

DG 28: The role of professional associations in mathematics education

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Introduction

Associations of mathematicians, mathematics teachers and mathematics education researchers around the world share a common aim of promoting and improving research and practice in mathematics education.

How do the different groups see their roles? How do they undertake their work? What is their role in relation to educational reform? To what extent do mathematicians, mathematics teachers and mathematics education researchers collaborate? Should the relations between associations be strengthened? Is there a new role for associations in the context of the current global trend for evaluation of performance through PISA, TIMSS etc.? Would it be desirable to establish a world federation of mathematics teacher associations to help respond to global trends and issues? DG 28 was asked to seek answers to these questions.

A survey of professional associations

The organisers of DG 28 developed a survey that was available through the ICME11 website during fall 2007 and spring 2008. It was developed in both English and Spanish.

Respondents

A total of 52 societies responded to the survey—24 in Spanish and 28 in English. Respondents were mostly from Europe, the Americas and Australasia, no responses came from Asian countries. The table below summarises the responses.

Main focus	International (membership and purposes across national borders)	National (mostly confined to one country)	Regional (established in a single region of a country)
Mathematics	0 Eng + 0 Sp	6 Eng + 3 Sp	0 Eng + 0 Sp
Mathematics education research	2 Eng + 0 Sp	4 Eng + 0 Sp	1 Eng + 0 Sp
Mathematics teachers/teaching	1 Eng + 1 Sp	10 Eng + 10 Sp	6 Eng + 10 Sp

Main findings from the survey

Aims, Mission, Purposes

The responses split in two directions. On the one hand, there are societies that aim to support mathematics (research, dissemination, education) generally. On the other hand, there are societies that regard mathematics education (in a broad sense, including a majority of teachers as members, and not only researchers in mathematics education) as their specific field of interest. In general these organisations exist in countries where there is a separate society with specific interest in mathematics research.

In many countries there is a (not always easy) co-existence of societies of general purpose (constituted mainly by mathematicians related to research and university teaching, but which nevertheless do extend their influence to school mathematics matters) and societies of specific educational purpose (related to school mathematics and to teacher training). The survey shows that this co-existence is well spread, but does not provide means to analyse it further.

As an additional remark, there are no responses in Spanish of societies that have an exclusive focus on mathematics education research. This contrasts with there being seven societies with this focus among the English-language responses.

These categorisations are not exclusive, with many societies having interest and substantial engagement in more than one category. For example, NCTM cites the support of teachers as its main aim, it publishes the *Journal for Research in Mathematics Education*, which is among the most respected journals in mathematics education research. On the other hand, the Royal Statistical Society (UK) is primarily involved with the overall field of statistics, but has a significant initiative in statistics education through its Centre for Statistical Education.

Main mathematical and educational focus

The societies set their sights high. The statements of ‘Aims, mission, purposes’ typically include statements about ‘service’ and achieving a vision of the ‘greater good’ of mathematics, the teaching and learning of mathematics, research in mathematics education, and the community as a whole.

Whilst the different societies have different terminology for their aspirations and their work, their intentions cluster in three groups: they claim to support research in mathematics education, support the work of teachers, and to help students and the community.

We found three recurrent ideas in the responses:

- stimulate the interchange of ideas and experiences between members of a community and build bridges between communities (for example, between researchers of different fields; between researchers and teachers);
- improve mathematics education by: supporting the work of mathematics teachers; spreading results from research; discussing and implementing innovative pedagogical practices among teachers; and making researchers more aware of teachers’ needs;
- communicate about mathematics outside the mathematics education community; foster and increase interest for mathematics and mathematics education; and take on the role of the “public voice of mathematics education”.

There were only two societies that cited a specific aspect of mathematics as their main focus (statistics; ‘critical mathematics’). In fact, the latter operates via the internet and, more generally, the internet is already a vehicle for the development of special interest groups (for instance, on Dynamic Geometry software, Problem Solving, Algebra and History of Mathematics in Math Education). Analysing this situation further in relation to professional associations could be of interest, especially in the context of the opportunities for collaboration provided by the internet.

Governance and membership

Whether they responded in English or Spanish, all the societies reported that the governance of their organisation is in the hands of volunteers. There were various names for this group, including council, committee, board of directors, and executive. All of the regional mathematics teacher groups indicated that they are affiliated with a national body, in much the same way as the regional teacher groups in Spain are members of the national Federación Española de Sociedades de Profesores de Matemáticas. Similarly, regional groups in the USA are affiliated with the NCTM as the national body.

In relation to the Spanish language respondents, there is a great variation concerning the number of members, from a few tens (for example, Sociedad Peruana, the Comité de Educación Matemática de Paraguay and some regional societies in Spain) to the declared 27.000 members of the Federación Iberoamericana de Sociedades de Educación Matemática (FISEM).

Considering the membership figures we can suggest the need to encourage the merging of mathematics associations in some countries (perhaps through temporal, or regional, federations), to achieve a minimum size that will allow some real impact in society.

The national mathematics teacher organisations that responded in English all have memberships numbering in the thousands. Most also reported employing paid staff. The organisation that stands out is the NCTM, with a membership well over 100 000 and a staff of 100. This makes it an order of magnitude greater than any of the other groups.

The societies with a focus on mathematics, and mathematics research, that are located in relatively populous countries (for example, Spain or UK) have memberships in the thousands. The smallest in this group was from a small country (Ireland) with 300 members. Some of these societies reported employing paid staff.

The societies with the smallest numbers of members were those with a focus on mathematics education research. The smallest were less than 100, and the largest around 300. Next largest on average were the regional mathematics teacher groups. These ranged up to 1000 members. None of the societies in these two smallest groups reported employing paid staff.

Main Activities: journals, meetings, student activities and policy influence.

Obviously, in view of such large differences among the size of the societies, their level of activity is also very different.

Communications—larger societies usually publish one or more journals or bulletins; some small ones did not indicate that they have any communication means; many have websites and an email list. Professional journals are published by the vast majority of the societies. These range from annual to ten issues per year, with most distributed a few times per year.

Meetings—almost all societies confirm that one of the most common roles is that of organising courses and seminars, conferences and congresses of direct relevance to their members and their interests. Providing face-to-face opportunities for professional contact is a major role and include formal conferences, but also meetings with much less formal intentions such as “sharing” teaching strategies or findings from research. Many societies also reported organising activities for students, mostly around the preparation of Mathematical Olympiads.

Policy influence—mathematics associations try to be an interlocutor with the relevant authorities concerning mathematics education policy. Societies reported a wide variation in their influence on policy for mathematics in schools. This influence does not depend on the size of the association, but is rather due to the particular position of some members of the association. Among those reporting the least amount of influence were the organisations involved in research in mathematics education, and the regional mathematics teachers groups. For some, influencing policy is an active priority—“we have been increasingly active in promoting mathematics education”; “NCTM has focused on advocacy as one of its five strategic initiatives”—whilst others tend to provide responses when invited.

Presentations and discussions at the Congress

DG 28 held three sessions during ICME 11. These dealt with, in turn, associations locally, associations regionally and associations globally.

The operation of associations

The problem of independence

Independence of associations from government and other official institutions is important as it enables the association to be the authentic voice of the profession.

Although they are largely based on volunteer effort, associations need money to operate, and this comes from a variety of sources in different countries including membership fees and sales. Outside organisations (business and government) can support associations through sponsorship and contracting project work, but this can lead to potential problems by compromising the independence of the association.

National institutes that are well-funded by government can have a negative impact professional associations, and the independence of the professional voice can be lost. There

needs to be a balance between the range of stakeholders in mathematics. These national centres should support and encourage associations.

The problem of involvement

Associations need strategies for keeping people interested, involved and active ‘forever’. There are two issues. The first is ‘burn-out’ where formerly active people become less involved in the work of the association as a result of personal or professional interests. The second is a consumer orientation of members—they judge the association on what it provides for them and do not ask how they can contribute for the good of mathematics and the profession.

The main role of teacher associations as a link

Links between teachers

Associations are very important in overcoming the isolation of teachers. Day-to-day work in school is focused on everyday matters whereas associations have the capacity to address the professional isolation of teachers by providing information and helping teachers to feel and be professionally connected with others. Meetings, journals, websites and other means of communication are powerful in providing ongoing connections between teachers and with other professionals. Isolation is a particular issue in geographically large countries like Canada and Australia, although it is not necessarily a matter of geography—being in a school without any like-minded colleagues can also be extremely isolating for a teacher of mathematics.

Links between teachers and researchers

Associations can be the structures that improve the communication between researchers, mathematicians, and teachers. Mathematics teacher associations can play a role in fostering collaborative research practices and identify issues and possibilities for scaling up projects.

International collaboration between associations

There is already some international contact and sharing between mathematics teacher associations. For example, Latin American associations have a history of contact that reflects a formal regional structure of mathematics groups and a shared language. Some previous ICMEs have facilitated meetings between representatives of teacher associations, and there is ad hoc contact in a range of forums. There are also some examples of bilateral arrangements. There has never been, however, international promotion or coordination of collaboration between teacher associations.

Several factors suggest that a greater level of connection between mathematics professional associations will benefit both the work of those associations and the health of mathematics education more globally:

The findings from the DG 28 survey and subsequent discussions that associations in different countries share many similar challenges.

Associations in different countries have different strategies for meeting common challenges. Sharing those strategies will provide approaches that may be able to be adopted or adapted in other countries. The survey shows that the aim of influencing public policies is not well achieved by many associations, regardless of size or economic level of their country of reference. Thinking about different methods for helping societies achieving this goal could be a subject of discussion within ICMI, and at subsequent ICMEs.

The increased globalisation in mathematics education.

This is evidenced by the increasing number of international projects including PISA, TIMSS, the study of Mathematics Teachers’ Knowledge, and others such as those of the European Union. Good practice requires that the voices of mathematicians, teachers, and mathematics education researchers are present in all phases and at all levels in these sorts of projects. Acceptance of findings requires that these voices are representative of and connected to the relevant professional constituencies (that is, through associations). Achieving this requires international structure and connections between professional associations.

The evidence from ICME11 Plenary 2 and ICME11 Survey Team 3 that there remains a substantial disconnection between researchers and research findings, and policy makers, practitioners and 'real' classrooms.

Open and effective communication between researchers on the one hand, and policy makers and teachers on the other, is essential to shortening the gaps in the knowledge bases. Communication needs to be two-way. Projects will come and go—associations, on the other hand, have a long-term presence and are therefore a key vehicle for promoting and sustaining necessary communication. This disconnection is best seen as an international phenomenon, given that no one country can have all the answers. Hence international structures and connections between professional associations will be beneficial.

One outcome of globalisation is increased awareness of the disparities between the educational provision in different countries.

Many members of professional associations in developed countries feel a responsibility to assist the professional work of colleagues in developing countries. This desire results from the collegiality between educational professionals. Current arrangements make any responses ad hoc at best, and impractical at worst. Again, international structures and connections between professional associations will provide a practical mechanism.

The internet provides a fantastic vehicle for each association to provide resources and information to mathematics educators, mathematicians, and teachers. Each association could provide a portal (an International Page) which gives access to documents, interactive mathematics tools, summaries of national issues, position statements, and selected articles from its journals. All that is needed is a single web address that links to the international pages of other associations. If each association created such a page and publicised the resource to its members, then international dialogue would be enhanced. With a small amount of coordination, this concept could grow to constitute a significant contribution to the work of teachers of mathematics, teacher educators and others in a wide range of countries. National associations could identify a contact person who speaks English as a contact able to foster person-to-person links as appropriate.

Conclusion

The work of DG 28 has identified some common themes in the work of professional associations committed to mathematics education around the world. The current context of increasing globalisation highlights the need for greater connections between these organisations, and electronic communications provide cost-effective means for building these connections. Now is the time to look forward to create new opportunities for learning about mathematics educators around the world. Professional associations can lead the way.

Strategic leadership is required. We believe that ICMI needs to create a focus on building international collaboration between associations of mathematics education professionals.

We recommend that:

1. The ICMI Executive appoint a liaison and coordination officer to explore and foster international collaboration between national professional associations.
2. A report on the feasibility and benefits of establishing an international association of mathematics teacher associations be prepared and considered by the ICMI general assembly in 2012.
3. A page be created on the ICMI website for information about national and international professional associations. The page should contain links to the websites of organisations and other information and resources as identified and negotiated by the liaison and coordination officer.