

# Excellence in the Teaching of Mathematics

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## PROFESSIONAL STANDARDS PROJECT

The first in an occasional series of articles on this major AAMT project, providing some background to the project and giving an outline of its methodology.

### Introduction

It is clear that statements of 'professional standards' for teaching are coming. They are education's version of practices in a number of other areas such as accounting, engineering and the like. In fact they may have already arrived in some states and territories. *A Class Act* (Australian Senate Employment, Education and Training Reference Committee, 1998), the report of the Senate Inquiry into the Status of the Teaching Profession, concluded that professional standards in teaching are essential for teaching 'to be accepted as a profession'. There is also a widely held view that 'the teaching profession must be prepared to participate in the processes of constructing, owning, implementing and monitoring professional standards' (Boston, 1999).

So what are 'professional standards' and why might we have them? In the current context in education in this country, professional standards are statements of what teachers need to know and be able to do in order to do their work at an acceptable level. They go beyond mere statements of required initial qualifications, although these may be important. They can be standards for entry into the profession. Or they can be about accomplished or expert performance of the work of the profession, linked to monetary rewards. The reasons for having professional standards can range from building community confidence in teachers' work and thereby improving the status of teachers and teaching to supervision of individual staff members by principals. Ensuring that students have appropriately skilled teachers is essential — public statements of standards can help in this.

Ingvarson (1997) identifies a huge benefit to teachers from having documented standards of excellence, and this may be the most appealing reason to have them, among committed teachers of mathematics like AAMT members, at least. He explores the advantages of a 'Standards-based PD System'. He argues that having a clear picture of what the goals are (i.e. the standards of excellence) will enable teachers to design their own professional development around reaching those goals. Such an arrangement is an essential ingredient of true 'professional practice' and far cry from the far too common professional development systems and approaches which tend to focus on 'implementation of new policies'.

The Council of the Australian Association of Mathematics Teachers Inc. sees it as a 'do it, before someone does it to you' scenario. In the spirit of 'doing it' the AAMT has entered the field in a major way, in partnership with Monash University in a three-year project entitled *Research and development of national professional standards for excellence in teaching mathematics*. The project will develop standards (i.e. written descriptions) of what excellent teaching of mathematics looks like (i.e. what these teachers know and do). It will also develop an assessment scheme and protocols for certifying this excellence.

### The AAMT's perspective

The rather long winded title contains some key words about the orientation of the Association's approach:

#### Research...

The project is asking questions and seeking to answer them through research. (Can we identify what 'excellent' mathematics teachers do? Do we need different standards for the different levels of schooling (early childhood/

primary/secondary)? Can these descriptions have shared meaning and serve to set standards? How can the achievement of the standards be assessed?)

### ...national

This is a collaborative venture involving members from all levels of schooling, all around the country.

### ...excellence

While there is a legitimate place for standards of 'competence' in teaching mathematics, and the AAMT and its members would be key contributors in this area, it is more legitimately the province of systems and employers; this project focusses on the clear interest of the profession in defining excellence in the work of established, experienced teachers.

### ...teaching mathematics

Some earlier work on standards and competencies was generic (National Project on the Quality of Teaching and Learning, 1996), but the Association's strong view is that the teaching of mathematics requires knowledge and understanding of mathematics and its teaching and learning is reflected in the focus on mathematics-specific standards; it is encouraging that this view is shared by Boston (1999).

The word 'professional' in the title emphasises the Association's focus on non-industrial issues, although in this project a key task will be to work with education systems and other employers to ensure that the standards are implemented. This may mean arguing that accredited teachers receive recognition through career enhancement and salary, as has been the case with similar efforts in the USA (see below).

## Developments in the USA

Standards for teaching mathematics have been on the agenda in the USA for most of this decade. Building on the reception for its *Curriculum and Evaluation Standards*, the National Council of Teachers of Mathematics (NCTM) developed and published *Professional Standards for the Teaching of Mathematics* in 1991. The *Professional Standards* was a landmark publication, being a major effort to describe a vision for mathematics teaching. The emphasis was to describe teaching, professional development and support for teachers that was consistent with the messages of reform in the *Curriculum and Evaluation Standards*.

The National Board of Professional Teaching Standards was established to identify 'high and

rigorous standards for what accomplished teachers should know and be able to do, and to develop and operate a national, voluntary system to assess and certify teachers who meet these standards' (NBPTS, 1989). The NBPTS is part way through the process of developing and implementing standards across the K-12 range. Some of the NBPTS standards are generic (Early Childhood/Generalist) while others deal with particular curriculum areas such as mathematics. There is separation in terms of level of schooling/age of students. Given the foundation work done by the NCTM, the NBPTS has published standards, and accredits teachers in the areas of Early Adolescence (age 11-15) Mathematics and Adolescence/Young Adulthood (age 14-18+) Mathematics among a range of other areas.

The NBPTS standards are contained in documents that are typically 40-50 pages long. The Adolescence/Young Adulthood Mathematics Standards (NBPTS, 1996) contains four categories:

- Commitment;
- Knowledge of Students, Mathematics and Teaching;
- The Teaching of Mathematics; and
- Professional Development and Outreach

and a total of eleven Standards.

For example, in the category The Teaching of Mathematics, the Standard relating to Reasoning and Thinking Mathematically:

*Accomplished mathematics teachers develop students' abilities to reason and think mathematically — to investigate and explore patterns, to discover structures and relationships, to formulate and solve problems, and to justify and communicate their conclusions.*

is followed by two pages of discussion and elaboration of what teachers should know and do, and how and what skills students should develop.

The assessment for NBPTS accreditation is designed to enable teachers to present evidence that they meet the standard. It is an extremely rigorous process that takes around a whole school year to complete. It involves the presentation of a portfolio with specified entries (video tapes of lesson segments, examples of student work, etc.) and attendance for one day at an Assessment Centre to sit written papers. All the 'marking' is done as a peer review by teachers currently working at the relevant year levels.

The work of the NBPTS creates some confidence that the project the AAMT is embarking on is feasible; it is not, however, being used as a template or goal. It was developed in the USA, for its conditions and aspirations. Although the debt to the NCTM is

acknowledged, the materials and the processes are in the hands of a separate body. The joint AAMT/Monash project aims to create teaching standards and assessment processes that are directly based on AAMT members' input, and ultimately owned by them.

## Next steps

To achieve this aim, Teacher Focus Groups will be working with researchers in four states. These groups comprise experienced and expert teachers of mathematics who will be involved in each of the project's five stages:

- development of draft standards (1999);
- verification of written standards (1999–2000);
- validation of standards (2000);
- development of assessment materials and procedures (2000–2001);
- trial implementation (2001).

From the second of these stages onwards the wider membership of the AAMT will be able to take part in the project — responding to draft materials, providing examples of good practice and trialling materials and processes. In fact, draft standards are scheduled to be available for consultation and comment towards the end of the year, and all members will receive a copy. These, and drafts of subsequent materials will be made available for comment on the AAMT website.

This project is nothing if not ambitious. It is trying to reach consensus on standards for excellence that are able to be fairly assessed in the wide range of educational settings in which teachers of mathe-

tics work in this country. This is being done at a 'friendly distance' from the education systems and employers, while at the same time working towards their uptake of the materials and processes.

This will be a costly project, particularly in terms of the time and efforts of the AAMT's members. Yet in the current political and educational context it is a project that Australia's teachers of mathematics cannot afford not to do. Credible standards for excellence in teaching mathematics can only come from a project like this — your contribution and participation will enrich the work being done over the next three years, and the final result. You are invited and encouraged to play a role.

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