NEWSLETTER

International Group for the Psychology of Mathematics Education

December 2018

In this issue

Message from PME Presidents

Dear Colleagues from PME,

Marking the first time PME was held in Sweden, PME 42 in Umeå (July 3-8) drew over 680 participants from over 49 countries and was seen by all who attended as an experience not to be forgotten. With a conference theme of Delight in Mathematics Education, the conference chairs of Ewa Bergqvist and Magnus Österholm and the whole local organizing team delighted our minds – with a stimulating scientific program – and our senses with the midnight sun and an open air conference dinner. From the opening session right through to the closing session every need of the many participants was anticipated and while a well-structured conference schedule to the ample spaces to present, listen, and confer the scientific program fed our minds, fika filled our stomachs. For me, this was a special conference as I was able to merge my passion for PME with the joy of being back in the country of my childhood.

Scientific and social programs aside, PME 42 was also a time of managing our affairs. At our AGM we approved the special project, School Mathematics: Connections to Social and Cultural Contexts in East and Central Africa to be held Strathmore University in Nairobi, Kenya in the summer of 2019. We also approved a PME regional conference to held in Moscow, Russia in March 2019 (https://education.yandex.ru/pme/en/).

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Message from the Editors

Dear PME colleagues,

Welcome to the December 2018 Newsletter! In this issue, we remember the PME 42 conference in Umeå and bring reports from across the conference. Our thanks go to all the colleagues who organised group activities at PME 42. You can find their reports in this issue, along with the experiences of some PME members from the conference.

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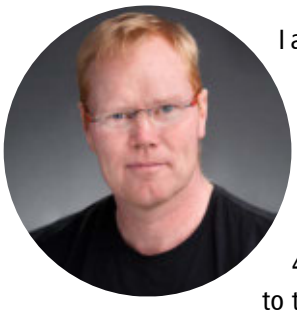
Message from PME President (continued)



I am proud to be part of an organization that is so committed to geographic diversity and the promoting of mathematics education in underrepresented countries. In this regard, we also announced the location of PME 44 (Khon Kaen, Thailand) and PME 45 (Alicante, Spain), both of which speak to the commitment of PME to attend to the geographic diversity of our members and to the commitment of our members to step up and host the annual conference.

In our ongoing bid to achieve charitable status in the UK, we also approved changes to our constitution and membership fee in order to come into alignment with the UK Charities Commission. With these changes approved we will now be able to file an application with the Commission and hopefully have good news to report by PME 43.

For the first time in PME history, we also voted in a president-elect. This procedure was approved at PME 40 and was put in place to allow for a one year overlap between the incoming and outgoing president. I am happy to announce that Markku Hannula was elected as the president-elect and he and I are working closely together in the run up to him becoming the president after PME 43.

Markku was not the only person elected at PME 42, however. As we said goodbye to Kim Beswick (Australia), Csaba Csíkos (Hungary), Cris Edmonds-Wathen (Australia), and Stanislaw Schukajlow (Germany) and thanked them for their years of service to the PME-IC and PME we also welcomed four new members to the IC. Elected to the IC were Judy Anderson (Australia), Anika Dreher (Germany), Anthony Essien (South Africa), and Maitree Inprasitha (Thailand). With Cris Edmonds-Wathen's departure from the IC we also saw a change in our executive with Laurinda Brown (elected at PME 41) taking over as treasurer.

Looking forward to PME 43, it is already time for us to start thinking about registration, submissions, and reviewing as well as the wonderful experiences that Johann Engelbrecht, Sonja van Putten, and their team have planned for us. The conference website is already active and can be found at https://www.up.ac.za/pme43. I look forward to working with the PME 43 team in the coming months and I look forward to seeing you in Pretoria July 7-12, 2019.

Sincerely,
Peter Liljedahl

Message from the Editors (continued)

Many exciting developments are taking place in our community. You can read about them in the messages of the presidents as well as in the reports of the different Portfolio Groups of the International Committee (IC).

At the last AGM (which, as always, took place at the PME conference) we thanked the departing members of the IC for their contribution to PME especially over the past years: Kim Beswick (Australia), Csaba Csikos (Hungary), Cris Edmonds-Wathen (United Kingdom), and Stanislaw Schukajlow-Wasjutinski (Germany). And we welcomed the new-elected IC members and look forward to their work: Judy Anderson (Australia), Anika Dreher (Germany), Anthony Essien (South Africa), and Maitree Inprasitha (Thailand). In addition, a historic event happened with the election of PME's first president elect: Markku S. Hannula (Finland). You can read his first message just above this text. With wonderful memories of PME 42 in our minds, we look forward to PME 43 in Pretoria, South Africa in July 2019. In case you do not want to wait that long to attend a PME conference you might also attend PME & Yandex Russia Conference in Moscow, Russia in March 2019. This will be the second regional conference after the first one hosted in Chile in November 2018. Information and reports on the conferences are provided in the Newsletter. In case you might be infected by those interesting reports to host a regional conference yourself or to apply for a grant to conduct a PME Special Project, the necessary information is also provided in the Newsletter. Depending on the financial surplus of PME, there might be next round of applications in which you might have a go.

We'd like to end our message with giving credits to our dear colleague Keith Jones, who is going to leave the editors' team after three years of a delightful cooperation. We thank him for his hard work for the Newsletter, the time spent with collecting articles, overseeing the

production process, downsizing the final PDF-version, and so much more. Working together with you has been a pleasure, Keith! Related to Keith's withdrawal from the editors' team, we are very happy to welcome Daniel Sommerhoff of Germany as an interim member for the production of this issue of the Newsletter. We are very grateful to Daniel's intensive work on the good looks of this issue. Well done, isn't it? To be able to publish the Newsletter in its usual form in the future, the editors' team is looking for a new editor with experience with editing software. Please have a look at our want ad right before the announcement forum of the website at the end of the Newsletter.

If you'd like to be on board in the future, we are very happy to receive your application!
We hope that you enjoy this issue of the newsletter and find it informative and thought-provoking.

Maike Vollstedt, Igor' Kontorovich, Keith Jones, & Daniel Sommerhoff
Feedback on the newsletter is always welcome!
(newsletter@igpme.org)

Message from PME President Elect

Dear friends at PME,

PME 42 conference in Umeå was wonderfully organized and the scientific program was stimulating. The Swedish team did great job making everyone feel welcome and everything run smoothly. For me, personally, it was an exciting event, as I became the first president elect of IGPME. It has been a wise decision to establish a system where the president elect can shadow the work of the acting president for one year before taking the lead of PME activities. I did serve in the PME International Committee (IC) 2003-2007, but many things have already changed and I have a lot to learn.

I have participated the IC post-conference meetings in Umeå and several on-line meetings of the PME Executives. I must say that Peter Liljedahl as the president and the whole IC are wonderful. PME is in really good hands. Our organization has very good governance policies and practices, and we are finally receiving a more solid legal status as an organization. Our financial situation is excellent and our scientific community is vibrant. I am really thankful for all the good work that the past presidents and IC members have been doing for PME.

Our financial surplus has given us a possibility to expand the scope of our activities. PME has been establishing new activities: Early Researcher Day, special projects, and regional conferences. I was a keynote speaker at the special project "Fostering Professional Development of Early Career Researchers in Ghana" in 2017, and I will participate in the regional conference in Moscow in March. I find these activities useful and very much in the spirit of PME. However, there is always the question whether the resources could have been used more efficiently elsewhere. Soon we have enough experiences to reflect on these new PME activities and to decide how we want to continue.

Our yearly conferences are an established event for mathematics educators. There has been a good balance between continuity and development in the conferences. Some new scientific activities have been introduced every now and then, and the membership has been active in discussing our policies in a constructive spirit. PME is in a good shape, and the active membership is the most important ingredient to keep it thriving for years to come.

The next PME will be just a little east from Umeå – and quite a far southwards. Many of us PME people are already working on our submissions for PME 43 in Pretoria, South Africa. The South African team is doing a wonderful job and the venue is perfect for an international conference. It will be another memorable PME conference, and I look forward to seeing many of you there.

Markku Hannula

PME 42 Reports

Working Group Report: Integrating Mathematics in STEM Education: An International Perspective

Submitted by Judy Anderson (Australia) and Yeping Li (United States of America, China)

Since there has been limited attention to STEM education research in the mathematics education community (English, 2016), last year we convened the first Discussion Group on STEM education at the PME conference in Singapore (Anderson & Li, 2017). With over 35 participants from more than 12 countries, it was evident there was a need for a community of scholars from the mathematics education research community to consider the role of mathematics in STEM education in schools, to critique the approaches to integrating mathematics with the other disciplines in STEM education, and to share the challenges of coordinating competing and dissimilar 'practices' across the diverse disciplines in STEM (Hobbs, Cripps Clark, & Plant, 2018). Participants were keen to continue the conversation this year and to consider possible contributions to a scholarly publication on STEM education. The goal of our working group sessions was to provide the opportunity for mathematics educators and researchers from diverse contexts to connect, share experiences and develop chapter proposals for the book.

We had more than 20 participants from 14 countries to attend both working group sessions at PME in Umea. Except for the two convenors of the group, all participants were new to our STEM research group – it is therefore not surprising that initial discussions centred around similar issues to those discussed in Singapore. Questions discussed included:

- Do we have a shared understanding of STEM education?
- What is the role of mathematics in developing integrated STEM curriculum for students?
- What different STEM education approaches are being implemented internationally?
- What are the benefits of an integrated STEM education for students?
- What evidence is being used to justify, sustain and scale up STEM education initiatives in different contexts?

Based on participants' current research interests, they were keen to discuss possible contributions to a research volume on integrated STEM education with possible themes including:

- Student perceptions and experiences of STEM across the different levels of schooling
- Teachers as designers of STEM curriculum and learning experiences
- Pre-service and in-service STEM teacher education
- Pedagogical approaches to integrated STEM education
- Increasing participation and student engagement in STEM including issues of gender equity

There appear to be important considerations at the conceptual level as well as at the pragmatic/implementation level. The later could lead to a series of case studies to reveal what is happening in different countries and/or different contexts. The working group agreed it would be desirable to develop and publish a volume on STEM education viewed in an international context with specific themes and questions that are important to the international community, especially from the mathematics educators' points of view.

Since the conference in July, abstracts have been submitted for the proposed publication with first drafts of chapters to be submitted at the end of January 2019.

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Hobbs, L., Cripps Clark, J., & Plant, B. (2018). Successful students – STEM program: Teacher learning through a multifaceted vision for STEM education. In R. Jorgensen & K. Larkin (Eds.), STEM education in the junior secondary (pp. 133-168). Singapore: Springer.

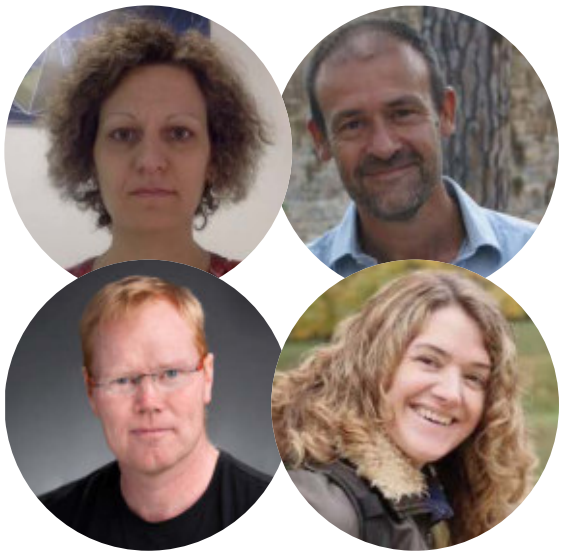
Working Group Report:
Teacher Tensions as a Lens to Understand Teachers' Resistance to Change

Submitted by Chiara Andrà (Italy), Pietro Di Martino (Italy), Peter Liljedahl (Canada) and Annette Rouleau (Canada)

Teaching in general, and teaching mathematics in particular, is a complex endeavour. Looking at the teaching of mathematics through the lens of tensions allows us to represent this complexity and to capture the nuances and problems of school life (Berlak & Berlak, 1981). Our goal with this working group was to broaden our understanding of the role of tensions in research related to mathematics teacher practice and knowledge.

In our first session, we examined how teacher tension emerges in literature, and extended it through our own experiences with teacher tensions (see Liljedahl et al., 2015). In small groups, we then discussed how the current research positioning of tension as the affective result of teachers having to manage between competing, worthwhile aims meshed with our collective experiences with teachers, as researchers in mathematics education and/or as mathematics teacher educators. Participants proposed scenarios that suggested tension is not necessarily binary; it can be thought of as *between* or *with*. For example, participants suggested tension can occur *between* new norms and regular routines or tension can occur *with* time, e.g., a lack of time to assess, to teach the curriculum, and to prepare. Participants' experiences also highlighted that tensions can be thought of as resolvable in that they can result in a conclusion garnered from several choices that may not please everyone but does satisfy the problem.

In the second session we discussed possible pedagogical approaches to invoking teacher tension as participants considered the question: How do tensions help us to understand, and to provoke, change?



Participants suggested that tension shifts pedagogy (and mathematics) by directing attention and intention to troublesome aspects of teacher practice. We finished the second session by co-constructing a list of 15 potential research topics in tensions, e.g., the ethical dimension of creating tension, productive vs non-productive tensions, patterns in managing tensions and emotions. The working group ended with a short discussion on next steps for future collaborations.

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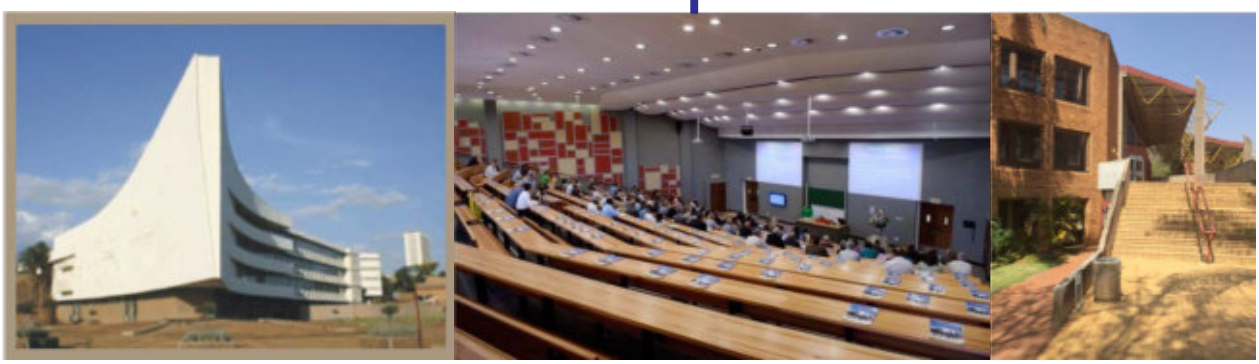
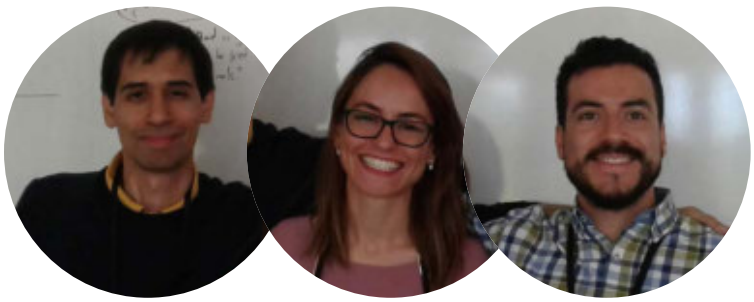
PME 43 - Impressions



Working Group Report: Mathematics Education Research from and in Latin America

Submitted by Vanessa Neto (Brasil), Raimundo Elicer (Denmark) and Gustavo Bruno (Spain)



Following our common interests in mathematics education research in the Latin American context, we Vanessa Neto (Federal University of Mato Grosso do Sul - Brazil), Raimundo Elicer (Roskilde University - Denmark) and Gustavo Bruno (Autonomous University of Madrid - Spain) gathered to elaborate on an understanding about the school mathematics context in the region from a socio-political perspective on mathematics education. The strategy involved exploring PME 42's topic "delight in mathematics education" by evoking resembling particularities among Latin American countries as examples of psychological manifestations of the socio-political in school mathematics.

We gathered Latin American researchers and others who had shown interest in the region and its research context to discuss about the approach that we had adopted in our research, in order to elaborate an agenda for mathematics education research from a socio-political perspective.

In our interpretation, school mathematics has been taking an important role in the society. The statement about the importance of "mathematics for all" is sustained by the idea that "one such attribute of a modern human being is her ability to understand and master the world. Also, the development of mathematical skills in children is understood as essential to the development of nations in the logic of modernity: "Math skills are proven to be fundamental to a person not only as a skilled workforce, but also as a citizen", to achieve "social progress, economic growth, and citizenship" (Valero, 2017, p. 123). Our argument is that these cadres link socio-political perspectives that produce an "alchemy", in the sense of optimistically turning anything into gold (Popkewitz, 2004), with specific psychological inscriptions in Latin American students. So, with this argument we opened the discussion together with our colleagues.

In the first slot Bruno addressed this "delight" theme, in regard to mathematics education research, the fabrication of psychological inscriptions (Popkewitz, 2004), and its socio-political implications. After this, Neto showed some illustration of the effects on the subject via mathematics education as a political technology. All invited researchers discussed in groups and provided a summary of how they are understanding "psychological inscriptions" in mathematics students in each of the countries represented. The conclusion about this first part was that some colleagues resisted our research approach but others were surprised and engaged in the discussion. The Latin American context needs to create a common ground to discuss their problems in mathematics education, and this WG was the first step to build an agenda between both young and senior researchers on the continent.

In the second slot, we needed to continue the discussion started in the first part because many colleagues wanted to question us and tell us about their experience. After this, Elicer presented an example of progressivist ideas "incepted" in Chilean school mathematics from international agendas. And again, the discussion was very fruitful.

In sum, for us the experience was challenging and it showed us the necessity to continue and to strengthen our Latin American research community. The next steps in this WG is to continue the discussion with the colleagues to refine our research, and to build a research agenda in order to map and to produce results in mathematics education from socio-political grounds.

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Working Group Report: Replication in Mathematics Education

Submitted by Matthew Inglis (United Kingdom), Stanislaw Schukajlow (DEU), Wim Van Dooren (Belgium) and Markku S. Hannula (Finland)

Quantitative researchers have a great deal of flexibility in their analytical choices, e.g., exclusion criteria, dependent measures, including covariates, and so on. Alarmingly, Simmons, Nelson and Simonsohn (2011) noted that these factors may lead the traditional 5% false-positive rate to be inflated to as much as 60%. The most obvious consequence of an inflated false-positive rate is that some published scientific articles report effects that are simply not true. The Open Science Collaboration (2015), a group of 270 scientists, published a landmark paper that aimed to determine whether or not this was the case, by conducting 100 replications of studies reported in three psychology journals in 2008. Only 36% of the studies replicated. This issue is particularly live in the context of education research. Makel and Plucker (2014) found that only 0.13% of articles published in the top 100 education journals have reported replication studies. The consequence of these observations is that we simply do not know the extent to which we can trust published mathematics education research findings.

The goal of this working group, which met for the first time at PME42, was to consider what role replication research should have within mathematics education. We discussed:

- What 'replication' means in the context of both quantitative and qualitative mathematics education research. This led to a discussion of the importance of context in educational research and of different types of replication, including reproducibility (the ability to independently reanalyse the same data), direct replications (conducting an exact replication on a sample drawn from the same population) and comparative replications (conducting an exact replication on a sample drawn from a different population).
- Whether replication studies be presented at scientific conferences and published in high-profile academic journals and, if they should, how can this can be encouraged. We also consider which studies should be considered priorities for replication, and what constitutes a high-quality replication report.

- How the mathematics education community can encourage actions to improve the replicability of our work. In particular we discussed how preregistered analysis plans, and the open sharing of data and analysis scripts can support this endeavour.

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Working Group Report: Exploring the Role of Facilitators in Video-based Professional Development for Mathematics Teachers

Submitted by Ronnie Karsenty (Israel) and Alf Coles (United Kingdom)

This Working Group built on the Working Group from PME41 "Comparing different frameworks for discussing classroom video in mathematics professional development programs" and we were pleased to welcome many new participants. The aim of the group in PME42 was to discuss our emergent knowledge about the role of facilitators in video-based professional development (PD) contexts, as formed by existing literature and by current experiences of the participants. In the first session, after a brief overview of the use of video for PD in mathematics education, we moved to working on an example of facilitation. Ronnie brought a video recording of a facilitator (who was a teacher in a school) leading a PD session with other teachers in his school, making use of a video recording of a lesson. The context was Ronnie's Video LM project, which now involves training facilitators. The initial task for participants of the Working Group was to share, in small groups, what they noticed about the facilitator's "role", from the video. The aim was not to evaluate the facilitation (although this had to be insisted on several times!) but rather to elaborate roles that were observed and any roles that were missing. After sharing the discussion from small groups, we then invited those same groups to work on what characterises effective facilitation, what skills and knowledge are needed, and how these skills be might acquired. The groups each had a "homework" to prepare two powerpoint slides detailing their responses. We were grateful that each group rose to this challenge!

We began the second session with a grouping of the facilitator "roles" that had been offered and then we moved to each group presenting their slides, leading to questions and brief discussion. The task for the second session, having shared these ideas, was to work together (again in small groups) on articulating some researchable questions around video facilitation, which we shared in a final plenary discussion. The collated research questions were as follows: how can facilitators incorporate theoretical frameworks into their work with teachers?; Is there a distinction between in-service and pre-service teachers working with video?; Might we need to use frameworks in different ways with the different groups?; There is a challenge in getting pre-service teachers to reflect and identify elements of a framework; How do facilitators' goals change when facilitating pre compared to in-service teachers?; How would facilitators anticipate patterns in teachers' engagement?; What would facilitators identify as critical moments in their own facilitation?; How would the identification of critical moments support the development of facilitators?; What is the impact of facilitators' use of "judgmental" words on the PD session?; How do facilitators establish and maintain a safe environment for participants to share their work?; How does facilitation appear in different video-based PD contexts (e.g. with a video from a teacher perspective compared to a student perspective videos?) with videos of participants' lessons or not?; What is the role of the tasks the facilitator is using along with the videos?; When should a facilitator introduce new language and when build on the teacher's own discourse?; When should facilitators act on something eg to offer an idea or not offer; to respond to a deficit, or not; how do we recognise when something needs to be shifted?' When is a facilitator needed? Is the expertise already present in the space / group?; Might non-facilitated groups creating a judgment-free environment? (e.g., with a task given on a piece of paper); How might discourse be different in facilitated or non-facilitated groups?; How does the facilitator background/skill influence the discussion (eg mathematician, expert teacher, etc)?; Many of the questions above have been researched on teachers; is there anything unique to facilitators? Can we ask something new about facilitators that we haven't asked about teachers?; Is there anything unique to facilitating mathematics teachers?

In terms of next steps for the group, there was appetite for the WG to continue at PME43 and, before then, to see if we can share some examples of our own facilitation. One idea, for the next WG, is to bring different examples of facilitation, to work on collectively.

Working Group Report: International Perspective: Measuring Mathematics Teachers' Knowledge in the Digital Era

Submitted by Agida Manizade (United States of America), Chandra Hawley Orrill (United States of America), and Hege Kaarstein (Norway)

The aim of this working session was to explore current issues related to the design and development of measures of mathematics teachers' knowledge in the context of mathematics teachers' change. *The International Perspective: Measuring Mathematics Teachers' Knowledge in the Digital Era* working group was organised by Dr. Agida Manizade, Radford University (USA), Dr. Chandra Hawley Orrill, University of Massachusetts Dartmouth (USA), Dr. Hege Kaarstein, University of Oslo (Norway), and Dr. Guo Kan, Beijing Normal University (China). Seventeen researchers from 13 countries were present and participated in the constructive discussions over two days examining current strategies used by researchers to design measures of different types of knowledge needed for teaching mathematics. These researchers used a wide range of conceptual and theoretical frameworks as the basis of the tools they developed to measure different types of teacher knowledge. The discussion of theoretical and methodological challenges associated with the design of measures was also included and was engaging.

We began by reviewing the key ideas emerging from recent work in this area by outlining different purposes and conceptualizations of measures of mathematics teacher knowledge. The design of assessment tools for measuring different types of mathematics teachers' knowledge was categorized by two main factors: purpose and content. This discussion was followed by dialogue about various theoretical and conceptual frameworks for measuring mathematics teachers' knowledge such as frameworks used in the following projects: 1) COACTIV, Professional Competence of Teachers, Cognitively Activating Instruction, and the Development of Students' Mathematics Literacy Next; 2) LMT, Learning Mathematics for Teaching; 3) TEDS-M Teacher Education and development Study in Mathematics; 4) TPACK, Technological Pedagogical Knowledge; 5) The Knowledge Quartet; 6) PSK, Professionally Situated Knowledge; and 7) Threefold Domain-Specific Structure Model for Mathematics.

The group considered pros and cons of implementing existing measures of teacher knowledge based on consideration of the various domains. The researchers identified the lack of clear definition of the domain as being a critical challenge. The group pointed out that conceptions

such as CK, PK, PCK by Shulman and by Baumert and colleagues; Mathematical Knowledge for Teaching by Ball and colleagues; Profound Understandings of Fundamental Mathematics by Ma; Mathematical Knowledge in Use by Kersting; Technological Pedagogical Knowledge by Mishra; Pedagogical Design Capacity by Remillard; and Knowledge Quartet by Rowland, and Teacher Beliefs by Philipp and colleagues were all overlapping. However, different conceptions of the knowledge teachers were needed and they lead to diverse assessment designs.

During the second session, the group discussed different types of measures of teachers' knowledge including but not limited to: dynamic measures of mathematics teachers' pedagogical content knowledge; classroom observation protocols; silent video analyses; animations suitable for teacher professional discussions; mathematics teacher certification assessments; analyses of classroom scenarios through cartoons, video enactments, and transcripts; analyses of classroom videos; and paper and pencil tests of different types of teacher knowledge based on diverse theoretical frameworks. Finally, participants discussed theoretical and methodological challenges associated with the designing measures of mathematics teacher knowledge (Herbst & Kosko, 2014; Hill et al., 2008; Kaiser et al., 2014; Manizade & Mason, 2011; Silverman & Thompson, 2008; Thompson, 2016; Tirosh, 2000). We encourage PME members interested in continuing this working group to contact us, as we continue to work toward a book on this topic.

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Working Group Report: Learning Mathematics in/through/by Arts Practices

Submitted by Ricardo Nemirovsky (United Kingdom) and Kate O'Brien (United Kingdom)

The aim of this Working Group was to examine the complex relationship between mathematical practices and material making. Our idea for the session emerged in working and sharing across three related themes in contemporary mathematics education research: (1) renewed interest in the role of the body, technology and materiality in learning mathematics, (2) growing concern for attending to affects and aesthetics in mathematical learning and (3) the political importance of addressing issues of accessibility in a field that struggles to engage learners with "abstract" practices that are historied as Western, white, and male-dominated. Seeking to make connections across these lines of thinking, we set out to use both material experimentation and reflection to outline a research program that might encompass the historical, cultural and

educational connections between mathematics and the arts.

In order to foreground material making as a thinking process, we chose to focus our sessions around the practice of a particular artistic technique: crochet. This unconventional choice was motivated by certain practical concerns. Crochet is easy to learn, it requires only a few small tools

to practice and many people have some level of experience with this form of needlework. But our choice was also related to how fibre arts sit nicely on political divides that separate craft from art, maintenance from creativity, and women's work from traditionally male-dominated fields of expression. Crochet, in particular, is a radically open-ended technique, where wildly different forms can be created through the repetition of the same looping structure.

With this in mind, we began the Working Group with only a short contextual introduction to the history of crochet and launched straight into making and learning crochet for the first half hour of our session. Among the more than thirty participants, there was a wide diversity of skills and experience in the room; we had total beginners and expert crafters. One participant only realized that she already knew how to crochet after she began to learn again -- the activity suddenly summoned a distant memory of doing it with her grandmother as a child. Participants took many different approaches to learning: some chose to work on their own or were deeply embedded in online videos that they sourced. Others looked for instruction from the front of the classroom or from their neighboring crocheters. The atmosphere of making greatly altered the environment of our lecture hall -- the room quickly grew very loud, more informal and relaxed.

After these initial ventures in making, we gathered together to consider some ideas from ethnomathematics (Gerdes, 2011) and Wassily Kandinsky's theories (1926/1947) about the expressive nature of the point and the line. Breaking into small discussion groups to look at examples of "mathematical arts," we ended our first session by generating a number of open questions: Can a mathematical analysis of a natural phenomenon or a work of art have the effect of disenchanting it? Is there a difference between the aesthetics of making and the aesthetics of observing? How can math-art practices involve the participation of the community? What are the implications of exploring and expressing feelings as legitimate components of mathematics learning? How are art practices related to this?

Between sessions we took time to collate these questions, presenting them to our group at the beginning of session two. We used this session to speak in detail about Jacques Rancière's (2006) theory of aesthetics and sensibility, focusing on the radical power of art to disrupt conventional forms of perception. Everyone got a chance to pick up their crochet work from the first session and we broke out into small discussion groups once more before coming together for a large final discussion. In this conversation, we talked about the role art practices might have in changing more traditional approaches to mathematics education: changing the atmosphere of the classroom, engaging new forms of participation, and making space for new sensibilities and play. It was proposed that a new culture of mathematics might expand ideas about what math can be by making mathematics less different from everything else.

Given that for some learning crochet was an incredibly demanding process, we also discussed a change in the way one might understand "procedure." Rather than rejecting procedure as mindless repetition, in working the crochet, we found something new growing out of procedure. Many participants were surprised that by repeating small incremental changes, the work transformed itself in unpredictable ways. Others were excited by the gift of time to explore: "I wonder what's going on here. But I'll keep going. I don't have to be decided yet. There is time to articulate my thoughts later." Memory was an important topic in our conversation: childhood memories, memories of failure and success, ways in which the practice of crochet touched on past experiences and opened them to being discovered anew. There was a general consensus that doing art is problem solving but this was tempered by a concern for attending to adult/parental insistence that students learn "real" mathematics.

This Working Group was imagined as the beginning of a larger conversation that might constitute a ground for a research program to be pursued by mathematics educators and researchers. Interested in furthering our work with these questions, we have set up a forum to continue our Working Group's activities online. We encourage anyone interested in these topics to join us by writing to Ricardo Nemirovsky (r.nemirovsky@mmu.ac.uk.edu). Our online forum seeks to generate a growing library and discussion space that could result in a joint paper articulating major research questions about learning mathematics and the arts as entangled and embodied practices. We look forward to continuing this work and conversation at the next PME.

Learning mathematics in/through/by arts practices was conceived in conversation with Liz de Freitas and Anna Chronaki. It was led by Ricardo Nemirovsky, Kate O'Brien, and Nathalie Sinclair.

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Working Group Report: Mathematical Learning Disabilities (MLD): a Challenge for Mathematics Education

Submitted by Cécile Ouvrier-Buffet (France), Elisabetta Robotti (Italy), Thierry Dias (Switzerland), Marie-Line Gardes (France)

In recent times, research interest in learning difficulties has increased around the globe. Some of them are still subject to little research (Lewis & Fisher, 2016). This is the case of *Mathematical Learning Disabilities* (MLD) which are the source of raising educational and social inequalities. Research regarding MLD is carried out in different fields, with various theoretical backgrounds, research hypotheses, and aims (Butterworth et al., 2011; Lewis & Fischer, 2016): cognitive sciences, neuroscience, psychology, mathematics education. MLD definition and diagnosis do not enjoy a clear scientific consensus. Moreover, the links between these different fields of research are not enough developed and they should be improved. We claim that specific studies should be structured and developed in mathematics education regarding MLD in order to improve the detection and the remediation of MLD in an educational context. In particular, that implies a better knowledge of the existing research dealing with MLD. We have then two main aims:

- To circumscribe research about MLD in mathematics education and to federate new collaborations in this field;
- To structure a collaboration at the interplay between mathematics education and cognitive sciences: we hope that such collaborations will evolve.

At PME 42, we proposed a WG and about fifteen people followed it. We thank the participants for the relaxed and good work atmosphere and their contributions. In the session 1, we firstly defined common contents for the WG. We asked participants two questions: What are your keywords about "special educational needs? What are your keywords about "mathematical learning disabilities? We then elaborated a map of the keywords (Fig. 1). In a second step, we tried to identify current and future research interests about MLD in math education. In small groups, we discussed aims, research questions, theoretical frameworks, methodology. This work allowed us to introduce the second session:

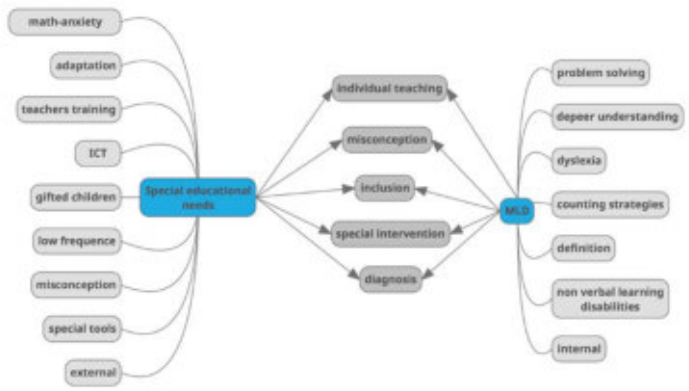

Fig. 1: Map of common contents and keywords

- To propose to the participants at the WG a survey about MLD to enrich the discussions of session 1 and to collect information for different countries. This survey is always available here!
- To identify specific keywords to structure a bibliographic database.

In the session 2, we built a structure in a free reference management software (Mendeley) with different tags: definitions, topics, kinds of articles and research field (Fig. 2).

In the end, we opened the discussions on the links between math education and cognitive education. We think that collaborations are important for several reasons (Gardes & Prado, 2016): first, to identify pedagogical actions, based on fundamental cognitive research results, which could be effective in educational activities where MLD students are involved ; second, to develop these educational interventions with students in order to analyse their protocols produced during these educational activities.

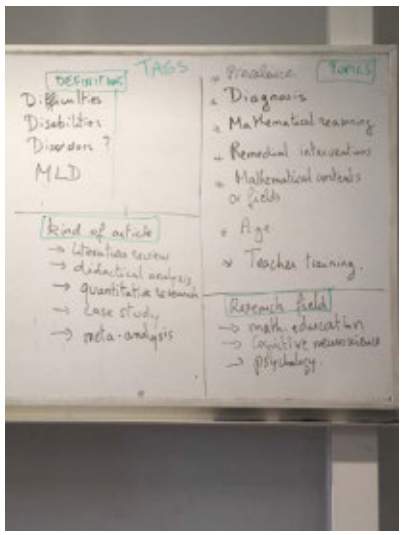

Fig. 2: Tags defining reference structure in Mendeley

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Working Group Report: Argumentation and Formative Assessment: A Possible Synergy?

Submitted by Annalisa Cusi (Italy), Francesca Morselli (Italy), and Cristina Sabena (Italy)

This working group was a new initiative, aimed at gathering researchers in conjugating two research themes: formative assessment and argumentation in the mathematics classroom. In the last decades, we find a certain amount of research focusing on formative assessment, i.e. educational assessment activities aimed at supporting learning and teaching (assessment activities *for* learning, Black and Wiliam, 2009). We also find many studies on mathematical argumentation, dealing with possible links between argumentation and proving processes, the importance of classroom discourse as a social activity and argumentation as a source of mathematical learning (see Stylianides et al., 2016, for an overview). However, less attention has been dedicated to the search for possible synergic opportunities opened by conjugating the two themes. The WG engaged a group of PME participants in reflecting on the dialectical relationship between formative assessment and argumentation, working together and sharing their research experiences around the leading question: "*How may formative assessment practices support mathematical argumentation?*"

In order to ground the work on concrete examples, participants were offered materials and also theoretical elaboration from the European project FaSMEd, which was aimed at investigating the role of technologically enhanced FA methods to support student learning, www.fasmed.eu.

In the first session we focused on task design. Starting from the analysis of different tasks employed in the FaSMEd Project, as well as from participants' tasks, we faced some guiding-questions: *How to design formative assessment tasks with argumentative components (also considering different school levels)? What makes a task an argumentative task? Can we outline different categories of argumentative tasks?*

Everyone has been actively engaged in addressing them, performing the analysis of the data according to their own theoretical lenses and experience. In this analysis, three dimensions primarily emerged: the role of the student performing the task, the object around which the task is formulated, and the formulation of the task itself. The discussion highlighted in particular the importance of the formulation of the task (logical aspects and the role of natural language), its complexity, its cognitive load. Prediction and making hypothesis have been in particular identified as a means to elicit argumentation.

Session 2 focused on the methodology for the implementation of argumentative tasks in the classroom, starting from the leading question: *How to design a methodology of work in the classroom aimed at supporting the students' development of argumentative competencies through formative assessment practices?* Starting from examples of classroom episodes, we discussed the characteristics of a lesson that could develop argumentative competencies through formative assessment practices, as well as typical ways of organising classroom discussion (starting from a selection of group answers, starting form the results of a poll, …). At the same time, some criteria for assessing argumentation have been addressed.

The working group ended with a general discussion on possible links between formative assessment and argumentation. We feel that the working group has been a good occasion to establish a community of researchers interested in the theme and to lay the foundations for future collaborations.

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Working Group Report: Eye-tracking in Mathematics Education Research: A Follow-up on Opportunities and Challenges

Submitted by Maike Schindler (Germany)

Interest in eye-tracking (ET) in educational research is growing in recent years (van Gog & Scheiter, 2010; Was, Sansosti, & Morris, 2017) and ET equipment and technology have become more affordable. Already at PME 38, there was a Working Session on *The use of eye tracking technology in mathematics education research* by Barmby, Andra, Gómez, Obersteiner, and Shvarts, which served an introductory purpose and investigated possible research questions that would benefit from ET research methodology. However, over the past four years the technology and its use have intensively developed, and on-line ET by ordinary web cameras is promising to become a part of everyday e-learning user experience in the next few years.

One relatively new trend in mathematics education research is the use of dual and multiple ET for capturing two or more persons' eye movements, which allows for studying, for instance, collaboration, the social nature of learning, and the teaching/learning process in vivo (Lilienthal & Schindler, 2017; Shvarts & Zagorianakos, 2016). There are even new portable ET systems available on the market and being developed (e.g., Toivanen et al., 2017). Such trends and technical developments offer new opportunities, but also pose novel challenges to researchers in mathematics education—not only on a technical level but also regarding the design of studies and methods of analysis. The partially new challenges of conducting ET studies were one springboard for this WG. The other one was the fact that although

Anna Shvarts holding an impulse presentation

the ET sub-community in mathematics education research is just at the beginning of its development, there are already many independent research groups conducting ET studies. Research using ET in mathematics education could benefit from increased scientific exchange and discussion.

Our WG aimed (a) to strengthen the exchange and collaboration between researchers who are actively conducting ET research in mathematics education, and discussing methodology and the theoretical underpinning of ET studies, (b) sharing experience of portable eye-tracker's usage, by providing hands-on possibilities to test different portable ET systems, and (c) to grow the awareness of opportunities and limitations provided by ET technology, including innovative methods of data collection and analysis.

The WG was structured in two sessions. Session 1 started with an impulse presentation by Maike Schindler on "Opportunities and challenges of ET technology", which was followed by discussions in groups. Among others, the participants discussed the significance of interdisciplinary knowledge for ET research. A second impulse presentation held by Achim J. Lilienthal addressed "Dual/multiple ET: data collection and analysis", which was again followed by lively discussions among the groups of participants. In the ongoing discussions, the participants addressed possible future directions of ET research in mathematics education as well as issues that they perceive in current research. Dual eye-tracking technology is perceived still being challenging for widespread use. Eeva Haataja and Enrique Garcia Moreno-Esteva added an impulse presentation on the theoretical background, possible research questions, and challenges of multiple mobile ET. In the following, the participants discussed the variety of possible research questions, addressing, for instance, task design, the investigation of learning difficulties, and strategies of creative versus algorithmic problem solving. The gap between qualitative data analysis and quantitative analysis based on standard eye-tracking measures was perceived as still one of the key challenges. The first session ended with a short outlook to the second session.

Session 2 started by Anna Shvarts providing background information on the physiology of eye movements and the role of periphery vision

and giving a summary of the first session. The second session focused on allowing the participants hands-on experience with eye-trackers: The organizers brought three mobile ET systems (Tobii Pro Glasses 2, Pupil Pro Glasses, and Ooga glasses developed at the Institute of Occupational Health in Finland and manufactured at the University of Helsinki) that the participants got to try in groups. For this purpose, some of the participants had brought their own mathematical tasks, to test what they could "see" through ET – and to evaluate whether ET would be beneficial for their research purposes. Further, the second session also involved brainstorming about future collaborations and communication about research using ET in mathematics education, about exchange of programs, and the possibility of sharing literature and/or data. Finally, the organizers collected email-addresses of interested people to create a mailing list of ET-interested researchers in mathematics education. If there are more people interested in joining the mailing list, please contact Maike Schindler (maike.schindler@uni-koeln.de).

Participants testing ET glasses

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Working Group Report: *The Desired Teacher* of Mathematics Teacher Education

Submitted by Iben Christiansen (Sweden), Kicki Skog (Sweden) and Lisa Österling (Sweden)

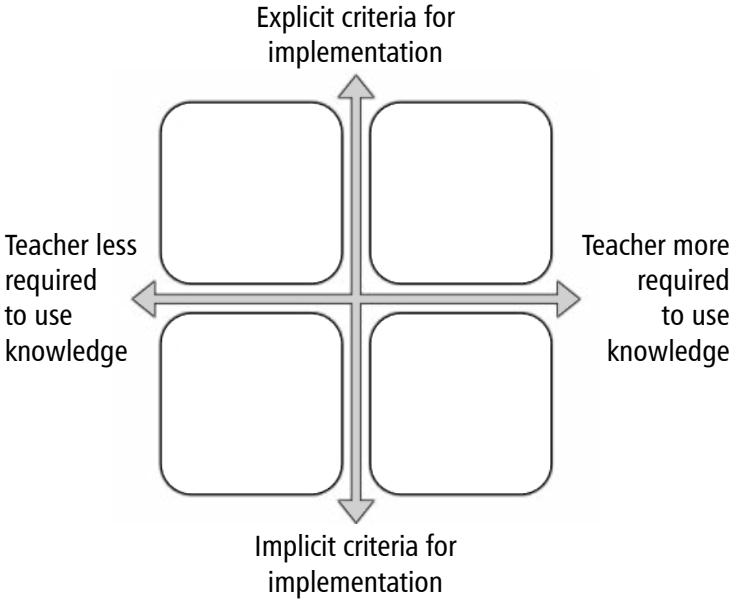
Teacher education is under scrutiny around the globe. Improving programmes rests on an envisioned *desired teacher*. But do teacher educators agree on what constitutes good teaching? The purpose of this working group was to collaboratively develop and apply a framework that could help to recognize images of the *desired teacher* reflected in teacher education programmes around the world.

The notion of the *desired teacher* recognises the teacher as a subject who is also subjected to discourses of power (see Montecino & Valero, 2015). Images of the desired teacher produce 'regimes of truth' which normalise certain practices while excluding or remaining silent about others. The working group was guided by two questions:

- What are the images of the desired teacher reflected in institutional materials etc.?
- What categories or frameworks help us identify these images?

In the first part of the workshop, participants explored different sets of institutional materials, both to obtain a first idea of the images of the desired teacher which could be traced therein, and then to begin inductive development of analytical categories.

A tentative framework was then introduced by the workshop organisers based on previous work (see figure).



The **French** document (Fiche no 12 - Grille d'évaluation du professeur documentaliste stagiaire) was a national document for assessment. The group analysing it clearly recognised the values and ideas about civil servants. The proposed image of the ideal teacher is a public servant who is relatively compliant but utilises reasoned judgment within the given framing. The relation between teachers and learners was not engaged in the document.

Based on the group's analysis of the document, the addition of two additional axes to the figure was considered, namely autonomy versus compliance, and civil servant versus representative of the discipline.

The group who analysed **Singapore's** teacher education practicum assessment criteria used the introduced framework to some extent. They found that the criteria were very located in the classroom. The analysis was impeded by many of the criteria starting with the formulation "student understands ... ", as in "student understands the importance of …". The group had chosen to mostly ignore this, but we had some plenary discussion about it. Clearly, "understand" can carry different meanings – recognises, understands conceptually, understands how to/instrumentally. The question then is, which is it?

There were two documents from **New Zealand** - one list and one narrative text. The narrative was found to put learners at the centre, reflected in formulations such as "... in order to … students' needs …". The document thus also engaged in the relation between teacher actions and learners. The list on the other hand was more about the actual teaching actions and did not appear to include any assessment of the duality of teacher actions and learners. The analysis had considered what was emphasised in the text through wording of headings, use of italics, etc. Using citations, the narrative document appeared quite persuasive.

After the issue of compliance had been raised by the "French group", the group working with the material from New Zealand looked at the verbs in the two documents as a way to determine the compliance expected of the desired teacher. The question was raised, however, if it was indeed compliance that was explored in this respect, and the tentative answer was no. It also gave rise to the question of whether autonomy and compliance are really opposites.

The image of the desired teacher from **South Africa** had to be generated from analysis of three documents. This meant that the group looked for connections across the documents, which contained both some commonalities and some contradictions. For instance, should the desired teacher be an expert in assessment, just be able to conduct a test, or simply be able to find documents that tells him/her what to do?

Just like the French document, the South African documents reflected the broader national situation and history. In the South African documents, this was evident in the interplay between the teacher not having much autonomy and the commitment to social transformation through education. Interestingly, the documents also reflected an image of the desired Department of Education.

One participant referred to a framework he has used, so we started the second session with him presenting this as well as examples of its use in analysis. Thereafter, groups continued to explore the same or a different set of documents.

Clearly these document analyses and devising a useful framework are complex tasks and the discussions were fruitful. While no conclusions were reached, the work continues and we hope to shortly publish our five suggested images of the desired teacher.

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Working Group Report: The Design of Intended Mathematics Curricula

Submitted by Andreas J. Stylianides (United Kingdom), Willam G. McCallum (United States of America), Lynne McClure (United Kingdom) and Aisling Twohill (Ireland)

The term *curriculum* has been used in multiple ways in the research literature and in different jurisdictions. This Working Group (WG) focused on a particular kind of curriculum that Schmidt et al. (1996) called the *intended* curriculum and broadly defined to include an educational system's visions, aims, and goals for students' learning of a particular subject. The notion of intended curriculum is akin to Remillard and Heck's (2014) notion of *official* curriculum, which, however, was framed more broadly to include also any curricular resources (e.g., textbook series) designated by an educational system as embodying its curricular vision. Given that many educational systems do not designate such instructional resources, we opted for the narrower notion of intended curriculum as the focus of this WG.

The WG engaged more than 40 PME participants in discussion and debate about principles for the design of intended curricula, such as the Common Core State Standards in the USA and the National Mathematics Curriculum in England. Such documents set out expectations about what mathematical ideas should be taught and when, and include learning goals to be met and assessed. By considering relevant methodological and theoretical advances in the field, together with two specific design efforts focused on intended curricula that we used as contexts for discussion, the WG participants aimed to identify some principles pertaining to the design of intended curricula.

Although the WG participants did not reach consensus about principles that would helpfully underpin the design of 'good' intended curricula, the rich discussion and sharing that took place amongst WG participants from different educational contexts and perspectives helped increase everyone's awareness of the different models of intended curriculum design currently in use in different countries and the forces (political, cultural, educational, professional, parental, etc.) that influence the processes and outcomes of that design. The WG also delineated aspects of curriculum design and implementation to outline a framework for analysis and comparison of curricula:

1. Authorship: Who designs the original state produced curriculum documents, if such exist? Who provides the research base? Who oversees and evaluates the published curriculum?

2. Ownership: Do teachers contribute to curriculum design, either in terms of structure or design? What implications does this have for enactment in classrooms?

3. Interpretation: Who translates documents into activities? Does the state or academic community play a role in overseeing the process, for example, in the writing of textbooks?

4. Local context: How far is it possible to compare curricula in use in different cultural contexts? How detailed should curricula be in order to make explicit (some aspects of) the hidden curriculum?

5. Assessment: In what ways do assessment methods and foci influence the curriculum experienced by learners of mathematics?

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Working Group Report: Mathematics and Special Education

Submitted by Helen Thouless (United Kingdom) and Robyn Ruttenberg-Rozen (Canada)

The Mathematics and Special Education group has been an active group at both PME and PME-NA for seven years. Our purpose this year (Helen Thouless, UK, Robyn Ruttenberg-Rozen, Canada, and Ron Tzur, USA), as in other years, was to promote cross-disciplinary work that supports the learning of mathematics by students with special educational needs in the area of mathematics. This year at PME 42, the Working Group met twice. Ten people from six countries attended the sessions.

The focus of both days of the working group was on our current project: we are putting together an edited book about current research on how to teach mathematics to children with special educational needs. The audience of the book is teacher educators, teachers and other researchers. Specifically, during these sessions, we worked on an outline of potential chapters for the publisher. Through the process of working on the outline, we discussed major concepts and arguments at the root of researching the teaching and learning of mathematics for children with special educational needs.

On the first day several new members joined the group. First, we quickly introduced ourselves, explaining our interests and research foci in the topic. The introductions were followed by an explanation of the history and purpose of the working group. Utilizing the information from the introductions and ensuring that there would be a range of interests in each group, the working group organizers arranged two discussion groups. On the first day, each discussion group discussed major themes, concepts and arguments in mathematics for children with special educational needs. Each discussion group then prioritized their big ideas in preparation for a wider discussion on the second day of the working group.

On the second day, the process of discussing the purpose and intended contents of the book led to invigorating discussions about inclusion, equity, labelling, classroom practices, and the importance of the child's voice among others. Importantly, because of the various international voices, we also had a rigorous discussion around the differences and commonalities in mathematics education for those with special educational needs across international contexts.

As a group, we are committed to working on this book project throughout this academic year and look forward to discussing our progress at PME-NA 40 and PME 43.

PME 43 - Impressions

Seminar Report:
Reviewing for PME: A Primer for (New) Reviewers

Submitted by David M. Gomez (Chile)

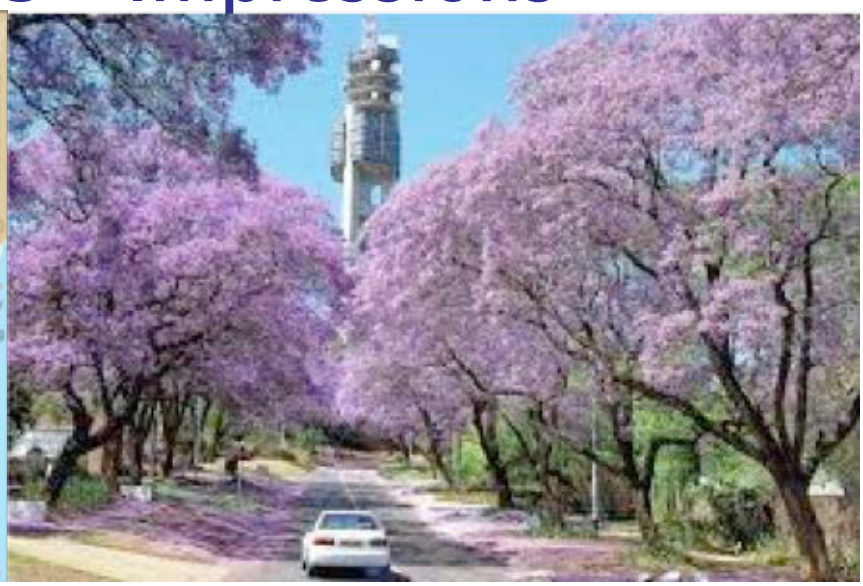
Peer reviewing has been considered for a long time essential for improving the quality of scientific work. But peer reviewing skills, as with any other skill, need practice to achieve mastery. PME conferences rely on voluntary peer reviewing by eligible PME members to ensure its traditionally high scientific standards. The PME reviewing process for Research Reports has some peculiarities distinguishing it from other venues, such as (a) the detailed comments expected on each of the following content categories: rationale, theoretical framework and related literature, methodology/argument, results and interpretation/implications, academic style, and relevance to the PME audience; and (b) the lack of an opportunity to revise a submission before deciding on its acceptance. The PME reviewing seminar aims at providing early career researchers and researchers new to PME with a hands-on introduction on how to perform high-quality scientific reviews of PME Research Reports.

In PME 42, the seminar was facilitated by David M. Gómez (Universidad de O'Higgins, Chile) and Anika Dreher (University of Education-Freiburg, Germany). We were very pleased by the size of the audience: about 20 participants from a diversity of countries, most of them early researchers with no previous experience of reviewing either for PME or for other conferences/journals. After an introduction to peer reviewing and to the specificities of the PME reviewing system, participants engaged in a hands-on reviewing experience of Research Reports contributed from authors submitting to PME 38, 39, and 40. This work was resumed in the second session of the seminar and, after finishing their own reviews, participants were able to contrast their impressions with the real reviews that those Reports had received.

The quality of reviews is a core input for the work of the International Program Committee of each PME conference, and we expect this seminar to help us get more and better reviews in future PME conferences.

I want to take a moment to thank Anika Dreher for her service to PME by facilitating this seminar since PME 39. I invite all of you who are experienced in peer reviewing and want to help in shaping the future of PME to volunteer for coordinating or facilitating future seminars. You can also contribute by sharing with us your submitted Research Reports and corresponding reviews for using them as working examples.

PME 43 - Impressions

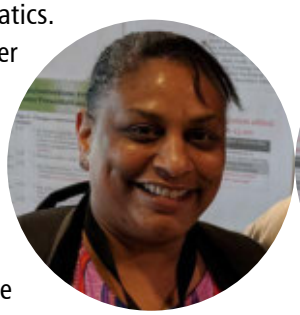


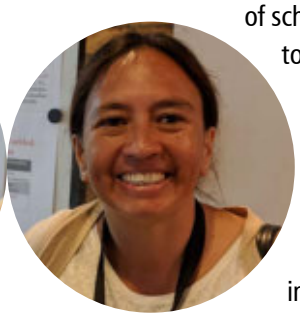
PME Experiences

Our First PME

Contributed by Anita Crowder (United States of Amerikca) and Pamela Reyes (Germany)

From a research standpoint, our first PME has been enlightening. Anita first heard of PME last year, when Dr. Nathalie Sinclair skyped into a doctoral course on mathematics education at Virginia Commonwealth University. Pamela felt very passionate about mathematical thinking and was very excited about sharing her research about basic ideas with others who had the same interest. Both of us were full of expectations for this first experience at PME. We each arrived at Umeå University alone, not exactly sure where we would fit in with our unique backgrounds and experiences in mathematics. While Pamela was a little worried about her English pronunciation for her presentation, Anita was concerned that her research subject might be a bit too tangential.





It was while we were both feeling this trepidation that we found each other at registration on that first day; and it was at the first-timers' meeting that we realized that we had needed to feel neither trepidation nor isolation. The PME first-timers' meeting gave us the opportunity to meet colleagues from around the world with research interests as diverse as the participants. It was obvious then that the IGPME is a very special group of scholars. The work presented was varied and open, including studies on the unconscious, imagination, student learning, and mathematical thinking. Pamela found that everyone welcomed her with warmth and patience as she navigated her first immersive English-language experience, while Anita found that the conference encompassed research from all corners of the field, so her topic was not as "strange" as she had imagined.

We very much appreciated the format of the plenary lectures, especially those with reactors. Because neither of us had attended this sort of conference before, these lectures aptly demonstrated the professional and direct way in which academic differences of opinion should be addressed. These lectures showed us that differing opinions on current research and concepts is not only possible but should be expected and valued as a way to stretch, change, and solidify one's own perceptions. Usually such interaction takes place within the pages of scholarly journals, so it was a rare opportunity to watch researchers have such face to face discussions.

The "chicken-egg" debate on whether positive affect needed to precede or follow achievement was completely different than the others. While the discussion was interesting, it did not seem feasible that either side could actually "win". The debate became muddled when motivation was combined with positive affect. Extrinsic motivation, for example, is not necessarily positive, nor is motivation an affect in and of itself. Therefore, for "motivation" to be counted as a positive affect seemed a bit incongruous. Some type of motivation is obviously needed to complete every action, so, in the end, the actual crux of the debate seemed unclear to us as new researchers. However, the dynamic between the teams was fun to watch and we learned a lot about the bases of both sides of the argument.

Being a First-timer 'P' at PME42

Contributed by Eleanor Willard (United Kingdom)

As a PhD student 5 years ago, searching for conferences in my field, I was drawn to PME as it offered a fusion of both elements of my PhD. I resolved to attend a PME conference at the next possible opportunity. That did not happen until this year, when, as a post-graduate lecturer, I was in the position financially to support attendance. Luckily, I later found a funding source which paid for most of my costs but I had already decided I was going to attend with, or without, financial help.

I am a chartered psychologist, so that places me firmly as one of the 'P's in PME but, as I have a keen interest in Dyscalculia, the 'ME' is also very relevant. A PME conference seemed the perfect fit for me and my research interests.

Looking through the programme I initially felt that there was an emphasis on the 'ME' part of 'PME'. However, upon closer inspection, it was apparent that there was at least one talk per session that related to my field. As I cannot be in two places at once, that was all I needed. In those sessions I was struck by the supportive atmosphere for the presenter and it has made me feel confident, that, should I be able to attend again, I will apply to deliver a session.

The welcome, and my experience, was terrific. It is a large conference but I found the first-timers meeting on the first day really helped me meet others and realise, very quickly, that the conference was not all about academic discourse. There was plenty of humour too. It had a lovely relaxed feel. I think without this session I might have struggled to integrate. Not through any fault of the other delegates, merely because of the size of the conference.

A real highlight for me was the debate on 'Chicken-egg cycles' which was the plenary-panel session on the Friday. The session was delivered and debated in a funny entertaining way, but some really important points were made. It was a great way to start the day. I also loved the excursion to the moose safari and was struck by the beauty of the area around Umeå. The city itself was lovely. I must return!

I did find that I met some great people, but was at a loss sometimes to remember their names (sorry!) I could often remember their place of work so perhaps adding this to the delegate names at the back of the conference program would aid people with memory lapses like me?

Overall the conference was a great experience and offered a wide choice of sessions. I would recommend that other 'P's attend in future, particularly those with an interest in the cognitive or affective elements of Mathematics education. I hope to return at the next possible opportunity.

My First PME

Contributed by Brendan O'Sullivan (Ireland)

I finished my PhD in late 2017 while working as a full-time post-primary school teacher. Given my day job as a teacher, it can be quite difficult to attend conferences, especially when they clash with the school calendar. One of the best things about PME is that it takes place during the summer. I jumped at the chance to go to Umeå for several reasons. It is the home of Johan Lithner and many top-class researchers in the area of mathematical reasoning. Lithner's framework played a big part in the work for my thesis. In addition, while I had been to Sweden once before, seeing the south and the west, I never visited the north of the country. I certainly wanted to experience the phenomenon of the midnight sun and I was not disappointed.

At first glance the PME conference programme is daunting. In many ways, anyone attending PME is spoilt for choice. So many quality talks and sessions and you can only be in one place at a time. The great thing, of course, is that all research interests are represented and it is very easy to get a taste of something that you had not previously considered. I first scanned the timetable for material relating to my research interests; textbooks, curriculum, post-primary issues and assessment. Often there can be a clash and there is some amount of agonizing as to how to choose. I am happy to say that I was never disappointed with what I finally attended.

Another advantage of PME being so big is that an early-career researcher can avail of so many different session types. The plenary talks were given by eminent researchers that effectively provided a thought for the day. It was also possible to experience colloquia, research forums and working groups and see how they operate. The majority of sessions were research reports and oral communications which give a good indication of the work being produced in different parts of the world. I enjoyed the poster presentations, also, as these gave an opportunity to get a quick overview of research while interacting with those completing it. Towards the end of the conference, I attended the administrative meeting and took part in the democratic process of voting on policy decisions and electing members of the International Committee.

The highlight of the conference must be the amount of international friends that you make during the social events. I went on the excursion to the moose farm and later that night myself and some new-found colleagues had a lovely open-air meal in the forest. Surrounded by the Swedish countryside, I was able to interact with friends from Sweden, Norway, the UK, Australia, Germany and Israel. It was great to be part of such an eclectic mix of people and not only discuss work but also to hear about their lives. It is very true that you learn as much from talking to people between sessions as you do within the sessions themselves. I would never get an opportunity to mix with so many different people unless I attended an event like PME.

Those that attend PME are at all different stages of their careers. The icebreaker was a lovely event where I got an opportunity to meet people that served as an anchor throughout the days ahead. During the course of the conference, I got advice on my own work and offered ideas to others. I was able to hear about the demands of academia and the joys of article writing. PME 42 was a positive experience and I would certainly look to writing a paper and attending future conferences. If you are hesitant, my advice would be to take the plunge as you will join a friendly welcoming community and will leave it both energised and inspired.

The Delight of PME42

Contributed by Amy Smith, Bingqian Wei, and Cody Jorgenson (United States of America)

As a doctoral candidate, your advisors often give "advice." Many times that advice gets shelved for much later consideration. Last year, our advisors suggested that we attend PME42 to participate in an international mathematics researcher conference. And we are so delighted that we acted on their suggestion! PME42, in Umeå, Sweden, was a perfect introduction to the broad world of mathematics education research. Keeping with the theme of PME42, here are three delights we experienced as first-time attenders.

The first delight was the exceptional academic program. For all three of us, PME42 was a precious opportunity to see how many different perspectives there are in our field and how much the theoretical framework of each study affects the research being done. We were intrigued to learn how researchers study similar research problems in different ways. Much of our research has focused on the multiplicative and fractional reasoning of students and teachers. It was interesting to see how other researchers are approaching related areas with different theoretical frameworks. Beyond looking at others' research, we had the opportunity to reflect on our own research projects. We heard a lot of voices from outsiders during the presentations of our projects' research reports. The researchers in attendance gave critical questions of the methodologies we used, the claims we made, and the instruments we created. They prompted us, as insiders, to deepen our research analysis.

The second delight was the social program. Fikas (a uniquely Swedish version of the coffee break), excursions, and conference dinners were ideal opportunities to meet other researchers and network with individuals doing similar research to ourselves. Throughout our PhD programs, we have read research from many members of the PME community. By attending this conference, we were able to put faces with names. We met researchers from other parts of the world, and two of us were even lucky enough to connect with researchers to be on our dissertation committees. Less formally, texting and long lunches became an essential part of our PME experience. Through our daily debriefs, we noticed how narrow our current understandings were and how precious the opportunity of attending this international conference was. We questioned our understandings as well as those presented in the sessions and found that we had voices and ideas that could be shared at an international level.

The final delight was the newfound confidence that we gained in our own research abilities. Prior to attending the conference, we were hesitant to step forward and share our ideas as lead authors. Attending sessions from different levels of researchers—especially those from doctoral students, candidates, and post-doc—built our confidence as researchers. PME is extremely supportive of new researchers, and we would love to see the Early Researchers' Day expanded to foster more researchers like ourselves. Having attended PME42, we learned to bravely share our research and opinions and to not be afraid to ask or be asked questions. These are the most important lessons we will take from PME42.

Being a doctoral student can sometimes cause one to develop an imposter syndrome – always wondering if we really know what we think we know, or if we are just pretending. PME42 helped us each reflect on our own understandings, and we realized that we do know more than we thought we did! This was a great feeling to have and gave us the confidence we need moving forward into our dissertation work. With our first international conference under our belts, we look forward to attending future PME conferences and contributing to the field of mathematics education research.

Introduction to New Members of the PME International Committe

New IC member: Judy Anderson (Australia)

As a former secondary mathematics teacher and school leader, I am currently the Director of the STEM Teacher Enrichment Academy at the University of Sydney, where I have worked for 16 years. As Academy Director, I manage a large team of academics and support staff to deliver professional learning to primary and secondary school teachers in New South Wales. We have an extensive research program to collect evidence of impact of the Academy program from participating teachers, their students, their school leaders, parents and other local school community members. To date, we have worked with more than 800 teachers from 170 schools enabling large-scale, longitudinal data collection.

My first PME conference was in Honolulu in 2006 and since then I have attended a further four PME conferences. With Prof. Yeping Li, I facilitated the STEM Discussion Group in Singapore and the STEM Working Group in Umeå, Sweden. I am a member of the Secretary Portfolio Group and look forward to making a valuable contribution to the PME community over the next four years.

New IC member: Anika Dreher (Germany)

I am an Assistant Professor working at Freiburg University of Education in Germany. My main research interest focuses on teachers' professional knowledge and situation-specific skills. In the context of PME, a fruitful Taiwanese German research cooperation (TaiGer) could be established, which allows me to reflect on this research from an intercultural perspective. In particular, together with Feng-Jui Hsieh, Ting-Ying Wang, and Anke Lindmeier I could start the binational research project "Teacher noticing in Taiwan and Germany – What is the role of cultural norms regarding aspects of instructional quality?" which is funded in both countries (MOST & DFG). The first time I have been to Taiwan was actually during the first PME conference I attended: PME 36 in 2012. I have participated every year since then. Among other things, I have presented six research reports so far and facilitated the seminar "Reviewing for PME: A primer for (new) reviewers" during four PME conferences. In the IC, I belong to the Policy Portfolio Group and I very much look forward to further contributing to and working with the PME community.

New IC member: Anthony Essien (South Africa)

I work as Associate Professor in mathematics Education at the Wits School of Education, University of the Witwatersrand in South Africa. I am also the Head of the Mathematics Education Division at the Wits School of Education. In addition, I serve as an associate editor of Pythagoras – the academic journal of the Association for Mathematics Education of South Africa. My field of research is in mathematics teacher education in contexts of language diversity. More specifically, my research focuses on how mathematics teacher educators and teacher education programmes prepare pre-service teachers for teaching mathematics in multilingual classrooms.

My first PME was in 2007 in Korea with the PME conference in Umeå, Sweden in 2018 being only my second. It is my intention to make PME one of the conferences I attend annually.

I belong to the Treasurer Portfolio Group in the PME International Committee and look forward to working with other members of the IC and the wider PME community.

New IC member: Maitree Inprasitha (Thailand)

I am an Associate Professor in Mathematics Education Program at the Faculty of Education, Khon Kaen University, Thailand. I hold Ph.D. in Mathematics Education from the University of Tsukuba, Japan and have long experiences in studying Japanese Lesson Study for more than 15 years. My main research focus and publications revolve in Mathematics Education and teaching style of Lesson Study and Open Approach. These could make me being well-known as the first group of Thailand's educators on implementing this issue to develop mathematics teaching and learning. I have been overseeing the APEC Lesson Study series since 2006 until present. 19 APEC member economies have been participating in this project and created their Lesson Study community in APEC.

My first PME was PME 17 in Tsukuba, Japan, in 1993 as a supporting staff. Then attended PME in 1996 (Valencia, Spain), 2006 (Prague, Czech Republic), 2009 (Thessaloniki, Greece), 2011 (Ankara, Turkey), 2012 (Taipei, Taiwan), 2013 (Kiel, Germany), 2017 (Singapore), and 2018 (Umeå, Sweden), 9 times in total.

At national level, I have been overseeing many national projects implementing Lesson Study in schools in many parts of the country. The first Lesson Study project school with collaboration with Khon Kaen University coaching by me has celebrated her 10 years of experiences in implementing lesson study in Thailand in 2016. I established the Center for Research in Mathematics Education, the first center in Thailand and this center becomes a part of National Center of Excellence in Mathematics. Moreover, I also established the Thailand Society of Mathematics Education (TSMEd) in 2013 and Institute for Research and Development in Teaching Profession for ASEAN (IRDTP ASEAN) in 2014. I have been regularly invited to be an invited speaker and moderator for international conference especially among APEC countries.

Credits for Former IC Members

Kim Beswick

Submitted by Lovisa Sumpter (Sweden)

Professor Kim Beswick was a member of the International Committee [IC] since her election at PME 38 in Vancouver, Canada. She has made many important contributions to PME in several different roles. The main role may not be strictly IC but is definitely a main contribution. In 2015, she was the conference chair for PME 39 in Tasmania, Australia. Anyone organising a workshop or a conference knows how much work it is, especially if you are the only chair. Another role where she made a big contribution was in PME 42 in Umeå, Sweden, where Kim was one of the plenary speakers. It is during these years, from 2014 to 2018, she was serving as IC member. With this in mind, it is easy to understand how hardworking Kim is. Just to share an example of the work she did as a member of the Policy Portfolio Group:

Kim did a survey and a review regarding how PME and other conferences enables new participants entering a new community. This review provided us with information about what we are doing well but also what else we could do in order to be more welcoming. This is an important contribution to our community. I was fortunate to serve together with Kim in the policy group for two years, and as the head of the Policy group I thank her, not only for her many contributions, but also for her positive attitude including smiles and laughter.

Cris Edmonds-Wathen

Submitted by Laurinda Brown (United Kingdom)

Cris joined the exec in 2015, for 3 years, and was treasurer of PME from 2016-2018 (2 years). Having been a member of the Treasurer's Portfolio Group with Cris in charge for a year, I have experienced at first hand her energy and dedication to the role. For instance, she had the skills to work on managing increasing operating costs and looking at the continued financial stability of PME.

What I will remember most about the way Cris worked is her concern to support people, whether they were presenting budgets or final accounts for conferences. This same energy was brought to administering the first couple of years of the grants for Special Projects and Regional Conferences under the surplus scheme, supporting the development of some of the proposals so they would be suitable to fund.

I would like to thank Cris, personally, for having left a comprehensive and well-organised Dropbox of documents and being available for conversations that have ensured a smooth transition to my time as treasurer.

Csaba Csikos and Stanislaw Schukajlow

Credits for both were included in the Portfolio Group reports.

PME IC Reports

Policy Portfolio Group (PPG) Report

Submitted by Lovisa Sumpter (Sweden)

The Policy Portfolio Group (PPG) currently consists of Richard Barwell (Canada), Anika Dreher (Germany), Mellony Graven (South Africa), and is led by Lovisa Sumpter (Sweden).

The main work for PPG is about internal and external affairs of PME such as policy and membership. Some of the tasks for the year 2017-2018 are a review over the policy and the language on how authors are invited to review reviewers, and the continuing work from 2016- 2017 regarding our voting system. The former is an example of a task that we do in order to make sure that the structure is working as smooth as possible, but also helping us to improve the system. Regarding the latter, we see that the current system, a cardinal voting system, do according to social choice theory, avoid some of the problems connected to Arrow's impossibility theorem. However, it has several flaws compared to cardinal ratings system, which is according to research not only a more valid system but also will carry more information compared to ordinal ranking system. We will continue our work with this and give a report at the AGM next year, PME 42 in South Africa.

A lot of work is about how and if so PME should have its own research ethics just as, for instance, MERGA has. This is due to the emphasis on research ethics that has emerged in several countries, and many funding boards has nowadays a rule that research studies must explicitly describe how ethics have been taken into consideration. For instance, WHO has guidelines (https://www.who.int/ethics/research/en/), that can be thought of as general rules, but before implementing any rules, we need to understand how and in what ways these rules are applicable to our research field. The communication rules that have been implemented in the EU are connected to this, and similar rules are applicable in other parts of the world too. This too will be reported at the next AGM.

The main task for PPG is to keep the historical record of all decisions and votes made by PME and its IC. This is the 'house keeping'. Most often, one person has done this task alone which takes a lot of time. In order to make this job as transparent as possible and also share the workload, we will this year try a different system where we work in pairs instead. This is since we now have to revise the bye laws to include all the policies that has been voted in by the AGM.

Secretary Portfolio Group (SPG) Report

Submitted by Einat Heyd-Metzuyanim (Israel)

The Secretary Portfolio Group (SPG) currently consists of Judy Anderson (Australia, incoming), Man Ching Esther Chan (Australia), Berinderjeet Kaur (Singapore), Stanislaw Schukajlow-Wasjutinski (Germany, outgoing), and is led by Einat Heyd-Metzuyanim (Israel).

Responsibilities: The Secretary Portfolio Group (SPG) is responsible for facilitating communication with PME members, including future conference organizers, for communicating with external organizations such as the ICMI, and for keeping records of all PME activities. Specifically, the following is a list of our activities since June 2018.

Communication with future conference organizers: We have been keeping ongoing communication with the organizers of future conferences and PME 43 (Johann Engelbrecht, South Africa), PME 44 (Maitree Inprasitha, Thailand) and PME 45 (Ceneida Fernández, Spain). The communication regarding the particularities of organizing the conference has been greatly improved by initiating the use of the PME Wiki for this purpose. Organizers have found it useful for guiding them in preparing the presentations to the IC, and in facilitating the complex process of conference organization, which sometimes spans more than three years.

Igpme.org website. During 2018, the SPG group has been busy improving the website. I wish to thank Esther Chan for her hard work on this project.

Indexing of PME proceedings. After PME 41, the SPG group took upon itself to look into the issue of indexing conference papers and proceedings. These include ISSN/ISBN and DOI numbers. During the IC meetings in PME 42, we did some intensive research on this subject, including consultation with some PME members who have had experience with indexing issues. We discovered that the main obstacle towards indexing our proceedings in Scopus, for example, lies in the absence of a "publication ethics" and "publication malpractice" documents. These documents regulate issues of plagiarism, research ethics, co-authorship and more. PME does not currently have such a document and work on it will start during 2018-2019 by the Policy group (PPG).

Communicating with other organizations. The SPG is responsible for communication with other organizations. This year, we have been contacted by the ICMI secretary and asked to make our proceedings available for all. We are currently discussing the issue, and will move it for AGM approval if needed.

Outgoing and incoming members – Stanislaw Schukajlow- Wasjutinski and Judy Anderson

The SPG wishes to thank Stanislaw Schukajlow-Wasjutinski for his service during the years 2015-2018. Stanislaw started his service in the IC in 2014 as member of the TPG and moved to the SPG in 2015. He was a helpful member, always good-natured and easygoing. Stanislaw's main work in the SPG had to do with finalizing the Wiki, so that it could replace the conference organization documents. The past year, when we moved to using the Wiki as the main source for all future conference organizers, saw the good effects of his work. We wish Stanislaw much success in his future engagement with the PME community.

We welcome Judy Anderson, who has been elected for the IC in Umeå (PME 42), to our portfolio group. Congratulations, Judy, for your election. We look forward to working together!

Treasurer Portfolio Group (TPG) Report

Submitted by Laurinda Brown (United Kingdom)

The Treasurer Portfolio Group (TPG) currently consits of Yiming Cao (China), Anthony Essien (South Africa), Kai Lin Yang (Taiwan), and is led by Laurinda Brown (United Kingdom).

The Treasurer Portfolio Group responsibilities include: managing the financial transactions of IGPME (e.g., making payments and deposits, responding to financial queries, issuing confirmations), maintaining records, advising on fiscal questions from present and future conference organisers, and preparing annual financial reports.

In addition to managing the regular financial transactions of IGPME, the TPG has been managing the proposals for regional conferences and special projects initiated under the surplus policy. Decisions about grants are made by the whole IC, in the case of grants up to 5000 EUR, or by the whole membership at the AGM, for grants above 5000 EUR. However, the TPG conducts the initial evaluation of proposals to determine whether they fit the guidelines for possible approval. The latest call for proposals was opened on 1st November, 2018, with bids being due December 15th, 2018. You can see the call for proposals on the Announcement Forum of the PME website: http://www.igpme.org/index.php/communication.

Finally, I would like, in my first year of being Treasurer, to thank Cris Edmonds-Wathen, the outgoing Treasurer, for being willing and available to answer my questions and to welcome Anthony Essien, who is currently heavily involved in the organising group for PME43. Much of my time as a new Treasurer has so far been engaging with getting to grips with systems but the TPG will begin to work as a team in managing responses to new proposals for Special Projects and Regional Conferences in the New Year.

Vice President Portfolio Group (VPPG) Report

Submitted by David Gómez (Chile)

The Vice President Portfolio Group (VPPG) currently consists of Maria Mellone (Italy), Miguel Ribeiro (Brazil), and Maitree Inprashita (Thailand), and led by David M. Gómez (Chile).

The role of the VPPG is to oversee the scientific matters of PME, in relation to the annual conferences, types of contributions, and reviewing, among others.

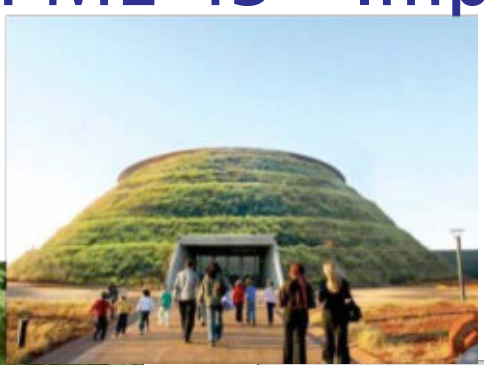
For the year 2018-2019, one of the main tasks of the VPPG will be the revision of the Rule of 4 and of co-presentation in PME conferences. This revision is motivated by the shift in research practices occurring across many fields, where team efforts are becoming more and more frequent, and the need that our authorship guidelines align with well-established international criteria. As a reminder, the Rule of 4 has been suspended for PME 43, where we will bring to the AGM a proposal for discussion and vote.

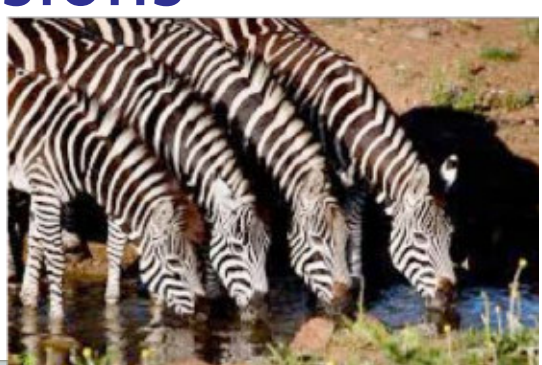
Another focus of this year will be the writing and/or revision of guidelines for several important aspects of the PME conferences, such as for plenary lectures, reactors, and plenary panel, as well as for reviewing. These tasks have direct impact on keeping the scientific quality of PME conferences at the high level that we expect every year.

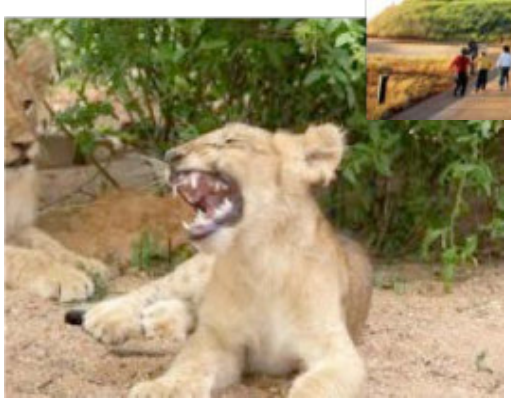
Other tasks of this group include the reviewing of the scientific aspects of all applications to the calls for special projects and regional conferences, and the search for possible initiatives of professional development of PME members. One particularly important initiative in this sense is the PME Reviewing Seminar: we need new conductors for this seminar from PME 43, so I invite all of you who want to contribute to PME by helping to the development of early and not-so-early researchers to contact us and volunteer.

This is a good moment to acknowledge the work of IC members who stepped down in PME 42, in particular that of Csaba Csikos. Csaba participated in the IC in the period 2014-2018, making important contributions to the PME community, most prominently as chair of PME 42 in Szeged, Hungary, as well as for his analysis of the PME reviewing criteria for Research Reports from a data-driven perspective in order to improve our reviewing practices and procedures.

PME 43 - Impressions

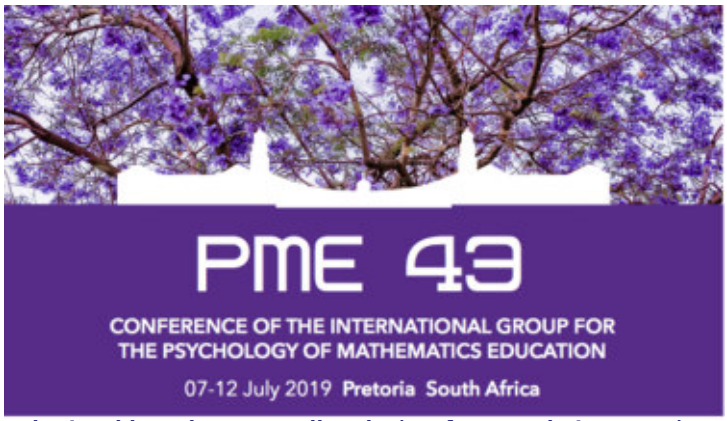






PME 43

Improving Access to the Power of Mathematics



Submitted by Johann Engelbrecht (conference chair PME43)

The local organising committee invites you to attend the 43rd annual meeting of the IGPME in Pretoria, South Africa from 7 to 12 July 2019 at the Groenkloof campus of the University of Pretoria. The conference will be presented jointly by the South African Mathematics Foundation and the African Mathematical Union.

The theme of the conference is ***Improving access to the power of mathematics***. Since this is only the second time the conference will be hosted on the African continent, we would like to give the conference a strong African flavour – focussing on access, which is relevant in South Africa as well as in the rest of Africa. However, we would also like to focus on the power of mathematics, thereby giving the conference a strong mathematics flavour. Hence our theme.

Pretoria (Tshwane), in Gauteng Province, is the administrative capital of South Africa. It is about 65 km north of Johannesburg and about 45 km from O. R. Tambo International Airport.

Known as "Jacaranda City" for its thousands of jacaranda trees, the city is also known for its universities and government buildings. The semicircular Union Buildings encompass the president's offices and hosted Nelson Mandela's inauguration.

The plenary speakers for PME43 are Sizwe Mabizela (South Africa) - non PME speaker, Núria Planas (Spain), Peter Liljedahl (Canada) and Ravi Subramaniam (India).

The plenary panel discussion will be held on the topic *What is proven to work (according to international comparative studies) in successful countries should be implemented in other countries*, and the panel members will be Judit Moschkovich (USA) (chair), Mercy Kazima (Malawi), Robin Jorgenson (Australia), Yeping Li (USA) and Heejeong Kim (Korea).

Our goal is to make the 2019 meeting scientifically and socially successful. We hope that your visit and stay in Pretoria and South Africa will be exciting, informative, and inspiring. We look forward to welcoming you to the conference in July, 2019. Remember it is winter at that time in Pretoria.

Visit our website at www.pme43.up.ac.za

PME Regional Conferences

South America

Submitted by David M. Gómez (Chile) and Wim Van Dooren (Belgium), chairs of the first PME Regional Conference: South America

In PME 41 (Singapore), the PME community gathered at the AGM voted for the approval of the first PME Regional Conference, in response to a proposal for organizing this event in Chile. The target region, South America, has been underrepresented in PME in many aspects such as conference attendance, participation as PME reviewers, and the number of PME conferences held in the region.

Some weeks ago, in November 14-16, this event took place in Rancagua, Chile. About 60 researchers (50 of them from South America) gathered at Universidad de O'Higgins, a newly created public university. In addition to the usual Plenary Lectures, Research Reports, Oral Communications, and Poster Presentations, this conference included PME sessions and Discussion sessions.The former aimed to introduce participants new to PME to its organization, history, conferences, as well as to explain how to become involved in the PME community. The latter, instead, allowed the group to discuss what are the unique foci and contributions of the regional research in mathematics education, and to explore possible ways in which the regional and the PME communities may interact more.

We want to thank the PME community for generously supporting this event, not only in the financial aspect but also with advice, feedback, and the reviewing of scientific contributions. A special acknowledgement is due to our plenary speakers Merrilyn Goos (Ireland), María Victoria Martínez (Chile), and Marcia Pinto (Brazil), as well as to Manuel Goizueta (Chile) and Stefan Ufer (Germany) who took part in the program committee.

PME & Yandex Russia Conference

Submitted by Anna Shvarts (Russia)

The Regional PME conference is conducted in Russia on 18-21st of March 2019, and being themed "Technology and Psychology for Mathematics Education" it is organized together with Yandex, Russian IT company.

Going back as far as over a century ago, Russia was actively involved in international discussion of mathematics education issues. Despite the current importance of Russian psychologists, such as Vygotsky, Leontiev, Davydov, and Krutetsky for the development of psychology of mathematics education, this dialogue diminished during the Soviet time and still there is very limited contact. The conference theme joins historical influence of Russian psychology and the technological future of mathematics education, providing a rear chance for a technological company to contribute to the development of Russian mathematics education community by hosting our conference at its office in Moscow.

PME & Yandex Russian conference is intended to facilitate restoration of the dialogue between Russian mathematics education community and international community and the conference plenary lectures are essentially focused on supporting this aim. Norma Presmeg will introduce the evolution of mathematics education research through the history of PME movement and development of research methodologies; she will also touch the role of Russian psychologist Krutetsky. The role of Russian psychology will be deepen by Steve Lerman in his talk about Vygotsky's approach to learning and development. Lerman points that the historical figure of Vygotsky, still to be investigated, inspires researches in ME in different countries. Jumping from psychological background towards new directions, Marie Arsalidou will present findings of developmental neuroscience on mathematics cognition and discuss its importance for evidence-based education. The following two lectures are dedicated to the technology in ME: In his lecture on

sensory-motor roots of mathematical reasoning, Dor Abrahamson will expose contemporary technology as enriching both, research methods and educational design solutions. Sergei Posdniakov is going to draw a trajectory of cultural transformations towards development and appropriation of technology that contributes to productive mathematics learning.

Apart from plenary lectures and personal presentations we plan two topic-centered discussions: one discussion will concern the opportunities and challenges that technology provides for mathematics education; at the other discussion we are going to plan future steps in the development of Russian mathematics education community.

By the deadline for Research Reports 49 contributions have been submitted. We are glad to welcome 19 contributions from Russia, 26 from other countries, and 2 proposals from the mixed teams. Russian contributions are summited by diverse authors: educators, psychologists, mathematicians, philosophers and even one school teacher. Find additional information at the conference website

https://education.yandex.ru/pme/en/

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Russia

Calls from PME

PME Special Projects and PME Regional Conferences

Submitted by Laurinda Brown (United Kingdom)

The PME IC would like to draw attention to the following calls under the IGPME Surplus Policy and Regional Conferences Policy: http://igpme.org/index.php/communication/policy-documents

2018 Call for PME Special Projects

The International Group for the Psychology of Mathematics Education (IGPME) has opened a call for proposals from its membership for furthering its goals through special projects. The proposal applies for the funding years 2019 (for small projects) and 2020 (for large projects). The deadline for proposals for 2019 and 2020 is December 15, 2018.

More details can be found at http://www.igpme.org/index.php/communication/announcement-forum/262-pme-call-for-special-projects

2018 Call for PME Regional Conferences

The International Group for the Psychology of Mathematics Education (IGPME) has opened a call for proposals from its membership for organising PME Regional Conferences. The proposal applies for the funding year 2020. The deadline for proposals for 2020 is December 15, 2018. The original call document can be found at http://www.igpme.org/index.php/communication/announcement-forum/263-pme-call-for-regional-conferences

PME Newsletter Editor Wanted

Submitted by Maike Vollstedt (Germany)

The PME IC and the Newsletter editorial group extends a call for an voluntary editor to join our team. We seek in particular individuals with the skills to design and edit the graphics of the newsletter.

Requirements for the job:

1. Acquaintance with the PME membership and past PME conferences

2. Experience with the editing software Adobe InDesign (with a preference for having access to Adobe InDesign) and graphic design.

3. Excellent English writing and editing skills.

Please contact Maike Vollstedt for further information.

Applications, including CV and a short description of relevant experience, should be mailed to Maike Vollstedt (vollstedt@math.uni-bremen.de) by the end of January 2019.

PME Announcements Forum on the PME Website

The PME website (www.igpme.org) is the main portal for all communication and information regarding PME. A useful feature for PME members is the Announcements Forum as this is the place to post items of information for PME members such as job announcements, conference announcements, and so on. To access the Announcements Forum, please log in to the PME website using your 'conftool' login. You can then find the forum in the 'Communication' section. By clicking on 'subscribe' in the forum, you then receive an email each time an announcement is posted in the forum.

Since the previous PME Newsletter, the following items have been posted on the PME Announcements Forum:

1. *Conference in Ireland, 4-9 August 2019*
2. *First Announcement for Conference in Ireland*
3. *Vacancy at University of Agder, South Norway*
4. *The 1st International Commognitive Workshop*
5. *MEI 7 Conf on Research in Maths Ed, Dublin 2019*
6. *PME Call for Special Projects*
7. *PME Call for Regional Conferences*
8. *Broadening research on problem solving*
9. *Job announcement: Postdoctoral Fellowship*
10. *Journal SI: Early Childhood Mathematics Education*