension accuracy for inferential questions. Together, these results suggest that metacognitive knowledge is related to deeper understandings of texts. We discuss the implications of these findings and how future research on metacomprehension should consider different levels of understanding.

Testing the impact of metacognition and mind wandering on reading: An experimental study.

David Preiss, Pontificia Universidad Catolica de Chile, Chile; Miguel Ibaceta, Pontificia Universidad Católica de Chile, Chile

Abstract:
We implemented an experimental study to test whether attention monitoring and metacognitive strategies reduce the negative effect of mind wandering (MW) on reading comprehension. Specifically, we measured how often 116 high-school students (17-19 years) reported MW while reading a narrative and an expository text, both spontaneously and as response to a set of probes. The experimental group (52) was instructed to apply three metacognitive strategies: setting a goal before reading, making a pause to evaluate comprehension and making predictions. Two multiple regression analyzes were performed (one for each genre). Predictive variables were: experimental condition, fluid intelligence, type of school, daydreaming frequency, probe-detected mind wandering, and self-reported mind wandering. To test interactions, we implemented mediation and moderation analyses using Process. Controlling for the other variables, the experimental manipulation had a significant effect on reading comprehension. Probe-detected MW had a significant impact for expository text only. As regards attention monitoring, moderation analyses showed that the effect of MW on reading was not significant on the group with higher levels of self-reported MW episodes, that is, among those students that were more closely monitoring their attention. Results support the idea that training in metacognitive strategies helps to diminish the negative consequences of MW.

The Role of Executive Functions and Self-Regulation in Reading Comprehension among College Students

Vered Markovich, University of Haifa, Faculty of Education, Israel

Abstract:
Good readers implement a variety of meta-comprehension abilities in order to self-regulate their understanding, including calibration of comprehension (CoC). Specifically, here we explored the role of executive functions (EF) and self-regulation in reading comprehension (RC) focusing on the importance of individual's monitoring for understanding. Thus, exploring whether successful reading comprehension in college individuals is associated with improved EF abilities and enhanced self-monitoring skills. Our analysis revealed that improved comprehension achievements were correlated with higher accuracy in calibrating comprehension performance. Moreover, the tendency to overestimate self-ratings of competence was associated with lower performances in EF tests. In particular, overestimations were related to lower performances in the domains of working memory and response inhibition. These results highlight that difficulties with self-regulated learning specifically in college students when dealing with academic texts are likely to play a role in their academic achievements.

CHAIR: Beat Rechsteiner, University of Zurich

Parallel Session VII Time: 12:45 - 14:15 Location: LAB-F015

SINGLE PAPERS: CHILDRENS' COLLABORATED LEARNING

Self, Co and Socially Shared Regulation of Young Children During Collaborative Problem Solving

Seda Saraç, Bahcesehir University, Turkey; Yesim Mertkil, Ministry of National Education, Turkey; Sema Karakelle, Istanbul University, Turkey

Abstract:
The aim of this study is to explore self, other and socially shared regulation behaviors of young children during collaborative problem-solving process. Additionally, we wanted to investigate the impact of task difficulty on the occurrence of regulatory behaviors. The participants of the study were 16 triads of young children aged between 60 to 71 months (N=48). Two problem-solving tasks, adapted from Bryce and Whitebread (2012), used in the study. Each group built two shapes, an easy one and a hard one. All the problem-solving processes were videotaped and the final performances of the groups were photographed. Totally, 51,35 minutes of video data from 36 problem-solving episodes of 16 triads were collected. All video data were transcribed and running records of each problem-solving session were created. We are still in the process of data analysis. Group performances were scored. The verbal and non-verbal indicators of self, other and socially shared regulation behaviors are being coded for all groups and for both tasks. Percentage rates of self, co and socially shared regulation will be calculated for both (easy and hard) problem-solving tasks of all 16 triads.

Temporal sequences of socially shared regulation of learning: relations with age and performance

Valeska Grau, Pontificia Universidad Católica de Chile, Chile; Amaya Lorca, Pontificia Universidad Católica de Chile, Chile; Pietro Montagna, Pontificia Universidad Católica de Chile, Chile

Abstract:
There has been an increasing interest in the processes of socially-shared regulation of learning (SSRL) within collaborative activities in the classroom. Up to now, the sequences in which SSRL evolves while students are solving a collaborative task, and the relationship of those sequences and performance in the task have not been sufficiently explored. In the present study, 231 video-recordings of children working together in groups of 3 students were collected from 45 different schools. The groups were asked to solve a problem in collaboration that lasted between 15-20 minutes. Two types of analysis were developed to assess SSRL. The first analysis coded metacognitive regulation (MR), considering individual utterances as the unit of analysis. The second analysis ranked the collective activity in terms of symmetry and reciprocity.
An indicator of “SSRL” was created combining frequency of MR and symmetry and reciprocity. Results show that children at all ages tend to exhibit higher MR and SSLR from the middle of the sessions onwards, and there differences in MR and SSLR according to performance in the task. Also, different patterns of SSLR were found according to age groups. Theoretical and educational relevance are discussed.

Self-Regulation and School Readiness: Mediating Role of School Relationships

Fahretdin Hasan Adagideli, Istanbul University, Turkey; Ozana Ural, Marmara University, Faculty of Education, Turkey; Özgül Polat, Marmara University, Faculty of Education, Turkey

Abstract:
This study aims to investigate the link between self-regulation, school readiness, and school relationships. It is suggested that children's self-regulation influences their school relationships (e.g., child-teacher and peer), which in turn affects their school readiness. Participants of the study are 195 preschool children. School readiness is assessed by the teachers' rating and direct assessment. While the temperamental aspect of self-regulation (i.e., effortful control) is obtained from teachers, executive functions are assessed with three behavioral measures. In addition, teachers fill out child-teacher relationships and peer relationships scales for children as potential mediators. Findings show that certain aspects of self-regulation account for variance in the school readiness independent of measured intelligence. Although working memory and attentional shifting aspects of executive functions predict the direct assessment of school readiness, school relationships do not mediate between executive functions and school readiness. Furthermore, the attentional focusing aspect of effortful control not only predicts the teacher-rated school readiness directly but also predicts it through the partial mediation of children's prosocial and anxious behaviors towards peers. Findings will be discussed within the scope of school readiness with possible implications.

CHAIR: Clarissa Janousch, University of Zurich

Parallel Session VII Time: 12:45 - 14:15 Location: LAB-F017

SYMPOSIUM: USING MULTICHANNEL DATA TO EXAMINE SELF-REGULATED LEARNING IN INDIVIDUAL AND COLLABORATIVE SETTINGS

This symposium brings together empirical studies that employ new and unique approaches to using multichannel data to assess and understand metacognitive monitoring processes used during self-regulated learning. This symposium provides new insights that enhance our practical and theoretical understanding of metacognitive processes as they emerge during learning of complex topics. All contributors analyze metacognitive processes during self-regulated learning at an individual or group level. All contributions illustrate how we can develop methods for overtly investigating metacognitive processes (that are normally measured with self-report questionnaires) along with the accompanying social and contextual factors that influence them. These studies use different types of multichannel data (eye tracking and electrodermal activity), and all three contributions differ with respect to the methods used to analyze this multichannel data, such as multi-level modeling, hidden Markov models, and multidimensional recurrence quantification analysis to explore different micro-level metacognitive processes. As such, this symposium constitutes a novel set of presentations aiming to better understand the temporal unfolding nature of metacognitive processes not only from what is visible or observable, but from the behaviors that are often invisible when using product data, and have not been used conventionally in self-regulated learning research.

Do Eye Movements Contribute to Accurate Metacognitive Judgments during Multimedia Learning?
Nicholas Mudrick, North Carolina State University, United States; Michelle Taub, University of Central Florida, United States; Dennis Hernandez, North Carolina State University, United States

Abstract:
Successful self-regulated learning (SRL) with multimedia requires students to actively monitor and evaluate the relevancy of the content they are learning from. Content evaluations (CEs), or judgments whereby students evaluate the relevancy of the material they are viewing to their current goal can influence the amount of time and effort students spend learning with multimedia content. However, limited research has investigated the processes underlying accurate CEs with multimodal, multichannel process data measures like eye tracking. In this study, we examine how students' eye movements can reveal how students make accurate content evaluations for different representations of information (i.e., text and diagram) during learning with MetaTutorIVH (an intelligent virtual human-, multimedia-based learning environment). Results from multilevel modeling indicate that proportions of time spent fixating on the science questions and text, but not the diagram, influence the accuracy of students' diagram CEs. Our results emphasize the importance of multimodal, multichannel data to examine cognitive and metacognitive SRL processes during multimedia learning.

Monitoring progress of collaborative learning – what can physiological synchrony tell?
Muhterem Dindar, University of Oulu, Finland; Sanna Järvelä, University of Oulu, Finland; Jonna Malmberg, University of Oulu, Finland; Iman Alikhani, University of Oulu, Finland; Tapio Seppänen, University of Oulu, Finland

Abstract:
Socially-shared regulation of learning (SSRL) framework acknowledges that learning in collaborative settings occurs as a situated, cyclical, and dynamic phenomena. Therefore, research on SSRL should adopt instruments that can capture the dynamicity and complexity of SSRL. In this regard, utilization of physiological measures and analysis of physiological data can reveal about the temporal characteristics of SSRL processes. From the perspective of SSRL it was also stated that monitoring of learning progress is essential for successful collaboration. Drawing on this, this case study investigates the relationship between physiological synchrony (PS) and monitoring during collaborative learning. The physiological data in the current study is comprised of electrodermal activity (EDA) of collaborating students. Multidimensional Recurrence Quantification Analysis (MdRQA) was conducted to calculate the participants' PS. Monitoring utterances during collaborations was identified through video coding. The findings of the study demonstrate the affordances of MdRQA for the analysis of complex physiological data and indicates that investigation of PS among the students might provide useful insights about the nature of collaborative learning.

Monitoring in collaborative learning - Revealing the hidden structure of physiological states

Jonna Malmberg, University of Oulu, Finland; Ed Fincham, The University of Edinburgh, United Kingdom; Sanna Järvelä, University of Oulu, Finland; Dragan Gašević, University of Edinburgh, United Kingdom

Abstract:
The study investigated the hidden structure of monitoring events and electrodermal activity (EDA) during collaborative learning situation. Specifically, it investigated how the monitoring events are associated with EDA peaks. Participants of the study were 12 high school students working in groups of three students during seven collaborative learning sessions each lasting for 75 minutes. The topics of collaborative learning were related on physics. The collaborative learning sessions were videotaped and the students wore Empatica S3 sensors that measured their EDA. First the video data was analyzed using qualitative content analysis to identify monitoring events. Second the analysis focused on identifying EDA peaks according to their amplitude. Third, hidden markow model (HMM) was used identify patterns on how monitoring events and EDA typically associate in the context of collaborative learning. The results show, that EDA peaks were associated with events that did not include monitoring activity. The results of HMM indicate, that monitoring activities are associated with EDA peaks. It can be concluded that when physiological reactions are present, the learners are also likely to engage for metacognitive monitoring, which actually can potentially lead to decrease in EDA.

DISCUSSANT: Philip Winne, Simon Fraser University, Canada
CHAIR: Michelle Taub, University of Central Florida, United States
ORGANISERS: Jonna Malmberg, University of Oulu, Finland; Michelle Taub, University of Central Florida, United States

Coffee/Tea break in building: LAB

Parallel Session VIII Time: 14:45 - 16:15 Location: LAB-F015

SINGLE PAPERS: MOTIVATION AND ACHIEVEMENT

Role of Goal Orientation on Metacognition and Cognitive Strategies in Intelligent Tutoring Systems
Elizabeth Cloude, North Carolina State University, United States; Michelle Taub, University of Central Florida, United States; Roger Azevedo, University of Central Florida, United States

Abstract:
Cognitive, affective, metacognitive, and motivational (CAMM) processes are critical components of self-regulated learning (SRL) and essential for knowledge acquisition. Exploring the dynamic relations between these processes is imperative to understanding the complexities of learning and furthering the development of intelligent tutoring systems (ITS). Major gaps in research exist because ITS possess tools that foster CAM processes with the exclusion of motivation, which is problematic since SRL is non-existent without motive to learn about a particular topic (Azevedo, et al., 2017). Researchers currently rely on self-report measures that exhibit reliability and validity concerns (Winne & Jaimeson, 2002) when assessing motivation. In this study, we examined the role of goal orientation on metacognitive processes and cognitive strategy use when 98 college students learned about biology when engaged with a hypermedia-based intelligent system called MetaTutor. Overall, results indicate there were no significant differences among goal orientations and metacognitive processes and cognitive strategy use. We discuss the inconsistencies in our findings with previous research and developing methodologies that could address the challenges of measuring motivation in real-time. For instance, future studies have yet to implement multi-channel data such as eye-tracking, facial expressions and emotions, heart rate, and log-files when measuring motivation.

Investigating grit and its relation to students' motivation, metacognition and achievement
Yves Karlen, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland; Katharina Maag Merki, University of Zurich, Switzerland; Carmen Hirt, University of Zurich, Switzerland; Francesca Suter, University of Zurich, Switzerland

Abstract:
In this study with N = 1250 students from the upper secondary school level we investigated the relationship among grit, several motivational aspects of self-regulated learning, and achievement in the context of writing an academic paper over a longer period. Grit is consisting of two subscales, consistency of interest (CI) and perseverance of effort (PE). Results from multiple regression analyses indicated that PE is positively related to self-efficacy, metamotivational knowledge and motivational regulation strategies. No effects were found for CI on motivational aspects of self-regulated learning. PE predicted current achievement even after including motivational aspects of self-regulated learning and controlling for prior achievement. In contrast, CI showed no relation to performance. All in all, the results indicate that grit, particularly PE, is both an important predictor of self-regulated learning and achievement.

Understanding academic performance in higher education
Dyanne Escorcia, University of Poitiers, France

Abstract:
The present study aimed to determine the predictors of academic success for first- and third-year students enrolled on different courses at university, taking metacognitive processes of writing, education variables, and socio-demographic factors into account. A questionnaire was used in order to measure specifics self-perceived metacognitive components of writing. Participants were 231 university students enrolled in three disciplinary fields (i.e., sciences, human and social sciences, and language and literature) in an institution located on western France. The results showed that two metacognitive components were significant positive predictors of academic performance: conditional metacognitive knowledge and declarative metacognitive knowledge. Moreover, education variables (i.e. kind of high school track and domain) and socio-demographic factors (i.e. individuals gender and parental socio-economic status) appeared was being important predictors of academic success in higher education.

CHAIR: Yves Karlen, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

Parallel Session VIII Time: 14:45 - 16:15 Location: LAB-F040

SINGLE PAPERS: METACOGNITIVE MONITORING

Why are executive functions and metacognitive monitoring related? An experimental approach.
Donna Bryce, University of Tübingen, Germany

Abstract:
Much of the research into how executive functions and metacognitive skills are related has been conducted using correlational designs. While findings are mixed, they generally indicate that people who perform well in executive function tasks can also better monitor and control their performance in some other task, as compared to people with weaker executive function abilities. Using a within-subjects experimental design, I aimed to examine how executive functions may contribute or compete with metacognitive monitoring processes. In these experiments, participants completed typical executive function tasks and provided estimates of their own performance after every trial. Initial results indicate that in a Stroop task (which measures inhibition), increasing the executive function demands results in more accurate monitoring, whereas in a working memory task increasing the executive function demands results in less accurate monitoring. These findings demonstrate that the relationship between metacognitive monitoring and executive functions is highly complex and different for each executive function. Further, this new experimental approach has provided unique insights regarding the factors that influence monitoring accuracy.

Beyond Counting the Correct Responses: Metacognitive Monitoring and Estimations about Test Scores
T. Oguz Basokcu, Ege University, Turkey; Mehmet A. Guzel, Turkey

Abstract:
Assessment tools mainly rank students based on their total correct responses. Amongst those, for instance, Programme for International Students Assessment (PISA) is unluckily no exception. The study, therefore, aimed at investigating the students' metacognitive monitoring performance (i.e., ability of differentiating correct and incorrect responses accurately) beyond grading only. The sample, which composed of 6th graders (N=2832; 1422 male, 1410 female) and randomly selected from 15 primary schools in Turkey, took PISA test's maths section. Beside solving the questions, they decided whether they could solve the questions and rated their confidence levels on the correctness of their responses, which allowed to measure their monitoring performance (i.e., Area Under Curve). They also expected how their performance would be before the test, and estimated their own and peers' performance after responding questions. Results showed that monitoring ability was found significantly better as the total score increased. Low-performance group overestimated their actual scores whereas high-performance group did exactly the opposite. After-test estimations were even more inaccurate amongst low-performance group, however, high-performance group estimated theirs accurately. Each group overestimated their peers' performance too. Overall, the study suggests utilising additional assessment tools at testing has a potential to reveal more of the performance than conventional scoring.

The effect of re-reading strategy in comprehension monitoring

Maria Sofologi, Aristotle University of Thessaloniki, Greece

Abstract:
The aim of the present study was to investigate the effect of re-reading strategy in comprehension monitoring skills in fifth grade children. One hundred and seventy (Girls = 85) children participated in the study. Two groups (single reading and re-reading group), matched for their vocabulary skills, digit span, general reading and text comprehension ability, were selected. All the participants were examined in text comprehension tasks. The re-reading group had the opportunity after the first reading of the texts to read again the texts before answering comprehension questions. After reading the three texts, the participants were asked to answer eight comprehension questions for each text. Each question was followed by an estimation of their feeling of confidence for each answer. Absolute and bias accuracy indexes were calculated. Results showed that children at the end of elementary school tend to overestimate their level of performance in text comprehension tasks. The re-reading strategy, however, can increase the level of their monitoring accuracy. According to mean level differences, the re-reading group had significantly higher mean performance in the reading comprehension questions as well as higher accuracy and lower overestimation of the level of actual performance. Educational implications of the results are discussed.

CHAIR: Beat Rechsteiner, University of Zurich

Parallel Session VIII Time: 14:45 - 16:15 Location: LAB-F017

SINGLE PAPERS: TEACHERS' INFLUENCE ON SRL

Is young children's self-regulation in music lessons related to teachers' autonomy supportive style?
Antonia Zachariou, University of Roehampton, United Kingdom; Arielle Bonneville-Roussy, Roehampton University, United Kingdom

Abstract:
Autonomy-supportive contexts are thought to promote students' self-regulation. However, research looking at this link in young learners is scarce, potentially due to the limitations of self-report measures. This study adopts a novel, observational approach, to investigate autonomy support from teachers and self-regulation from young pupils in the context of music lessons. The first aim of this study is to validate an observational measure of autonomy support and self-regulation for use with young learners. The second aim is to investigate whether autonomy supportive teaching styles are related to music pupils' self-regulation. This study takes a quantitative observational perspective. A sample of 30 music tutors and their 60 young pupils (aged 5-8) are video-recorded during a one-to-one music lesson. Autonomy support is coded on the basis of a measure inspired by Whipple, Bernier and Mageau's (2011) observational measure for maternal autonomy support. The self-regulation coding scheme identifies positive self-regulatory behaviours in music (Zachariou and Whitebread, 2015) and failures in self-regulation (Bryce and Whitebread, 2012). Preliminary results are presented; it is hypothesised that autonomy supportive teaching styles will be positively related to young learners' levels of self-regulation during music lessons. This study can support further research into learners' self-regulation and teachers' autonomy support.

The relation between teachers' classroom practice and students' SRL: A multilevel approach
Sofie Heirweg, Ghent University, Belgium; Mona De Smul, University of Ghent, Belgium; Geert Devos, Ghent University, Belgium; Hilde Van Keer, Ghent University, Belgium

Abstract:
Notwithstanding the importance of self-regulated learning (SRL), large differences exist in students' SRL competences. Hence, in view of effectively promoting SRL, a growing body of studies currently investigates how student and teacher/class characteristics contribute to differences in students' SRL competences. Unfortunately, only few studies successfully integrated both student- and teacher-level variables into one analysis, thereby statistically taking into account the nested structure of students clustered in classes. This is nevertheless valuable in order to understand to which extent individual background characteristics (student level) on the one hand and aspects in teachers' classroom practice (teacher/classlevel) on the other hand contribute to students' SRL. The current study aims to fill this gap by conducting multilevel analysis including both student (i.e., gender, general achievement) and teacher level (i.e., implementation of SRL, self-efficacy) explanatory variables and relating these to students' use of cognitive, metacognitive and motivational strategies.

What would you demand beyond mathematics? Investigating teachers' facilitation of student SRL
Engin Ader, Bogazici University, Turkey

Abstract:
In this study, I intend to investigate teachers' facilitation of student metacognition and SRL while they are engaged in a PD program supporting their quality of implementation of mathematics tasks. Even though facilitating students' metacognition and SRL was not an explicit focus of the PD program, it is important to investigate whether teachers' facilitation of students' metacognition and SRL evolves and in what way, while they are engaged in such a program. The participants are 4 primary school teachers in a small private school and their teaching is investigated through 10-13 lesson observations for each teacher and accompanying reflection interviews through one school year. An observation tool for facilitation of student metacognition and SRL is used for coding of teachers' practice (Spruce & Bol, 2015).

CHAIR: Clarissa Janousch, University of Zurich

Keynote III	Time: 16:30 - 17:30	Location: LAA-G001

KEYNOTE SESSION

Partnering with Teachers to Design and Implement Assessments for SRL.
Nancy Perry, University of British Columbia, Canada

CHAIR: Katharina Maag Merki, University of Zurich, Switzerland

CONFERENCE CLOSING	Time: 17:30 - 17:45	Location: LAA-G001

CLOSING WORDS

Conference Chair: Yves Karlen, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

EARLI Metacognition SIG Coordinator: Anique de Bruin, Maastricht University, Netherlands

POST-CONFERENCE WORKSHOP Time: 08:30 - 12:30 Location: LAB-F015

HONING PROTOCOLS AND PRACTICES FOR STUDYING SELF-REGULATION IN CLASSROOMS

This workshop provides space for researchers interested in studying metacognition and self-regulation in naturalistic contexts (e.g., classrooms) to come together to consider: the utility of various methods and measures for "capturing" self-regulation of/for learning (SRL) in real contexts and real time; what challenges are associated with using various tools and protocols, and ways to address those challenges; and the "next wave" of data collection in SRL research (i.e., How can we design research to generate knowledge that will make SRL and SRL-promoting practices more integral to earning in classrooms and other naturalistic environments?).

Target Group/Audience
This workshop will appeal particularly to researchers preparing to or already engaged in studying metacognition and self-regulation in naturalistic settings such as classrooms. Participants will be active; they will be invited to provide feedback about the shared projects and protocols, but also to share their own ideas and experiences studying SRL in real time and authentic events.

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Nancy Perry, University of British Columbia, Canada
Therese N. Hopfenbeck, University of Oxford, United Kingdom

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- Nancy Perry, University of British Columbia, Canada
- Nikki Yee, University of British Columbia, Canada

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