

Networks of Learning: Professional Association and the Continuing Education of Teachers of Mathematics in Pakistan

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Importance of the professional development of teachers has been recognized and research has contributed greatly in terms of proposing variety of approaches for the development of teachers, both pre-service and in-service. Among them, networking among teachers, teacher educators, curriculum developers and policy makers have been recently receiving attention an innovative and flexible professional development forum for creating ownership among these stakeholders' regarding implementing change and reforms in educational landscape in different countries. The paper draws on the notion of "networking" and shows how a number of professional associations have become as networks of learning to encourage the continuing professional education of both pre-service and in-service teachers in the context of Pakistan. A case of the Mathematics Association of Pakistan (MAP) as a Network of Learning is presented. The formation and growth of this network can be viewed as developing insights into the improvement of mathematics education in the developing world. The contributions of the association may also add value to the learning of teacher colleagues in other parts of the world. This sharing of the experience may further support in opening up possibilities for creating other networks of learning to assist reform efforts in education throughout the world.

What are networks?

It is difficult to find one suitable definition of a network given the range of purposes for which they are established. However, David Clark (1996) in his book *Schools as Learning Communities* quotes a useful definition proposed by Alter and Hage (1993: 46):

Networks constitute the basic social form that permits inter-organizational interactions of exchange, concerted action, and joint production. Networks are unbounded or bounded clusters of organizations that, by definition, are non-hierarchical collectives of legally separate units. Networking is the art of creating and/or maintaining a cluster of organizations for the purpose of exchanging, acting, or producing among the member organizations. (Clark, 1996, p.142)

Darling-Hammond and McLaughlin (1995) have stressed the importance of networks as a powerful tool in teacher learning, can be for both pre-service and in-service teachers, as cited by the report named [Networks@Work](#) (Queensland Board of Teacher Registration, 2002). The report says: " Networks provide the 'critical friends' or 'peers' that teachers need to be able to reflect on their own teaching experiences associated with developing new practices in their classrooms. Teacher networking often provides an opportunity for teachers to visit the various schools of participants and to gain 'practical pedagogical clues' (Moonen and Vooget, 1998, p.102), from other teachers' classrooms. Also, "Professional relationships forged outside the immediate working environment enable teachers to gain valuable insights into new knowledge and practice beyond that gained from interactions with colleagues in their own schools" (Board of Teacher Registration, 1997, pp. 6-7).

Lieberman (1999), while quoting several educational change leaders (e.g. Darling-Hammond and McLaughlin, 1995; McLaughlin and Talbert, 1993; Cochran-Smith and Lytle, 1993), says that " Networks are becoming popular, in part, because they encourage and seem to support many of the key ideas that reformers say are needed to produce change and improvement in schools, teaching, and learning.

Networks seem to provide:

- Opportunities for teachers to both consume and generate knowledge;
- A variety of collaborative structures;
- Flexibility and informality;
- Discussion of problems that often have no agreed-upon solutions;
- Ideas that challenge teachers rather than merely prescribing generic solutions;
- An organizational structure that can be independent of, yet attached to, schools or universities;
- A chance to work across school and district lines;
- A vision of reform that excites and encourages risk taking in a supportive environment; and
- A community that respects teachers' knowledge as well as knowledge from research and reform (Lieberman and Grolnick, 1997).

Various writers (e.g. Darling Hammond and McLaughlin, 1995; Smith and Wohlstetter, 2001; Lieberman and Wood, 2003) have identified two distinctive features that teacher networks exhibit in their pursuit to better support teachers' learning on a regular basis:

- **Personal and Social Relationships:** improved relationships, flexibility, risk-taking, commitment, openness in interacting with each other and clarifying values and expectations.
- **Academic and Professional Aspects:** innovation, enriching practice, continual development of teachers focused on professional concerns such as student learning, sharing and getting relevant professional information (dissemination), developing healthy and shared norms, enriching curriculum and influencing policy makers.

Lieberman and Grolnick (1997) observe several themes that give networks their purpose such as "creating purposes and directions; building collaboration, consensus, and commitment; creating activities and relationships as building blocks; providing leadership through cross-cultural brokering, facilitating, and keeping the values visible; and dealing with the funding problems' (p. 196).

Networks should also continually get engaged in the process of diversifying their activities and programmes so that evolving and changing needs can be accommodated. This requires training of network leaders in managing the complex relationships and meeting the evolving needs in an effective manner. Also networks can get engaged with processes of follow-up of their professional development activities through engaging different individual and institutional members. These follow-up activities can also help participants to develop insights into the issues that the professional networks are supposed to tackle. This continual sharing of professional practice of teachers within the networks can help all the participants to develop the culture of evidence essential to develop teaching practice along professional lines.

Why are networks important in the context of Pakistan?

Recently Aga Khan University Institute for Educational Development (AKU-IED) based in Pakistan, a leading Institute mandated to uplift the quality of education through its innovative programmes and research initiatives, has supported six professional associations; namely, Mathematics Association of Pakistan(MAP), School Head Teachers Association of Development of Education (SHADE), Science Association of Pakistan (SAP), Pakistan Association of Inclusive Education (PAIE), Association of Primary

Teachers (APT) and Association of Social Studies Educators and Teachers (ASSET) to form a network called Professional Teachers Associations Network (PTAN). This network has some funding support from the Canadian International Development Agency (CIDA). The overarching aim of this Network is **to promote an enabling environment for the professional growth and development of educators from diverse backgrounds, as a contribution to the improvement of education in Pakistan** (PTAN Funding Proposal, unpublished).

In the funding proposal of PTAN, an insightful assessment is made about the status of teachers in Pakistan. It states:

Teaching in the context of Pakistan continues to remain as a neglected profession thus leading to poor status for the teachers within society. This status quo also remains prevalent due to the absence of networking amongst Pakistani teachers and an authentic platform to raise genuine issues to broader audiences as well as to support their own professional development. Pakistani teachers today, find themselves as an ignored identity, in most educational reforms and quality improvement initiatives in the country. This despondency has further perpetuated nonchalance and lack of conviction within their profession leading to the educational system working in a dismal situation. The main victims, thus being the students the so-called primary beneficiary of education. (PTAN Proposal, unpublished p.1)

PTAN, through its constituent members is helping teachers from different sectors (public, private not-for-profit and private for profit) to come together and discuss their professional matters in a more open manner and develop a collaborative strategy to approach their professional matters. For example, the composition of working committees of these professional associations is made up with fair representation of teachers from all the constituencies such as government and private and other non-governmental organizations that they are serving. This coming together of teachers from different sector schools helps members of these networks to understand their particular issues and develop a holistic approach towards creating greater cooperation to deal these issues on a more sustained and focused manner.

CASE OF MATHEMATICS ASSOCIATION OF PAKISTAN (MAP)

MAP was established as a professional association of mathematics teachers to upgrade the quality of mathematics education in Pakistan. Since its inception, July 4, 1997, it has been committed to providing a learning platform for all those related to the field of mathematics education whether directly or indirectly.

MAP has adopted a three-pronged approach to address the matter of the continuing development of mathematics teachers. Firstly, it has created and structured focused programs for mathematics teachers both pre-service and in-service to provide opportunities for them to interact freely with each other on professional matters. For example, MAP organizes a regular workshop every month on various topics such as teaching fractions meaningfully or geometry - making connections etc.

Secondly, for children to develop positive attitude towards mathematics, MAP has been very active in organizing separate programs for them. In these programs, the children have opportunities to work in teams to experience mathematics as an interesting and challenging subject. The main focus of these programs has been to help children to see that mathematics is a valuable subject for them to pursue. Also through these programs, MAP is helping mathematics teachers to see as how they can teach children according to

the new demands of teaching and learning for understanding. For example, MAP has so far organized three Olympiads for children of different grade levels to work on interesting and challenging mathematics in a collaborative fashion.

Thirdly, in order to create a strong support mechanism for teaching and learning worthwhile mathematics, MAP has been working on various projects where important stakeholders are being encouraged to re-learn mathematics so that they can see the broader role of mathematics in their daily life situations. In this regard, MAP has been actively engaged into the process of rewriting textbooks with the Provincial bodies such as Sindh Text Book Board, a policy level body to design and produce text books for the province of Sindh in Pakistan.

Also it is organizing workshops for parents so they can see what it means to learn mathematics and how they would be able to support children's mathematics understanding. This work with the wider society enables MAP to create greater synergy and networking amongst different stakeholders to achieve quality mathematics education within Pakistan and beyond.

If one looks critically at the work of MAP, it is clear that it has created several avenues where mathematics can be conceived of as a human activity and considered as a subject essential in daily life situations and within larger socio-political levels. Within this scenario the learning of mathematics can be seen as an important subject for making informed decisions in today's fast changing world.

Activities and organization of MAP

MAP offers a variety of approaches to upgrading the quality of mathematics education:

- It assumes the role of champion in furthering the goal of quality of mathematics education in the contexts where it serves.
- It encourages networking amongst its members and the wider society to deliberate on professional matters and issues in a sustained and effective manner.
- It is proactive in influencing the policies of government concerning the goals of quality mathematics education within the country and beyond.
- It has established an Institute of Math Olympiads intended to serve the development of mathematical thinking amongst students at all levels.
- It develops partnerships for learning with similar professional associations in other countries.

The working committee of MAP is responsible for all its affairs. It comprises members representing various sectors such as private and government schools. Proportionate representation of different sectors enables MAP to cater to the diverse needs in an informed fashion whilst in committee meetings the debates normally canvas professional issues as well policy formulation concerning the activities of MAP. The Chair of MAP is responsible for the overall direction of the association and is accountable to its working committee for all the affairs ranging from policy implementation to setting the strategic directions to achieve the intended goals of MAP. Veuglers and Zijlstra (2002) have pointed out the importance of the role of the Chair of learning network:

Chairing such group means that all people should get involved, each voice should be heard. The chair must have the competence to analyze the experiences and ideas and place them in a theory that has clear links to the practice of the schools. (p. 172)

What qualities does MAP have as a network?

MAP, as a community of professionals, would not have been playing such a constructive role towards the professional development of teachers without some of the important characteristics of networking. One of those characteristics is improving the quality of relationships among its members and MAP has been pursuing that by developing and working in teams. Teams are necessary for the successful operation of most of its activities. As John West-Burnham (2000) has said:

Effective teams have come to be seen as one of the crucial characteristics of quality organizations and, equally significantly, one of the most powerful catalysts in an organization for implementing change (p.15).

Another quality of networking is a culture of sharing. MAP has created such a culture where both the active members of MAP and other fellow colleagues share their professional knowledge and concerns in a very open and candid manner. They understand that their views would be well listened to and they would get useful suggestions from their fellow colleagues in a non-threatening environment, which MAP has created so far. This is in sharp contrast with a culture where alternative suggestions are not listened to and valued; this is often observed in the discourse of education in this country. At the moment MAP is operating in Karachi, the largest city of Pakistan having population 10 million people. As being private and non-profit network, it is relatively new in the professional development scene of Pakistan. However, with its consistent efforts, MAP has assumed a very influential position in Pakistan. Governments both at provincial and national levels have approached MAP for variety of initiatives. For example, MAP has remained very actively engaged in the processes of the development of textbooks of Sindh province. MAP has also been contributing to the enhancement of the quality of mathematics education in Pakistan in a variety of ways. It has been created as a network to contribute to the development of different areas such as support to its members, involvement in curriculum development initiatives, actively disseminating the research results of various studies being conducted in mathematics education around the world and engaging in dialogue with professional organizations in the world.

MAP's Contribution to Curriculum Development

Efforts to bring change into mathematics teaching in Pakistan have to begin from the understanding that mathematics teachers are mostly textbook driven. Generally, they teach from the textbook page by page and their focus is on coverage of the syllabus rather than effective learning of students. A learning-for-understanding orientation should be considered important for the development of students to become informed citizens. To achieve that, considerable efforts have been made to devise a progressive curriculum with the involvement of the stakeholders of the school. In Pakistan, there is little involvement of teachers the development of the curriculum. Since they do not have an active involvement in curriculum development, normally mathematics teachers equate curriculum with the textbook and this prevents them from experimenting and implementing new ideas in the classroom. As Richard Barewell (2000) has rightly captured:

In Pakistan, teachers' practice operates entirely at the implementation level of the curriculum. Teachers have little influence on the intended curriculum in the form of textbooks or government publications and there is no tradition of school-level curriculum planning in the form of schemes of work or similar documents (p 37).

In that context MAP has taken up the challenge to change the notion of curriculum as well as the teaching of mathematics. MAP normally plans its workshops in a manner whereby teachers become active learners while working on several diverse mathematical activities designed to enrich meaningful understanding of mathematics. Now the question arises as how teachers can be supported to become more resourceful in implementing these activity-based learning approaches in their respective school contexts. This requires rewriting the curriculum of mathematics for schools. In recognition of this need, MAP, with the support of AKU-IED, played an active role in the review of textbooks of the primary grades of the Sindh Text Book Board (STBB), Jamshoro, an official body of the province of Sindh in Pakistan established to create, publish and distribute textbooks in the province. After successful review of these textbooks, MAP organized special workshops for mathematics teachers where reviewers shared their experience of reviewing the textbooks. For MAP, it is an exciting challenge to play a proactive role in influencing the design and development of the curriculum of mathematics not only at the school level but also at the national level.

Another aspect of curriculum development that MAP has been engaged in is the process of introducing Information and Communication Technology (ICT) in the teaching of mathematics. Through various workshops, MAP has encouraged mathematics teachers to learn possible ways to teach mathematics with the software packages such as Cabri Geometre and Excel. The advantage that these packages provide to students is to help them learn different concepts of mathematics in a more meaningful manner. For example, if they wish to explore different properties of angles and sides of a triangle, this can be done with simple dragging of the shape on the screen of the computer. Through dragging the shape they can see what effect it has to stretch the angle measurement of the shape if the vertex of one triangle is fixed etc. In this way students are getting engaged in the process of developing a conjecturing attitude towards mathematical propositions. This attitude may lead them to prove different mathematical propositions before accepting their truth.

Challenges for MAP in Maintaining its Professional Norms and Values in the Context of Pakistan

Since its establishment, MAP has been successfully engaged in creating a collaborative culture of doing and investigating mathematics. Its presence is being felt at various levels from schools to governments. It has created several types of professional networking for the development of mathematics teachers and in terms of provision of meaningful experiences for children. Despite all its efforts, MAP faces a number of challenges:

- Sustaining a culture of 'volunteerism versus commercialism'.
- On-going professional development of MAP leaders and active members.

- How to meet the increasing professional needs of mathematics teachers in Pakistan with implications for resources and outreach.
- Greater networking among sister organizations in the country and in the world.
- Encouraging alternative assessment practices as opposed to heavily emphasized established summative assessment practices in Pakistan.
- Planning and conducting research in mathematics education as all members are volunteers who take the responsibility for the completion and dissemination of research.
- Establishment of the Math Olympiad Institute devoted towards creating a variety of innovative activities for the children on an on-going basis.
- Having a sound infrastructure (Office space, permanent office secretary, computer, record keeping mechanism).
- Sustained funding until its operations become sustainable through its sources of income.
- Data Base Management System for membership and other relevant categories of the work of MAP.

The MAP leaders feel that the acceptance of these challenges would not only develop a feeling of accomplishment but also help in creating and sustaining effective networking for mathematics teachers and teacher educators in Pakistan. MAP as a network of professionals is definitely contributing towards improving the quality of mathematics education in Pakistan though there remains much to be done.

Therefore, it is essential for a country like Pakistan to encourage networks like MAP to continually grow and sustain their operations. Their continual efforts would lead them to empower not only mathematics teachers to become caring and competent professionals, but also support society to adopt a learning mode to face the challenges of the Twenty First Century in improving the quality mathematics education in Pakistan.

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