

## DG 5: International cooperation in mathematics education: Promises and challenges

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### Introduction

The aim of Discussion Group 5 was to discuss some relevant issues concerning international cooperation in mathematics education. The Discussion Paper posted on the Conference website identified the following aims for the group.

- Sharing experiences and learnings by mathematics educators from around the world arising from their international contacts;
- Identifying benefits and problems arising from such contacts; and
- Developing recommendations for research and action towards making such contacts more socially just and more effective for achieving the interests of all participants.

The Discussion Paper raised some initial issues and questions, rather than take a stand on them, towards initiating the discussion and dialogue between mathematics educators. Six main questions were identified for consideration by the group.

1. *What are the goals for international collaborations?*
2. *What are the barriers to genuine and equitable international cooperation?*
3. *Should cooperation be regional or global?*
4. *What forms could such cooperation take, and how to organize them?*
5. *How can a cooperative preparation of researchers in mathematics education contribute to the development of a genuine and equitable cooperation?*
6. *Can international cooperation lead to excessive homogenization?*

The discussion sessions during the congress combined questions 3 and 4, and were planned to allow each participant the opportunity to discuss in small groups at least three of the 5 resulting questions. In order to give justice to the rich discussion at the conference, only three of the main questions will be reported upon here.

Two comments might be relevant about the constituency of the group. First, and perhaps unexpectedly, the majority of participants were teachers, teachers' educators, school administrators not particularly engaged in research, but interested in international cooperation concerning the teaching of mathematics. While the interests of both groups are not identical, and while the Discussion Paper aimed at discussion of the issues from researchers' cooperation perspective, the discussion had demonstrated that there were sufficient common issues that spanned both areas. Such opportunities may not have been provided to in past ICME conferences. In particular, there was general consensus about the fact that international cooperation in research can produce tools and perspectives that are useful to orient international cooperation concerning the teaching of mathematics. Some questions put in the Discussion Paper such as those concerning diversity and the necessity to avoid any kind of domination or homogenization in the research field, were recognized to have immediate parallel concerns with delicate issues



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Discussion  
Group 5



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Discussion  
Group 5

concerning how to avoid that some orientations in the teaching of mathematics become globally dominant. Indeed it was observed that a dominant position in the research field can be used to support with “scientific” arguments the diffusion of teaching projects and teaching methodologies. Further, the participants shared the opinion that international cooperation in research can provide curriculum developers and teachers with tools and perspectives suitable to deal with that diversity in the local curriculum as well as classroom practices.

Second, the lack of attendance by many mathematics education researchers might be due to the overlapping of issues discussed here with other parallel groups running at the same time. In our opinion, this fact suggests an interesting question for the planning of the next congress: is it better to keep a plurality of groups that work in parallel on issues related to the organization and orientation of research in our field – or it would be better to select for each congress only one or two issues concerning policy of research, in order to avoid dispersion of people interested in that kind of topics?

### Why international cooperation in mathematics education?

The Discussion Paper identified two, arguably conflicting, reasons for international cooperations. Firstly, mathematics education today is undoubtedly affected by the globalization trends of our new times. Increasingly, public funding to universities is based partially on the amount of money they attract externally and on the number of publications they produce. In many countries, international competitive publications are given higher value than local publications. For many universities around the world international projects, in forms of attracting international students, conducting international development projects, and international publication, are seen as highly lucrative revenue. Further, World Bank lending schemes have imposed similar changes on many developing countries. Hence, undoubtedly there are economic benefits to educators engaging in international cooperation.

Secondly, a striking feature of this increasingly globalized world is its inequality. Numerous reports from international organizations have pointed out that the gap between the “haves and have nots” has increased within many countries and between countries. The cost of such inequality for social, political and peace conditions around the world cannot be neglected. Arguably, such inequality in access to resources and funds is paralleled by the dominance by some countries of the agendas and voices in international cooperation in mathematics education. Traditionally, mathematics education has been isolated from discussion of its contribution to this inequality either as a vehicle to legitimate it, if not increase it, or as a potential contributor to its reduction. Several authors have challenged the prevailing image of mathematics as a neutral/apolitical body of knowledge that is isolated from social and cultural considerations. The Discussion Paper noted the curtailing of funds from international agencies towards developing countries making it more difficult to look for governments for improved international cooperation in mathematics education. The late Miguel de Guzmán, a past President of ICMI, called for an increasing role of cooperation between professional mathematics educators and their associations to work to improve mathematics education worldwide. Hence there are social justice dimensions behind international cooperation.

The discussion at the congress identified other reasons for cooperation between academics and teachers from different countries or cultures. Cooperation in research and



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DG

Discussion  
Group 5

teaching provides opportunities to foster mutual understanding towards resolving conflicts arising from power relationships and inequality. Some participants made the distinction between collaboration (in the sense that one is working for another) and genuine cooperation (in which both parties are working towards common aim). Cooperation leads to greater understanding of social and historic reasons behind the different experiences and practices of the different systems. It also allows for self-reflection on the otherwise hidden assumptions and values behind each participant's practices. Similarly, it exposes similarities as well as differences between the different participants. Finally, it enhances the preparation of the students, teachers and researchers for better success in a globalized world.

### What are the barriers to international cooperation?

The Discussion Paper identified quite a few barriers to international cooperations. Among these were:

- *Financial*: The cost of attending international gatherings, or subscribing to international journals as a prohibiting for participation of some countries.
- *Language*: Educators from non-English speaking countries often feel excluded from some international activities that use English as language of communication.
- *Cultural norms*: Cross cultural cooperations often experience conflict due to lack of knowledge about appropriate manners of behavior and speech that extends beyond mere language.
- *Lowest Common Denominator*: Cooperation between cultures that are very different may lead the collaborators to compromise to levels that are lower than their individual interests and needs.
- *Conflicting agendas*: International projects may be regarded as a source of income for some countries (e.g. paid consultancies or international students) while other less affluent countries may need them as aid projects.
- *Voice*: Collaboration between educators with varying backgrounds, interests and resources may lead to domination of the voice of the more able and marginalization of the less powerful.

The discussion at the conference considered these and other barriers to cooperation. Considerable discussion was focused on the terms *equitable* and *genuine* in relation to international cooperations. Many participants warned against the naïve position towards the meaning of international cooperation that pretends that cooperation necessarily implies they are carried out among equals. Often, international cooperations are established among unequal participants with some participants positioned in a dominant role due to access to resources such as funds, technology or expertise in dominant modes of operation in research and/or teaching in mathematics education. In these contexts, *equality* in cooperation is built on a respect for the different *type* and not *quantity* of contributions of the partners, on the acknowledgement of the equal value given to the different knowledges the participants, and on the necessity to tackle problems of relevance for each of the parties involved. Moreover, genuine collaboration is one that is based on self-critical reflection by the different partners about their self interests and expected contribution to the cooperative activity, and on the transparency among participants in

relation to their expectations, contributions, benefits and voice in representation of the results.

Similarly, further discussion arose about the role of language as a limiting factor for genuine collaboration. In addition to the dominance of English in many international cooperative activities, the problem of language is also a matter of particular professional jargon used in different national communities to refer to the objects of their practices. Problems of understanding emerge due to differences in the meanings of commonly used terms. For example, the phrase “didactics of mathematics” carries almost opposite meanings for a native English speaker and speakers of other European languages. Further, care must be given not to exclude some participants from having access to that technical language by oversimplifying it. Hence, genuine cooperation must include a process of communication in which, through languages (natural and specialized), the parties involved negotiate their meanings and intentions for action

Lastly, a discussion arose related to the attitude of the parties involved in the cooperation. There was an agreement on the fact that “missionary” attitudes, that aim to uncritically transport knowledge and learning from one place to another, on the part of some partners do not help the establishment of genuine cooperation. Those attitudes lead to a patronizing relationship, which does not respect and value the diversity of the parties involved. Instead, an attitude of humility and openness to learn from each others should be the basis of international cooperations.

### **Does international cooperation lead to homogenization?**

The Discussion Paper stated that many authors have noted the similarities in mathematics education curricula and research in mathematics education around the world and raised the question whether international cooperation is leading to homogenization and standardization of the discipline. To aid the discussion on this question the Discussion Paper made the distinction between the two related terms “internationalization” and “globalization”. The term “internationalization” refers to any activity that has participants from more than one nation. They can be either official at state-to-state level, or less formal interaction at a professional or even personal level; they may involve two or more countries; and they may be at a regional level or a more extensive international level. The term “globalization” refers to the receding boundaries between countries and the awareness that such boundaries are receding. In other words, it is the increasing awareness of the “world as one” or the realization of the “global village”. In the minds of many, globalization is associated with transnational companies, multinational organizations, removal of barriers in trade and investment, and new forms of colonization of culture. However, the Paper made the distinguish between “globalization from above” and “globalization from below”, where the latter are activities motivated by concerns about environment, human rights, diversity of culture, and seeking an end to poverty, oppression and violence.

The Discussion Paper went on to argue that while globalization “from above” might lead to homogenization, globalization “from below” is associated with diversification and differentiation rather than homogeneity and universality. Perhaps this is best illustrated by the example of the ethnomathematics movement in recent years. The Discussion Paper argues that even though ethnomathematics is a globalized movement in mathematics education, it rejects the universalization of mathematics and mathematics education and stresses local knowledge and difference.



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DG

Discussion  
Group 5

The discussion at the congress pointed out several examples where international cooperation leads to contradictory patterns in homogenization and diversity. For example, some have pointed out how in the new world order, reforms in one country are transplanted, in many cases uncritically, to other countries. Some talked about the "Americanization" or the world curricula. However, many also argued that cooperation between different countries can lead to awareness of different approaches to both research and teaching methods that might increase variety at local level. Researchers in the discussion pointed out that the mathematics education literature in many countries reflects a greater variety in methodologies and theoretical stances now than fifty years ago. Hence, at the same time that trends in research and teaching are becoming homogenized at a global level, they are becoming increasingly diversified at a local level.

This report was written by Bill Atweh assisted by the Organising Team. He is happy to be contacted at [b.atweh@qut.edu.au](mailto:b.atweh@qut.edu.au) for further information on the work of this DG.



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