PSYCHOLOGY OF MATHEMATICS EDUCATION

PME NEWSLETTER

November/December 2010

MAKING A DIFFERENCE WITH CRITICAL OPTIMISM IN MATHEMATICS EDUCATION RESEARCH: Message from PME President João Filipe Matos

I'm still feeling the wonderful flavour of the Brazilian sweets at Belo Horizonte and recalling a number of stimulating sessions I attended at PME34. Thanks again to a devoted, extremely dynamic and committed group of Brazilian colleagues co-ordinated by Marcia Pinto. And immediately since I took office as President of PME in July, the International Programme Committee for PME35 (Ankara, Turkey) went on preparing the scene for the next conference thanks to the effort of Behiye Ubuz, chair of PME35.

I want to publicly thank Fou-Lai-Lin for the assistance and help in the process of handover of many on-going issues that are part of PME administration. One of those was the appointment of the Administrative Manager. And I can announce now that Bettina Roesken, from Ruhr-Universitaet Bochum in Germany, was selected for the position and started taking care of PME matters last October. Welcome Bettina!

As President of PME, I would like to express my deepest appreciation for the contribution of Jarmila Novotná as Administrative Manager over the past three years for all her hard work and clear commitment to fulfilling the aims of PME. Thanks, Jarmila!

A final word. Although we watch the world running into financial crisis one after the other, I would like to close this short message putting forward the idea of critical optimism. It is recognized that mathematics education plays a prominent role in education in general in most countries and that it may be a rather relevant dimension in promoting social development if taken in conjunction with other political measures and action. Accepting this premise, we may as researchers in mathematics education adopt a positioning of critical optimism as we may believe that yes, we can make a difference.

PME *Message from the Editors*

Welcome to our Newsletter of November/December 2010! It was great to meet you in Belo Horizonte. PME 34 conference was a success in all senses!

PME as a living organization thrives on the contributions of its members. Members share their research, provide leadership, take up administrative positions, and invite new-comers to the community. Such movement and change keeps PME alive. In this issue we focus on such change. We introduce our incoming PME President and thank past-President Fou-Lai Lin for his contributions. We announce PME's new Administrative Manager (AM) and recognize the efforts of past-AM Jarmila Novotná. We also review PME 34 from the perspectives of new and experienced PME members. We feature invited submissions from Konrad Krainer and Behiye Ubuz related to PME 35's conference theme of Developing Mathematical Thinking. We hope these inspire you as you prepare your proposals and submissions for PME 35.

On the theme of change… we welcome Silvia Alatorre as a new member of the PME Newsletter team. Thank you Silvia for joining the team as co-editor.

For the next issue (February/March 2011) we are seeking contributions or reactions to the contents of this issue. We are also particularly interested in articles that examine PME's efforts of developing our international community. Please, send your contributions directly to the editors. Hope you enjoy this Newsletter! Best wishes for the New Year!

Cristina Frade,<frade.cristina@gmail.com>; Cynthia Nicol <cynthia.nicol@ubc.ca>;
Silvia Alatorre <alatorre.silvia@gmail.com> – Editors of PME Newsletter

Inside this Issue

João Filipe Matos incoming PME President

invited submission by Aiso Heinze, PME Vice-President

Our constituency prescribes presidential elections take place every three years. As Fou-Lai Lin was elected president at PME 31 Seoul (South Korea) in 2007, this year PME members elected a new president during the AGM at PME 34 in Belo Horizonte (Brazil).

Thank you Fou-Lai Lin!

When Prof. Fou-Lai Lin started studying mathematics at the NTNU in Taipei (Taiwan) and earned an M.A. and PhD in mathematics from the Fordham University, New York in 1976 he had no idea he would be the PME president from 2007 until 2010.

Along the way, he was Director of the Department of Science Education of the National Science Council of Taiwan and earned a number of awards (for example from the National Science Council of Taiwan and the University of Cambridge). He has also been a member in numerous committees and associations, including the PISA governing board (2004-2007), the standing committee of the IEA (2002-2007) and the NCTM (2002-2003).

Like many longstanding PME members, Fou-Lai Lin started to visit PME conferences to become acquainted with the international mathematics education community. Because of his friendliness and charm, he became popular within PME and was elected as an IC member in 1988.

Elected as the first PME president from East Asia in 2007, he succeeded Chris Breen, the first PME president from Africa, demonstrating that PME is really an international organization active all over the world.

Fou-Lai Lin has left a lasting impression through his tranquil and calm demeanor – even in situations of chaos. We thank him for his positive influence and many contributions during his term of presidency.

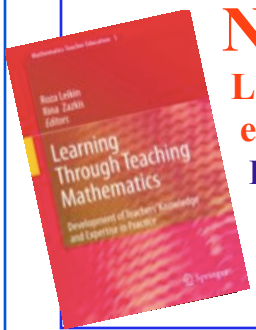
Welcome João Filipe Matos!

We would like introduce Prof. João Filipe Matos who was elected as our new President at the PME34. Prof. Matos studied Mechanics Engineering and Mathematics at the University of Lisbon where he also earned his PhD in Mathematics in 1991.

In recent years, he has coordinated several research programs dealing with topics such as modeling in mathematics education, mathematical activities including the use of technology in the classroom, and cultural issues of mathematics education. He is currently Professor of Mathematics Education at the University of Lisbon.

João Filipe Matos attended his first PME meeting in London in 1986 and since then has joined us for 21 further meetings. In 1995 he was elected as a member of the International Committee of PME and took over responsibility for PME business for four years until 1999. Eleven years later, he decided to stand as a candidate for presidential elections and made the game. Supported by the current IC and the retired president, Fou-Lai Lin, João began his presidential duties during the post conference meeting of the IC in Belo Horizonte and developed first ideas for his term of presidency.

The IC and all PME members look forward to working with Prof. Matos in the coming years.



New Book! Just Released!

Learning through teaching mathematics: Development of teachers' knowledge and expertise in pratice

Roza Leikin and Rina Zazkis (Eds.) (2010)

Presents international views on teachers' learning from their practice; the chapters are written by mathematicians or mathematics educators from Brazil, Canada, Israel, Mexico, UK, and USA.
Published by Springer ISBN: 978-90-481-3989-7. http://www.springer.com

Thank you Jarmila Novotná past AM for PME

The PME Newsletter interviewed Jarmila Novotná of Prague as the outgoing Administrative Manager (AM) of PME. Jarmila was AM from 2008-2010 and we asked her to share some of her memorable experiences during this time. On behalf of the PME community, we wish to acknowledge the outstanding commitment Jarmila has made, and thank her for her excellent job. We look forward to Jarmila's continued contribution to the PME community in many other ways.

Tell us about your first PME conference.
PME 24, Hiroshima in 2000 was my first PME conference. I heard from my colleagues about the high level and severe reviewing process for PME Research Reports, and was delighted when I found out that my paper was accepted. I remember the atmosphere at the conference was friendly and the audience showed interest in our research. The International Committee (IC) member who attended my presentation was Peter Sullivan. I was impressed by his friendly behaviour; he gave me the feeling that I was a valuable member of the PME community. Thank you, Peter.

When did you become Administrative Manager? What was happening with PME at that time, from your perspective?
I became Administrative Manager (AM) in January 2008 after the former AM (and first in PME history) Ann-Marie Breen resigned. Her performance in the job had been outstanding so it was a challenge to do the job as well as she had done. It was shortly after the new PME database and website was established which followed the IC recommendations.

When applying for the position I believed that with my PME experience as chair of PME 30 in Prague and as the member of the IC from 2003-2007 and my extensive knowledge of PME issues and various databases made me well prepared for the job. However, it turned out that I needed to also learn a great deal. Ann-Marie and then PME President Chris Breen helped me transition into the job. I believe I managed to do it properly addressing many difficulties of an ever changing PME.

What helped you decide to take on the task of the AM?
I would prefer to say who helped me. There were three main people who persuaded me: Joop van Dormolen, Ann-Marie and Chris Breen. If I am to say "what" helped me, it was my rich experience with PME in two roles – as the chair of PME 30 (the largest PME with nearly 700 attendees) and as an IC member. Moreover, I had my additional knowledge and experience from the world outside PME – as the organiser of other scientific events (SEMT conferences in Prague, ERCME in 1997, CERME 2 in 2001 etc.). My final motive was my supportive family background. I knew I could rely on their expertise in technology, language etc.

When you took on the task as AM what challenges did you face? The more experience I gained as AM the more confident I became that I was able to do an excellent job and that PME would gain immensely from my contribution of knowledge and skills. PME 33 in Thessaloniki in 2009 was a big conference and it needed a great deal expertise to help the conference run smoothly. Its size was comparable with PME 30 in Prague.

I am happy that together with the PME 33 Local Organizing Committee (LOC) and the International Program Committee (IPC) we managed to organize an excellent conference. After PME 33, I was pleased that the PME IC liberated the AM from some of the former tasks and duties. Of these, the most time consuming were assigning reviewers for papers and making blind submitted contributions. Thanks to this change I was able to devote more time to other interesting work in other areas of my career.

Which of your duties/tasks was most interesting?
I liked the contact with members of PME community very much. I tried to help the members with whatever problems they met. In my career of AM I answered a huge number of various questions about the database, previous conferences, and PME rules. It was always very gratifying whenever I managed to help and my help was appreciated. My feeling is that PME members valued not only the information I sent them but also its reliability and the speed with which I reacted.

...continued on page 4

Jarmila Novotná interview continued...

What is one of your more memorable accomplishments as AM?

This might not sound plausible and might offend some of the PME members but I believe that one of my most memorable accomplishments is that I managed to preserve many characteristics and rules that make PME a special conference from infringements of some IC members who were not familiar with PME constitution, rules, history and culture.

What advice might you give to the new AM?

I believe it is crucially important that the new AM become knowledgeable of documents such as the PME constitution, AGM and IC decisions and to use this knowledge to preserve PME as a very special conference. PME is not an ordinary event as is the case for so many other conferences that take place every year in many countries. I wish the new AM all the best in playing this important role and in future work.

Thank you Jarmila!

Education Committee of the European Mathematical Society

Bridging the gap between mathematics research and mathematics education

The European Mathematical Society –EMS, http://www.euro-math-soc.eu, consisting of about 50 mathematical societies in Europe, 20 academic institutional members, and many individual members has a number of standing Committees, http://www.euro-math-soc.eu/committees.html, among them the Education Committee. This Committee is working to bridge the gap between mathematics as a field of research and application on the one hand, and its teaching and learning in society on the other.

An Education Committee, http://www.euro-math-soc.eu/comm-education.html, was initiated by the EMS in 2009. Konrad Krainer (Austria) led it temporarily and organized a first meeting, Günter Törner (Germany) took over as chair starting from January 1, 2010; Despina Potari (Athens) was appointed as a vice chair by the EC of EMS; the correspondent within the EMS Executive Board is Franco Brezzi, brezzi@imati.cnr.it (Italy). It is worth noting that the Committee has decided that it cannot take a particular stance with regard to specific policy issues since there are many differences in tradition, conditions, emphases and priorities in the European countries. Positions and recommendations in favor of one approach over another would be inappropriate, as it would make the Committee a partisan agent in highly complex terrain.

Members of the Committee: Törner, Günter (Germany) (Chair); Arzarello, Ferdinando (Italy); Dreyfus, Tommy (Israel); Gueudet, Ghislaine (France); Hoyles, Celia (Great Britain); Krainer, Konrad (Austria); Niss, Mogens (Denmark); Novotná, Jarmila (Czech Republic); Oikonnen, Juha (Finland); Planas, Núria (Spain); Potari, Despina (Greece) (Vice Chair); Sullivan, Peter (Australia) and Verschaffel, Lieven (Belgium).

The Committee wishes to encourage all mathematicians, mathematics related institutions, and mathematics educators to communicate with the Committee on issues of interest to European mathematicians and educators. The Committee is interested in becoming a platform for exchange of information, experience and views, and to explore issues and problems of significance to European mathematics education and promote its development everywhere.

The Committee intends to be present at all major European and international conferences on mathematics education. We will also inform about our Committee and some of its first actions, next time at the CERME Conference in Rzeszow (Poland) in February 2011, and then at PME 35 in Ankara, Turkey. The Committee's contact person to PME is Núria Planas, who is also a PME IC member.

From June 11-14 the committee had a very encouraging meeting at Athens that was organized by Despina Potari; every participant brought in his/her expertise from the own culture; first results will be presented at CERME 7. To be precise, the Committee has decided to take an initiative that we expect to support the dialogue between mathematicians and mathematics educators, namely to identify a number of solid, well established findings in mathematics education. With discussing this topic on our Athens meeting we became aware that it is far beyond trivial to identify and rank findings within the last fifty years. Nevertheless, we are open for any message, guenter.toerner@uni-due.de, offering us proposal for specific candidates.

Introducing Bettina Roesken PME's new AM

The PME Newsletter also interviewed the incoming Administrative Manager (AM), Bettina Roesken, about her expectations for this new job. On behalf of the entire PME community, we wish Bettina all the best in this important position.

What did you enjoy most about your first PME conference?

PME 29 in Melbourne was my first PME conference. At that time, I had just completed my master studies and my supervisor told me to submit a Research Report. When I got the information that my paper was accepted as Short Oral, I was so excited to fly to Australia and to present my research to an international community for the first time.

Each PME conference has its own spirit and I think those very first conferences were most important for me and my work.

Many collaborations started from PME conferences and many common papers with researchers from all over the world resulted from that. Last year, I was very happy to go Brazil. We had good discussions in our Research Forum and I also profited much from that for my own research.

What are your main interests in math education?

In the last five years, I have been involved in a huge German project dealing with professional development of mathematics teachers. In particular, my doctoral studies were concerned with evaluating what dimensions are relevant for mathematics teachers regarding aspects of their continuous professional development. I am particularly interested in professional development that profoundly respects and cherishes teachers and their *needs*.

I am also working in the field of beliefs, and focus on studying their influence on the teaching and learning of mathematics. Particularly, I am interested in understanding the relevance of beliefs structures and how those can be investigated by quantitative measures. Finally, I am interested in history in mathematics, and I think it is amazing to see how knowledge has developed in mathematics and how much time it took for some concepts to arrive at what we have today.

What helped you decide to apply for the role of AM?

When I heard the announcement, I immediately thought that I would like to do the job. As a young researcher, I have profited much from the PME conferences and now I feel like it is a good job to work for the PME group. Issues like networking and organizing were in the focus of my last project job, too. So, those are things that I really like.

Many collaborations started from PME conferences and many common papers with researchers from all over the world resulted.

I also remember the many times, I asked Ann-Marie and Jarmila for my password and they immediately provided the help that I needed. Now, it is up to me to provide help for the many requests that other people have.

Last but not least, I like communicating with people from all over the world.

What do you think is the most important part of the AM job?

For me, the most important aspect is that I am kind of the connecting link between the PME community, on the one hand, and the IC and the president, on the other hand. Practically, that means that people can contact me with whatever issues are relevant for them.

What challenges do you perceive are part of this job?

At the moment, the main challenge is the time difference. With respect to the next PME conference, I am very happy to live in Europe, which makes communication with Portugal and Turkey very easy. The next different thing is to get to know about all the things that have been decided in the past and that are important for my work.

However, last PME administrative manager Jarmila always knows answers to my questions and I feel very safe. Using the conference management software ConfTool also makes things easy. However, nearly every day new things occur, but I like to handle that challenge.

The Quality Problem in Mathematical Learning

invited submission by Konrad Krainer

I agree with Alan Schoenfeld who argued at a recent conference (FMEE, Lisbon 2007) that *mathematics has an image problem*. We should not take it for granted that it is totally evident to all people that mathematics is highly important.

Instead, we should try to communicate the advantages and benefits of mathematics better to the public. However, an influential part of the public opinion on mathematics is *generated at schools*. And there (and partially also in teacher education), too many students do not really get engaged in enjoyable and fascinating mathematical activities. Thus they are not adequately supported to become freer through mathematical thinking (e.g. getting more and better means to argue, to estimate, or to sketch figures).

In contrast, too often, students even feel that mathematics reduces their intellectual creativity and freedom. To me, this shows that we don't have an image problem only (which might be solved by better communication and more sophisticated forms of public relations), we seem to have a severe *quality problem*.

In contrast to our vision of mathematics teaching (and the high status of mathematics in society and economy), *many students* develop only *little interest* in doing mathematics (or more precise: in doing the operations they are supposed to do in classroom); they develop *fear rather than joy*, and (as a consequence of the underdeveloped cognitive and affective challenges) only develop *low self-efficacy*; they do not get enough supportive feedback from teachers (and parents) and, in sum, far too many students achieve *low competencies* only.

This leads, for example, to drawings of students where mathematics is sketched as a fire-breathing dragon with a dangerous tail, or as an alien.

Many students think that all mathematical problems are solved, and that there is always only one solution and one way to find it. They believe that mathematical wisdom can be reduced to small tasks, and that the only way of learning mathematics is through quickly being driven along mathematical highways (formula, algorithms etc., constructed by wise experts centuries ago).

Too often students even feel that mathematics reduces their intellectual creativity and freedom

This image of mathematics as a ready-made, narrowly structured, only for experts accessible and frightening object stays in stark contrast to the potential beauty, utility, openness and intellectual challenge of mathematics.

This image of mathematics as a ready-made, narrowly structured, only for experts accessible and frightening object stays in stark contrast to the potential beauty, utility, openness and intellectual challenge of mathematics.

There are many teachers of other subjects and even mathematics teachers (in particular at the primary school level) having a certain emotional distance to mathematics.

What can be done in reaction to this *insufficient situation*? Public relations strategies to improve the image of mathematics? New standards and textbooks? National projects to reform teaching? Research papers and talks? Of course, all these strategies are important, and there will be some success here and there. But *the key are teachers*. And these *teachers need support*, both from school administration and from university.

In particular, mathematics teachers need *teacher educators* who work with them in the same innovative way teacher educators are expecting teachers to teach. These teacher educators need to collaborate with other colleagues like they expect teachers to do so.

Teacher educators need to evaluate and improve their courses in order to be a good role model (being self-

Quality Problem continued ...

critical and adaptive). They need to gather teachers' interests and pre-knowledge because this increases the likelihood that teachers realize the power of having sufficient information about their learners. Teacher educators need to use the rich experience and wisdom many teachers have since they can learn from them and they help them to build bridges between theory and practice.

The list of needed actions and reflections by teacher educators could be extended easily. However, the main message is clear: Mathematics teachers are the key to change. And all kinds of change we expect mathematics teachers to do, we should take as a starting point for reflecting and improving our own practice. The stronger this *culture of evaluation* becomes established at universities, the stronger it develops at schools (and at school administrations), too. It is important to investigate the learning of mathematics students and mathematics teachers, however, we also need to put more emphasis on exploring and understanding our influence on mathematics teachers' learning. This kind of *teacher education research* is *a key to support the development of mathematical thinking*, both of teachers and students.

Konrad Krainer is Full professor at the University of Klagenfurt, Member of the Senate and leads the Austrian National Initiative IMST (Innovations in Mathematics, Science and Technology Teaching, 2000-2012). He is a Founding Member of the Board of the European Society for Research in Mathematics Education (responsible for establishing a Summer School for Young Researchers). He was Associate Editor of JMTE (1998-2009) and is Co-Editor of the International Handbook of Mathematics Teacher Education (1998). Konrad Krainer is a member of the Education Committee of the European Mathematical Society (and led this Committee temporarily in 2009). His research interests are mathematics teacher education, school development and educational system development. konrad.krainer@uni-klu.ac.at

Mathematics Education Position Available

Lecturer/Senior Lecturer in Mathematics Education at the University of Auckland, New Zealand

Full details are available at this link: https://www.opportunities.auckland.ac.nz/psp/ps/EMPLOYEE/HRMS/c/HRS_HRAM.HRS_CE.GBL

The ID number is 12456 and the closing date is December 9th 2010. For further information contact MikeThomas (moj.thomas@auckland.ac.nz).

10th International Conference on Technology in Mathematics Teaching

ICTMT-10 will be held from Tuesday July 5th to Friday July 8th 2011 at the University of Portsmouth on the South coast of England opposite the Isle of Wight

Authors may submit their abstract immediately to ictmt10@port.ac.uk . On acceptance of their abstract, authors will be invited to submit a 6-page paper for inclusion in the conference proceedings. Authors of reviewed papers will have the further opportunity of submitting their papers for publication in "Teaching Mathematics and its Applications" http://teamat.oxfordjournals.org/

Submission of abstracts (< 300 words)
by 6th December 2010: Acceptance of abstracts
by 20th December 2010: Submission of papers (6 pages)
by 29th April 201: Review of papers and journal invitation
by 3rd June 201: Journal publication late 2011 / early 2012

First Time Perspectives: From the eyes of new PME members

A Conversation ....

PME 34, Brazil welcomed a number of first-time PME conference attendees. New participants from graduate students to professors came not only from Brazil, the host country, but also from Europe, United States, Canada and Australia. With new participants come new ideas and experiences that contribute to the life of the PME community. New participants also provide a lens on the conference experience that is often too familiar or forgotten by more experienced and seasoned PME attendees.

And so from the back of a bus traveling from the university to downtown Belo Horizonte we spoke with two PME first timers: Anke Lindmeier from Technische Universität München (TUM) School of Education Munich, Germany and Maike Vollstedt from the Leibniz Institute for Science and Mathematics Education, Kiel, Germany. It was a hot bumpy bus ride filled with the buzz of conference participants sharing their thoughts on the day's activities.

We recorded our conversation with Anke and Maike and share excerpts of it below. At the time of our conversation Anke and Maike were in the finishing stages or just completed their doctoral dissertations. Anke's research is in the area of teacher knowledge and competences where she has developed a model and tested it through a feasibility study. Maike's doctoral research focused on students' personal meaning for doing and using mathematics. Each is now working on new projects through post-doctoral positions in Germany.

How did you decide to attend PME 34 in Belo Horizonte Brazil?

Maike: I was invited by my boss to come. I thought it would be a great chance to meet all these people we are reading in our research and make international contacts. As I complete my doctoral program and am ready to begin another study, it is important to me to make contact with those in East Asia – which is very difficult to do at a European conference.

Anke Lindmeir, Cynthia Nicol, Maike Vollstedt

Anke: As I've just finished my PhD thesis, I think this is a good time to start attending international conferences and PME is one of the most known conferences in our area. I hoped I would be able to start a dialogue with others that will continue after the conference.

What are your first impressions of the PME programme?

Maike: It was a bit of a challenge to understand how PME works. With all the different kinds of the Research Reports, Short Orals, Working groups and Discussion groups. Deciding on Research Report and Short Oral were fine. But I was confused on how to choose a Discussion Group and was surprised that nearly everyone else had prepared where to go. Finally someone told me that I chose a Discussion Group when I registered for the conference. And I couldn't remember what I choose. It would have been helpful to have some short explanations in the program on what the differences between the various presentation formats are.

Anke: I think it is quite a dense program from really early in the morning to late in the evening. And it is hard to take breaks because there are so many interesting topics and you want to talk with so many different people. I was really pleased with the structure and organization. I was not lost.

It is sometimes a challenge to navigate the conference. How did you decide which sessions to attend?

Anke: I look at the title and the people. But as I do not know the people so much I scrolled through the electronic versions of the papers to decide if the session is interesting to me.

Maike: I decided by looking at the paper title to see whether or not it matched my research interest. I don't have a CD drive in my computer so I couldn't look at the program electronically and the proceedings are just too heavy to carry around all day.

A highlight of the conference for you?

Maike: I very much enjoyed the Happy Hour on Monday night—great music, great atmosphere. I had my first caipirinha [Brazilian drink made with lime and cachaça]. It was a good opportunity to meet, talk and dance. I felt I was so welcome.

continued on page 9...

First Time Perspectives: continued ....

Anke: I very much enjoyed the plenary talk by Brent Davis. I thought it was very inspiring. For non-native English speakers it can sometimes be a bit hard to follow. At international conferences the language issue is a problem making it difficult to understand and discuss complex ideas in a foreign language. It would be helpful if speakers could speak a bit slower and paraphrase ideas when the audience looks puzzled.

What suggestions do you have for the PME community to consider regarding first timers?

Maike : I wonder if the AGM and Policy meetings could be more structured. I think the PME Wiki is a good idea. It will allow for people to have a discussion first to discuss the pros and cons and then review these and vote at the meeting.

Anke: Perhaps more social structures such as a Happy Hour, café, or lunch for new comers alone would be beneficial.

Maike and *Anke*: Increased opportunities for young researchers to apply for funding to attend the PME conference. Consider reduced conference fees for graduate students.

The editors of the PME Newsletter appreciated the opportunity to talk with Anke and Maike and to learn more about the conference from a First-Timer perspective. We look forward to seeing each at PME 35 in Ankara Turkey.

Dr. Anke Lindmeier lindmeier@tum.de
Dr. Maike Vollstedt vollstedt@ipn.uni-kiel.de

PME by the Numbers

PME 34 Belo Horizonte Brazil

370 Participants
32 Countries represented
272 Research Reports submitted
121 Research Reports accepted

Reflecting Back: As a student from Nepal

invited submission by Hari Koiralah

In 1986 I was completing my masters in mathematics education at the University of Hull in England. Originally from Nepal, I had just spent a year trying to decipher both the British accent and jargons in mathematics education at the same time.

It was during my time at Hull that one of the professors told me that PME was organizing a conference in London and I should explore the possibility of attending it. At that point I was not thinking to attend PME; I did not even know what it was. However, after doing some research I found that PME brought together a group of educators who were interested in the psychology of mathematics education; attracting some of the people at the forefront of the field such as Professor Richard Skemp, whose work we had discussed in one of the courses that I had taken at the university.

The prospect of meeting and sharing ideas with others in the field was a good motivation for me to attend the conference. Fortunately I was able to get some funding from the British Council to register for the PME 10 conference held in London.

I attended several sessions during the conference. In many cases I hadn't the slightest idea what the presenters were talking about. It seemed to me that the majority of the participants were not like me; I thought they all spoke English with a British or American accent. However, I soon realized that they were speaking English with their

continued on page 10 ...

Experiencing PME continued ...

native accents. This was very encouraging and gave me the courage to speak with people and introduce myself as a student from Nepal. To my surprise, many people would make comments like "nice to meet you; I've never seen anyone from Nepal before." "You don't look like a Gurkha, are there different ethnicities in Nepal?" "Wow! You're from Nepal, you must be from high mountains."

... many people would make comments like 'nice to meet you; I've never seen anyone from Nepal before.' 'You don't look like a Gurkha, are there different ethnicities in Nepal?'

No one was talking about mathematics education; people were mostly talking about Nepal. It was great because I was more comfortable talking about Nepal rather than talking about mathematics education.

The next day I saw Professor Skemp at the conference; I recognized him immediately because I had seen a picture of him in a book. I was not sure if I should speak with him. I did not know how he would respond. Gathering my courage, I walked up to him and introduced myself as a student from Nepal. I told him that I had read some of his articles and the book *The Psychology of Learning Mathematics* and told him that I was very glad to see him in person. To my surprise he was truly interested in finding out how I came to England and what the field of mathematics education was like in Nepal.

He told me that I was the first PME participant from Nepal and was glad to see attendance from someone from a different country. We spent some time talking about Nepal and his hometown in England. He told me that he would love to visit Nepal one day. We took a picture together (right) and ran into each other a couple of times thereafter.

In 1991 I went to the University of British Columbia to pursue my doctoral degree in mathematics education. The PME proceedings became one of my sources for ideas and when I joined Eastern Connecticut State University in 1995 I gave a serious thought about writing a research report to a PME conference. Finally, in 1998, I was able to realize my dream of presenting at the PME in Stellenbosch, South Africa. Since then I have had several opportunities to attend and present at PME conferences (i.e. Haifa, Israel; Utrecht, Netherlands; Norwich, UK; Hawaii, USA; Melbourne, Australia; and Belo Horizonte, Brazil).

Over the years I have attended many different teaching and research conferences, met many educators, shared ideas, and learned a great deal. However, I can honestly say that the PME conferences have had the most significant impact on my growth as a mathematics educator.

Hari Koiralah with Richard Skemp

My very first conference made such an impression on me—it showed me everything that I could one day accomplish. I was lucky to meet Professor Skemp in 1986; he was a truly inspirational person who, in a few short meetings, helped me define some of my future goals.

Gathering my courage, I walked up to Professor Skemp and introduced myself as a student from Nepal.... He told me that I was the first PME participant from Nepal. To my surprise he was truly interested in finding out how I came to England and what the field of mathematics education was like in Nepal

I hope that the PME will keep on inspiring the next generation of mathematics education researchers from every corner of the globe in the same way that I was inspired in 1986.

Dr. Hari Koirala is a Professor in the Department of Education at Eastern Connecticut State University.
KOIRALAH@easternct.edu

ICMI STUDY 21 CONFERENCE: Mathematics Education and Language Diversity

Monte Real Hotel, Aguas de Lindóia, Sao Paulo, Brasil: September 16 - 20, 2011

ICMI Study 21 is a Study commissioned by the Executive Committee of the International Commission on Mathematical Instruction. It was announced at the 11th International Congress on Mathematical Education (ICME-11) held in Monterrey, Mexico in July 2008. The Study has two components: the Study Conference and the Sutdy Volume.

ICMI Study-21 Conference on Mathematics Education and Language Diversity is designed to enable researchers and practitioners from around the world to share research and experiences. As described in the Discussion Document, http://www.icmi-21.co.za, it is hoped that the Conference will attract not only established researchers but also some newcomers to the field including mathematics teachers with interesting and refreshing ideas or promising work in progress, as well as participants from countries usually under-represented in mathematics education research meetings.

Participation in the Study Conference -limited to at most 120 participants- is based only on submitted and accepted contributions. The Conference will be a working meeting organised around a number of themes. The IPC invites individuals or groups to submit papers in any of the following themes:

Theme 1: Focus on learning. Student mathematics learning and experiences in multilingual classrooms

Theme 2: Focus on teaching. Teaching mathematics in diverse language contexts

Theme 3: Focus on teacher education. Teacher education for diverse language contexts

Theme 4: Teacher education for diverse language contexts. Methodological and theoretical issues in researching mathematics teaching and learning in multilingual context

Theme 5: Focus on mathematics education and society. Reflections on the broader social, cultural and political issues in diverse language settings

Closing date for full paper submission is **30 January 2011, c**losing date for registration is **15 April 2011.** The Conference will take place in **September 16-20 2001**. For more details on the Conference and the Study, go to http://www.study-21-conf.fe.usp.br, or contact setarm@unisa.ac.za (M.Setati), mcdomite@usp.br (M. C. Santos-Domite).

PME 35 Plenary Speakers and Reactors

Plenary Speakers

Ali Doganaksoy, *Turkey*
Konrad Krainer, *Austria*
Janet Ainley, *United Kingdom*
Brian Doig, *Australia*

Plenary Reactors

Minoru Ohtani, *Japan*
Teresa Rojano, *Mexico*

Plenary Panel Convener

Olive Chapman, *Canada*

2011 MERGA and AAMT Conference

The 2011 *Mathematics Education Research Group of Australasia* (MERGA) conference is to be a very special event. We are hosting a joint meeting with the *Australia Association of Mathematics Teachers* (AAMT) and MERGA in Alice Springs, Australia. There will be a wide range of session options that include the familiar research paper presentations ("seminars"), round tables, short presentations, and poster presentations, but with additional options such as practical workshops and non-reviewed papers.

Given that the conference will be much larger than a usual MERGA conference the organisation and planning is crucial. You are requested to submit an abstract (an "Offer to Present") for all presentations, including research papers, by January 31st, using the form on the website. January 31 is also the date for Early Bird Papers – which will be reviewed, given feedback, and if necessary requested to be re-submitted — and for Symposia.

The date for full paper submissions for reviewed papers is still March 31st. This year, papers may also be submitted in the "not for review" category and these are due April 30, but note that an abstract still needs to be submitted by January 31. There will be separate sections in the proceedings for refereed and non-refereed papers.

Registration for the conference is now open, using the link on the conference website. Please read the conference website well, as there are many changes from the usual MERGA procedures. These include the template to be used and the submission instructions. Conference website: http://www.aamt.edu.au/Conferences/AAMT-MERGA-conference

Developing Mathematical Thinking:

Preparing for PME 35, Ankara Turkey

invited submission by Behiye Ubuz, PME 35 Conference Chair

Mathematical Thinking "*is about mathematical processes and not about any particular branches of mathematics*" (Mason, Burton, & Stacey, 1982, p.ix). Using this definition the mathematical processes such as modeling, inferences (e.g. analogies), conjecturing, defining, formalizing, generalizing, proving, abstracting, visual reasoning, and so forth can be considered as manifestations of mathematical thinking and relate to the learning of mathematical concepts. Thus, developing mathematical thinking is an explicit part of the National Curriculums all over the world as well as in Turkey.

Briefly speaking, there is an increased need all over the world to develop and support the development of mathematical thinking. All mathematics curriculums around the world, for example, the new elementary mathematics curriculum in Turkey, involve students using mathematical processes. There is, however, less emphasis on a professional development program on understanding the development of students' mathematical thinking.

There is an increased need all over the world to develop and support the development of mathematical thinking.

Teachers need to be supported in a program that includes a variety of aspects such as (a) viewing children's thinking as central, (b) possessing detailed knowledge about children's thinking, (c) discussing frameworks for characterizing the development of children's mathematical thinking, (d) discussing effective assessment frameworks to promote students' mastery of mathematical thinking through the classroom learning and (e) perceiving themselves as creating and elaborating their own knowledge with regard to children's thinking.

Since the foundation of The *International Group for the Psychology of Mathematics Education* (PME) in 1976, the PME community has included mathematical thinking in their agenda as well. *The handbook of Psychology of Mathematics Education* published in 2006 for the purpose of celebrating 30 years of PME provides a good summary about the work conducted by the PME community without treating mathematical thinking as a general theme – although it is mentioned in most of the chapters. Apart from entitling four chapters on mathematical thinking- numerical thinking, advanced mathematical thinking, proof and proving, and visualization-, the community has devoted no certain chapters to modeling, analogies, and so forth, although they were briefly mentioned in some cases.

Certainly, the PME group has made an important contribution to that development. But there is still a need to learn more about mathematical thinking. The space in this paper as well as the broad scope of the theme does not allow me to include all aspects of the work on mathematical thinking in this paper. Thus I focus on mathematical thinking and discuss it in terms of categories of studies rather than findings, theoretical perspectives, and methodologies.

Besides mathematical thinking itself, developing mathematical thinking and supporting the development of mathematical thinking have also attracted increased research attention in mathematics education.

Concerns about *developing mathematical thinking* can be posed in terms of the processes involved in working on and designing tasks, the processes involved in designing curriculum, pedagogical approaches that are useful in preparing and conducting lessons, the structuring and the presenting tasks to learners so as to be appropriate to students' needs and experience, and connecting topic within mathematics and between different subjects that otherwise seem disparate.

Mathematical thinking is also dependent on tackling questions conscientiously, reflecting on this experience, linking feelings with actions, studying the process of resolving problems, noticing how what you learn fits in with your own experience (Mason, Burton, and Stacey, 1982).

For example, higher order thinking that involves active control over the thinking processes, metacognition, is necessary for individuals to use mathematical processes in ways that go well beyond what they are taught. Further, affect including emotions, attitudes, beliefs, ethics, values, and morals is an indispensable concept in the development of mathematical thinking. One chapter in the handbook entitled as "Affect and Mathematics Education" highlights and discusses the importance of affect. Briefly speaking, the importance of engaging students, affectively as well as cognitively, is influential in developing mathematical thinking.

The 'constructivist' paradigm provides a framework for the discussion of the development of mathematical thinking. Constructivism lies at the core of PME research and therefore one chapter was devoted to that topic

The development of mathematical thinking can be supported and inhibited by classroom atmosphere (e.g. mathematical tasks, students' cognition, students' affective state, instructional activities, teaching methods, teachers, classroom culture and norms, and so forth), cultural and social context (e.g., language), assessment, and the use of technology. The importance of teachers in the classroom atmosphere leads the PME community to study on teachers and their teaching in four major categories: (i) Teachers' mathematics knowledge; (ii) Teachers' knowledge of mathematics teaching; (iii) Teachers' beliefs and conceptions; and (iv) Teachers' practice. Other categories re-

...continued on page 13

Developing mathematical thinking continued...

garding the activities of the teachers which received less attention are "teachers' attitude and affective aspects"; "teachers' researching"; "teachers in community"; "university teachers"; "teacher thinking and metacognition"; and "teacher reflection and reflective practice." Briefly speaking, teachers' cognitive and affective states took the attention of the PME community since the task of the teacher is to create an environment that would direct the student's efforts to mathematical thinking.

The use of technology was also treated as a theme in the handbook, including its use in the teaching and learning of calculus and geometry. Different computer systems (e.g. requiring programming languages, spreadsheets, dynamic systems, generic organizer, so on) were built up to enhance students' various mathematical processes. A generic organiser as a microworld, for example, aids the learners in the abstraction of the more general concept embodied by examples by enabling the users to manipulate examples of aspecific mathematical concept or a related system of concepts.

Cultural and social context help us understand situations linked to the context of mathematical thinking and its development. In *Vygotsky's Social Development theory,* for example, humans use tools that develop from a culture, such as speech and writing, to mediate their social environments. Initially children develop these tools to serve solely as social functions, ways to communicate needs. Vygotsky believed that the internalization of these tools led to higher thinking skills.

PME 35 (http://www.pme35.metu.edu.tr/) must surely be regarded as a great opportunity for teachers, mathematics educators, teacher educators, and policy makers around the world and in Turkey who are interested in mathematical thinking and its development. Plenary speakers and a plenary panel will absolutely provide the most relevant and effective progress in this direction, particularly focusing on tasks, teachers, learners, assessment, teaching approaches and so forth.

PME 35 is a great opportunity for teachers, mathematics educators, teacher educators, and policy makers around the world and in Turkey who are interested in mathematical thinking and its development.

References

Mason, J., Burton, L., & Stacey, K. (1982). *Thinking Mathematically*. Pearson Education Limited, England.

I wish to acknowledge Cynthia Nicol for her helpful comments on an earlier draft of this paper.

North American GeoGebra Conference

Where Mathematics, Education and Technology Meet

June 17–18 2011

Toronto Ontario Canada

The goal of the conference is to bring together both seasoned and aspiring researchers, educators, and software developers working at the intersection of mathematics, education, and technology, in general, and GeoGebra, in particular. This 2-day conference will be an opportunity for the participants to share their research ideas and findings, as well as good practices, and to start collaborating in future projects.

Important Dates

Proposal Submission: January 15, 2011 (Open to all)
Announcement of review: March 1, 2011
Proceedings Submission: May 1, 2011
Registration: May 1, 2011
Full Paper Submission: September 1, 2011 (by invitation only selected authors)

For further information about the conference, please feel free to visit the conference website at www.geogebra-na2011.ca and to email us at geogebra.na2011@gmail.com