



PME NEWSLETTER

June 2012

Looking forward to seeing you in Taipei...

Message from PME President João Filipe Matos

In a few weeks now PME36 will start at Taipei. I had the opportunity to visit Taipei in preparing and setting up the conference program and I could appreciate the excellent hospitality of the people and the charming and peaceful flavour of the place. Be prepared to face the hard task of choosing among a enormous variety of excellent local food, of tasting the local tea and getting the most of a beautiful country while immersing in its history and culture.

The conference itself will take place in a school, thus providing the context for a better understanding of part of the culture of schooling in Taiwan. Local organizers prepared the scene and the structure for PME36 participants to build upon a promising scientific program and to take advantage of having colleagues from many countries around the world share, discuss and network around problems and issues in mathematics education research.

This is an invaluable opportunity to learn in mathematics education that makes very concrete the theme of PME36. In fact, the PME conferences bring together researchers in mathematics education creating a sense of community

where learning depends on the quality of the relationships and mutual engagement that members develop with each other. Within this process it seems to be critical the way newcomers are included in the practices of the conference and the ways that old-timers play their role in the community stimulating the development of new ideas and helping to continuously reinvent mathematics education.

This is the rationale I take to address the PME membership with the message that creating opportunities to learn in mathematics education is an essential strategy to make learning mathematics a sustainable common enterprise.

I look forward to meet you in Tapei for PME36!

João Filipe Matos



PME Message from the Editors

Welcome to our Newsletter of June 2012! PME36 in Taipei Taiwan is only weeks away.

In this issue of the Newsletter we include a research feature from an exciting project that brings policy makers, researchers and mathematics educators together from Tanzania and Canada to focus on improving mathematics education in rural and remote communities. This feature exemplifies the kind of research that addresses the PME36 conference theme of ‘Opportunities to Learn Mathematics Education’.

As PME36 approaches we include highlights from plenary speakers and panelists of this year’s PME. We bring you the draft agenda for the PME AGM - always an interesting meeting - and worth attending if you are able to travel to PME36 this year. And Tai-Yih TSO, chair of the PME36 Conference, brings us images and places to explore while we are in Taipei Taiwan.

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



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Research Highlight

Mathematics Education in Rural Communities



Partnership meeting, August 2011 (from left to right): Joyce Mgombelo, Brock University Canada; Adolf Makauki, Athanas Ngalawa, Magishi Mgasa, Mzumbe University; Elaine Simmt, University of Alberta Canada; Peter Kajora, The Aga Khan University – Institute for Educational Development (Eastern Africa); Paul Mushi, Tanzania Institute of Education; Newton Maganga, Partners in Health, Environment, and Education (back); Anjum Halai, The Aga Khan University – Institute for Educational Development (Eastern Africa) (front); Makoye Wangeleja, Tanzania Institute of Education; Simon Karuku, The Aga Khan University – Institute for Educational Development (Eastern Africa); Iddi Makombe, Mzumbe University. *Missing from photo:* Florence Glanfield, University of Alberta Canada; Diana McIntyre, Tanbur African Aid Society; Dominic Msabila, Mzumbe University

Reaching Rural and Remote Communities for Educational Development:

Community-Based Partnership for Change

*invited submission by Florence Glanfield,
University of Alberta, Canada*

We, a team composed of mathematics educators, and literacy, governance, and rural development specialists, are engaged in the first year of a three-year study to learn how cross-sector and inter-disciplinary partners can work with local communities, regional and national institutions, and

international organizations to enhance mathematics teacher education in rural and remote settings in Tanzania. The partnership includes the University of Alberta, Brock University, Mzumbe University, the Aga Khan University – Institute for Educational Development (Eastern Africa), the Tanzania Institute of Education, and two non-governmental organizations: Partners in Health, Environment, and Education and Tanbur African Aid Society.

Our partnership and activities are framed by two distinct but compatible approaches. The first is an Indigenous approach to working with communities, where the development of relationships, emergent but shared concerns, and respect for both the indigenous knowledge of the local community and the academic knowledge of the university are valued (Glanfield, Donald, and Sterenberg, 2007; Poirier, 2007). The second frame for our

Research Highlight

Community-Based Partnership for Change continued ...

work is complexity theory (Davis & Sumara, 2008). The partnership (which from a complexity perspective needs to become a collective learning system if it is to be more than a collection of individuals) features distributed control, diversity, specialisation, and opportunity for significant interaction.

Recognizing that “social innovation cannot be achieved by private action alone” (International Round Table on Social Innovation, 2010) we are developing a partnership model for addressing the need for primary mathematics teacher development in rural and remote communities. The project is designed to facilitate learning opportunities through dialogue in local contexts. It will create opportunities for education, government and NGO stakeholders to partner with communities at the national, regional, district and school level to learn with and co-create innovative, effective and sustainable strategies and models for in-service teacher development in rural communities.

We are currently engaged in five case studies: the governance structure for education in Tanzania including the roles and responsibilities of the ministry and the two government agencies responsible for education; a university’s programming approach to enhancing teacher development in East Africa; the district education leadership that was identified as an exemplar of how to work with teachers to enhance their teaching; of a rural school community that has been having success for their learners through self-initiated teacher development; and the challenges of multilingual learners for teachers as understood in initial primary teacher education. The findings from the case studies are being used to develop strategies and models for in-service teacher development. Over the next two years we will implement and evaluate the strategies and models developed from these case studies.

Of particular importance to our partnership is learning how to create and sustain primary teacher development in ways that honour both the community tra-

ditions, practices and knowledge and human science research traditions, practices and knowledge. We believe that our partnership approach offers new possibilities for innovating mathematics teacher development policy, strategies and models for rural communities.

Research Team Members:

Elaine Simmt, University of Alberta (PI)
 Florence Glanfield, University of Alberta
 Anjum Halai, The Aga Khan University – Institute for Educational Development (Eastern Africa)
 Iddi Makombe, Mzumbe University
 Joyce Mgombelo, Brock University
 Dominic Msabila, Mzumbe University
 Athanas Ngalawa, Mzumbe University & University of Alberta
 Makoye Wangeleja, Tanzania Institute of Education

References:

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- Government of Canada Policy Research Initiative. (2010). *Social innovation: Summary of international roundtable on social innovation (March 18, 2010) workshop report*. Retrieved from <http://www.recherchepolitique.gc.ca/doclib/2010-0047-eng.pdf>
- Poirier, L. (2007). Teaching mathematics and the Inuit community. *Canadian Journal of Science, Mathematics, & Technology Education*, 7(1), 53-67.

PME36 Plenary Speakers Get Personal

We invited all PME36 plenary speakers to contribute to this issue by responding to the questions: How many PMEs have you attended? Where and when was your first PME? and How does your research life connect with the conference theme: Opportunities to Learn Mathematics Education



Wann-Sheng Horng

Professor, Department of Mathematics, National Taiwan Normal University, Taipei, Taiwan.

First PME attended: A meeting of scale like PME36 is my first.

In my talk I am going to tell a story about my own teaching experience in a liberal study course I gave for undergraduate students at National Taiwan University in the spring semester of 2012. For the goal of the course, 'Mathematics and Culture', I adopted an approach of reading mathematical fictions in order to help students make sense of school mathematics that they had been familiar with in high school years. By means of questionnaires, I collected data on how they were inspired by novelists bringing mathematical activities into plots of fiction. I will analyze the feedbacks in terms of narrative and discourse which are regarded by mathematics educators to play significant roles in learning of mathematics. I am a professional historian of mathematics and have been paying a lot of attention to the issues related with HPM (relations between history and pedagogy of mathematics). I am recently retired from National Taiwan Normal University. Yet, I still hold a status serving as supervisor for master and doctoral theses in the campus. In addition, I am also giving a liberal study course for undergraduate students of National Taiwan University.



Maria Alessandra Mariotti

Professor, Department of Mathematics and Computer Science, University of Siena, Italy.

First PME attended: PME11 Montreal, Canada 1987.

The potentialities of ICT tools for both teaching and learning have been extensively studied, but there has been the tendency to underestimate the complexity in integrating ICT-tools in school practice. I will present a specific theoretical framework, the Theory of Semiotic Mediation (TSM), that describes the process starting with the student's use of an artefact and leading to the student's appropriation of a particular mathematical content. Combining a semiotic and an educational perspective, the TSM elaborates on the notion of mediation while considering the crucial role of human mediation in the teaching-learning process. My contribution will take a perspective large enough to consider the idea of artefact without circumscribing it to the case of new technologies. I will discuss different kinds of artefacts that are offered to the teachers to enhance the teaching-learning activity in the classroom, the examples will be drawn from different teaching experiments involving ancient and modern artefacts.

PME36 Plenary Speakers continued....



Merrilyn Goos

Professor, Teaching and Educational Development Institute, University of Queensland, Australia

First PME attended: PME29 Melbourne, Australia 2005. I've attended 6 PMEs.

My research has used sociocultural theories to investigate opportunities to learn experienced by students, teachers, and more recently mathematics teacher educators. Starting out with an interest in secondary school students' mathematics learning, I wanted to examine the role of the teacher in establishing a community of inquiry that fostered mathematical thinking. Early accounts of reform-related research had yielded only general accounts of conditions supporting inquiry, so I concentrated on producing detailed analyses of practice that could guide teachers' actions. This research sparked a new interest in mathematics teacher education and development. I had previously

adapted Valsiner's zone theory of child development to analyse pre-service teachers' opportunities to learn during the practicum, but later I extended this work to the professional learning of practising teachers, especially in the context of technology-based innovation, in order to understand why teachers might embrace or reject teaching approaches promoted by teacher educators or curriculum reforms.

A second strand to my research on mathematics teacher education and development has investigated how communities of practice are formed in a pre-service teacher education program and sustained after graduation and entry into the profession. I also analysed my own role as a teacher educator in the formation of the community – a process that is often overlooked or downplayed in research of this type. My recent experience as Director of the University's Teaching and Educational Development Institute has provided opportunities to work with mathematicians on teaching-related projects, and this has led me to wonder about opportunities to learn across disciplinary boundaries in mathematics education.



Marta Civil

Professor, Mathematics Education School, University of North Carolina, USA

First PME attended: PME18 Lisbon, Portugal 1994.

My research focuses on cultural and social aspects in the teaching and learning of mathematics with a specific interest in non-dominant communities. My approach is based on a rejection of a deficit view of non-dominant communities, focusing instead on their resources, knowledge, and experiences—a funds of knowledge framework.

I believe that in order to address the mathematics education of minoritized students we need to take a holistic approach that includes schools (teachers and administrators), the students and their families. Some of my areas of research include: in-school and out-of-school mathematical practices; issues of participation in the mathematics classroom (who has a voice when?); Latino/a parents' perceptions about the teaching and learning of mathematics; teachers' beliefs about the teaching and learning of mathematics with minoritized students; students' understanding of mathematics, particularly with students whose home language is different from the dominant language of instruction. Ultimately my research is about turning language and cultural diversity into educational assets for the mathematics education of all students. As I will illustrate in my talk, this goal is directly related to the conference theme of "opportunities to learn in mathematics education."

PME36 Plenary Panel

The theme for this year's plenary panel is the conference theme:
Opportunities to Learn Mathematics Education

Convenor:

Lulu Healy, Bandeirante University of São Paulo, Brazil

Panelists:

Richard Barwell, University of Ottawa, Canada

Karin Brodie, Wits University, South Africa

K. Subramaniam, Homi Bhabha Centre for Science Education, India

Jean-Baptiste Lagrange, LDAR Université Paris-Diderot et Université de Reims, France



**Lulu Healy
(convenor)
introduces
PME36
Plenary Panel**

Having been invited by the PME newsletter editors to write a brief contribution related to the Plenary Panel of this year's PME conference (PME36, Taipei, Taiwan, 18 to 22 July, 2012), it seems appropriate to take the opportunity to share with the wider community, before the event, the questions that are guiding the papers and presentations for this panel session. The Plenary Panel represents one of the plenary activities of each annual PME conference. The panel is usually composed of five researchers, invited to contribute to a discussion of the conference theme.

The theme for PME36 is 'Opportunities to Learn in Mathematics Education', a theme intended to promote reflections upon developing and promoting mathematics teaching and learning in the diverse contexts which characterize and compose mathematics education communities. This diversity is well represented in the make-up of the panel itself, with contributions from researchers working in five different countries (Richard Barwell, Canada; Karin Brodie, South Africa; Lulu Healy, Brazil; Jean-Baptiste Lagrange, France; and K. Subramaniam, India). Their research interests bring a broad range of concerns, which focus in different ways on opportunities to learn.

Central to these concerns are questions related to equity and access and collectively the panel members work with a variety of different groups of learners in rather different learning contexts. These include learners who participate in work environ-

ments alongside schooling, learners with disabilities, learners who learn mathematics in a second language, as well as learners who are also teachers.

In addition to the identities of the learners themselves, learning opportunities are mediated by a multitude of aspects which compose the contexts in which they occur. Those of particular interest to the panel members include the language and technologies through which mathematics is expressed, issues related to curriculum, and extend into questions related to the research cultures through which "opportunities" are envisaged and investigated.

The questions around which the contributions to the panel are being structured are:

- Research has shown that many of the conditions that characterize the context in which learning occurs contribute to mediating the opportunities that different groups of learners have to engage with mathematics. How we look at these conditions deeply influences the ways we think of learning opportunities. Which of these conditions do you privilege in your work?
- What tools (theoretical frameworks and research methods) do you adopt to explore the role of these conditions in mediating access to mathematical knowledge and to focus on the questions of empowerment or disempowerment?
- Can widening our views on mediation help to identify previously hidden opportunities for learning?

We hope that the panel session itself will enable an opening of this discussion beyond the perspectives of the panel members and to this end, the panel would be happy to receive comments about, or reflections upon, these questions prior to the conference. These can be sent to lulu@baquara.com and will be circulated to the other panel members.



PME36 AGM Agenda (Draft)

PME36 AGM Agenda Draft

- 1. Opening of the meeting**
- 2. Adoption of the Agenda**
- 3. Adoption of the minutes of the 2011 AGM held in Ankara Turkey**
- 4. Elections**
- 5. Portfolio Reports:**
Brief reports will be given by the President's Portfolio Group (PPG), the Vice President Portfolio Group (VPG), and the Secretary Portfolio Group (SPG).
- 6. Treasurer Report**
Operating Budget, Skemp Fund, Reserve Fund
- 7. Proposed Change in Constitution**
To allow PME to achieve Charity status
- 8. Printed and Online Proceedings**
Research into options and copyright issues
- 9. Regulations for Plenary Sessions at PME conferences**
Discuss possibility of changing to at most one plenary in 10 years
- 10. Other Items**
- 10. ICMI Representative**
- 11. Brief Report on Future Conferences**

Taipei Taiwan Host of PME36

invited submission by Tai-Yih PME36 Conference Chair



I still remember how excited I was when I learned that PME36 is going to take place in Taiwan. From previous experiences to attend the PME meetings, I knew it wouldn't be an easy task to hold a conference with such high reputation. However, it was not until getting the opportunity to host a PME did I actually realize how much effort needs to be paid and how many challenges should be overcome. As the chair of PME36, I must say that the local organizers and I have given it all since the past year and really hope PME36 will be successfully held in Taiwan.

The theme of PME36, Opportunities to Learn in Mathematics Education, representing our anticipation that education should be developed and promoted in more diversified dimensions, will be addressed both in the plenary and panel sessions. After discussing with several professional researchers in various academic fields, we finally selected and invited plenary speakers and panelists as the following.

4 plenary speakers for PME36 are:

Wann-Sheng Hong
 Professor of Department of Mathematics
 National Taiwan Normal University, Taiwan.
Narrative, Discourse and Mathematics Education: An Historian's Perspective

Maria Alessandra Mariotti
 Professor of Department of Mathematics and Computer Science
 University of Siena, Italy.
ICTs as opportunities for teaching-learning in a mathematics classroom: The semiotic potential of artifacts

Merrilyn Goos
 Professor of Teaching and Educational Development Institute
 University of Queensland, Australia
Creating opportunities to learn in mathematics education: A sociocultural journey

Marta Civil
 Professor of Mathematics Education School
 University of North Carolina, U.S.A.
Opportunities to learn in mathematics education: Insights from research with "non-dominant" communities

Based on the conference theme, Opportunities to Learn in Mathematics, the panel for PME36 is organized as the following:

Convenor:
 Lulu Healy, Bandeirante University of São Paulo, Brazil

Panelists:
 Richard Barwell, University of Ottawa, Canada
 Karin Brodie, Wits University, South Africa
 K. Subramaniam, Homi Bhabha Centre for Science Education, India
 Jean-Baptiste Lagrange, LDAR Université Paris-Diderot et Université de Reims, France



PME, as one of the most well-known conferences in the field of mathematics education, attracts hundreds of mathematics educators around the world to attend each year. We would like to promote Taiwanese local culture and hope Taiwan gains more international visibility through PME36. We start by giving special notice to the

Taipei host of PME36

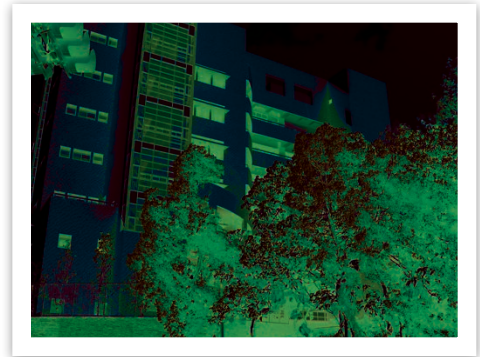
logo design of PME36 from three aspects, its superficial form, its meaning, and its relation with contemporary values. Firstly, the logo is fused with two Chinese characters, 數 *shù* 'mathematics' and 教 *jiào* 'education', deriving the meaning, mathematics education. Secondly, the left part of the logo symbolizes the image of a tree with eight stacking branches. The tree illustrates a Chinese adage, 十年樹木, 百年樹人 *shí nián shù mù, bǎi nián shù rén*, meaning it only takes ten years to grow a tree, but a hundred years to rear a people'. It emphasizes the importance of education and difficulty to nurture people. Plus, the image of eight-level branches represents the landmark in Taipei city, that is, Taipei 101, which is built with eight stacking blocks on top of the base. Last but not least, the color of the logo, green, demonstrates that we share the contemporary value of environmental protection. We will try our best to honor this value throughout the conference.



To give a further taste of the local culture, we chose National Chiang Kai-Shek (C.K.S.) Memorial Hall as the venue for the conference opening ceremony. National Chiang Kai-Shek (C.K.S.) Memorial Hall <http://www.flickr.com/photos/mikemcd/2141072714/in/photostream/> all is one of most representative architectures in Taiwan. Here, participants will have a chance to experience the beauty of classical Chinese architecture.



For the following four days, all activities will take place at Wesley Girls' High School. PME36, as a pioneer bringing the international conference to a high school campus, expects participating educators around the world to have opportunities to observe a contemporary education environment in Taiwan.



Preparation for PME36 is an ongoing procedure and a lot of works are under operation. I would like to express my gratitude to many colleagues who have worked with me from the beginning of the organizing process. I appreciate Dr. Laurie Edwards for setting up ConfTool, Dr. Bettina Roesken for helping me understand all administrative operations of PME, Dr. Joao Filipe Matos for assisting me to manage conference affairs, Dr. Fou-Lai Lin for providing experiences and suggestions about the organization, and the principal of Wesley Girls' high school, Jya-Yi Wu, for providing the venue to hold the conference. I am also grateful to International Program Committee members, Local Program Committee members, and all staff assisting with the conference preparations. I deeply believe that our devotion and efforts will lead a successful experience. On behalf of the PME36 Organizing Committee, I wish you all a wonderful journey to PME36, this July.

Tai-Yih TSO
PME36 Conference Chair

Photo retrieved from:

<http://www.flickr.com/photos/mikemcd/2141072714/in/photostream/>



MASTER AND DOCTORAL PROGRAMME 2012-2013

***RESEARCH ON THE TEACHING AND LEARNING OF EXPERIMENTAL SCIENCES,
SOCIAL SCIENCES AND MATHEMATICS***

(taught in Spanish)

Coordinated by:

University of Huelva (Spain) (UHU). Departamento de Didáctica de las Ciencias y Filosofía

Other participating universities:

University of Extremadura (UNEX).

Departamento de Didáctica de las Ciencias Experimentales y de la Matemática

International University of Andalusia (UNIA) (La Rábida -Huelva).

The Master offers 3 paths: Experimental Sciences Education, Social Sciences Education and Mathematics Education. It includes subjects, which are shared by the 3 paths and specific subjects. The common subjects deal with professional development and research design. In the specific subjects, apart from introducing research lines and features in each area, one deals with contents, which are linked to the research domains that are being developed in the participating universities:

- a) Teachers' Pre-service education, professional knowledge and development (Experimental Sciences, Social Sciences and Mathematics)
- b) Problem solving (Experimental Sciences and Mathematics)
- c) School research (Experimental Sciences and Social Sciences)
- d) Environmental education (Experimental Sciences)
- e) Didactic of heritage (Social Sciences)
- f) Didactic of Geometry (Mathematics)
- g) Mathematics knowledge for teaching (Mathematics)
- h) Didactic of History (Social Sciences)
- i) Scientific-cultural literacy and heritage (Experimental Sciences and Social Sciences)

The pre-registration is open for the University of Huelva

(<http://www.juntadeandalucia.es/organismos/economiainnovacionyciencia.html>).

Note: Two options: attending and non-attending. The non-attending option has to be asked for to the Director of the Master, because a limitation of such places exist.

More information in <http://www.uhu.es/noticieros/master-iea/> or contacting the Master Coordinator, Dr. José Carrillo (carrillo@uhu.es) or the Secretary of the Master (master.ieac@ddcc.uhu.es).