

# Inquiry into Teacher Education

## ***House of Representatives Standing Committee on Education and Vocational Training***

### **Response of The Australian Association of Mathematics Teachers Inc.**

#### ***Introduction***

The Executive of the AAMT, on behalf of its Council and over 5000 members welcomes the opportunity to provide input to the National Inquiry into Teacher Education being conducted by the Standing Committee on Education and Vocational Training. This submission represents the views of members in as comprehensive a manner as possible, given the short timeline for submissions. A draft of this submission was prepared and posted to the AAMT web site. All members were then invited to contribute to the draft via an email notice. Members had a period of approximately three weeks to provide input. Their input was then synthesised into this final submission.

A recurring theme in their responses, and one that is of great concern to the AAMT is the critical shortage of suitably qualified and prepared secondary mathematics teachers. The issues that surround the shortage of teachers of mathematics are complex and the consequences of not addressing them are, in the view of this Association, extremely serious:

*What is the cost of not enough teachers? What is the cost to a school that cannot fill a position with a suitably qualified teacher? What is the emotional cost on the teachers of that school trying to fill the gap? What is the impact of children being taught science, technology or mathematics by under-qualified teachers “filling in”? What is the long-term impact on students in terms of their attitudes towards learning mathematics, doing mathematics and teaching mathematics? What is the long-term impact on society of people who have not been taught mathematics by enthusiastic and knowledgeable teachers, in an era where the capacity to make informed and critical decisions based on a capacity to apply a sound knowledge of mathematics to a real situation is becoming increasingly important?*

*The cost to children, to schools, and to society cannot be measured in dollar terms alone, but even a cursory calculation of the material and personnel cost of a society that is not scientifically, technologically and mathematically aware is enormous. The key to preventing such a situation from arising is a school system in which young people are challenged and inspired by well-qualified teachers of science, technology and mathematics. The AAMT believes that the current and impending shortage of mathematics teachers has enormous cost to Australian society, both in financial terms and in terms of the loss of knowledge. We believe that significant expenditure now to address these serious problems will save far greater losses in years to come.*

*The AAMT believes that the issue cannot be avoided, and that significant investment of resources needs to be made on several fronts. These include exemplary education and training for new teachers, significant ongoing professional development for existing teachers of mathematics as well as effective and innovative retraining programs for teachers not qualified in mathematics who are teaching out of their subject speciality. However, such exemplary pre-service and in-service education will count for little unless issues such as the pay and conditions of teachers are addressed. The impact of low salary scales for teachers who quickly reach a ceiling, when compared with other work that people with expertise in science,*

*technology and mathematics could undertake, cannot be underestimated. In an education system where structures and working conditions have changed little in the past fifty years, yet community expectations and teachers' responsibilities have increased dramatically, it is little wonder that recruitment and retention of well-qualified teachers looms as a major problem. Any long-term solution requires a systematic addressing of salary scales, working conditions and school structures.*

*Simplistic attempts to address the problem such as encouraging more people to undertake tertiary studies in mathematics, recruiting new teachers from interstate or overseas, or advertising campaigns will provide, at best, short term benefits. Long-term solutions depend on raising the profile of teaching, and recognising the enormous contribution teachers make to the lives of young people and to society in general. This, in turn, depends on outstanding teachers being given the opportunity to share their expertise through professional associations, in Universities, in systems, and in centres of excellence in mathematics education training and research. Organisations and centres such as these, working in partnership, with adequate funds for coordination, research and development, will go a long way towards re-establishing teaching as the cornerstone of a scientifically and mathematically advanced society.*

*Nothing less than a whole-hearted engagement by government, state systems, the independent and Catholic sectors, and the community in general will suffice if there is to be a culture of innovation in mathematics education. Australia's future depends on a sustainable and strong school system, both government and non-government. Schools that do not have excellent teachers of science, technology and mathematics will become behaviour management institutions, rather than places of learning.*

AAMT submission to the 2003 Review of Teaching and Teacher Education

As teachers of mathematics in schools at all levels and in all states, territories and jurisdictions, our members have a keen interest in the education of teachers of mathematics at all levels. We do note, however, that this is one of a series of reviews of teacher education in mathematics, at least, over the years and it is appropriate to consider the effectiveness of these reviews. Indeed one of our respondents expressed her frustrations thus:

*I felt a real sense of déjà vu in this process as when I looked through my folder of past submissions, I found a photocopy of a submission by John Taffe which was published in the Australian Senior Maths Journal, probably in about 1989-90. It was titled:*

*"The Unpopularity of Mathematics: Can Teacher Education Change the Picture?" It was made to a Discipline Review of Teacher Education in Maths and Science<sup>1</sup>.*

*Next I found the submission I sent to AAMT when Steve Thornton wrote the AAMT submission to the Review of Teaching and Teacher Education in 2002.*

*My question is:*

*Does anything happen as a result of such reviews<sup>2</sup>? My fear is that in 10 years time, such reviews will still be happening, but let's hope that SOMEONE will do something as a result of this current review.*

Teacher, Tasmania

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<sup>1</sup> The so-called Speedy Review. It is interesting to note that there were some gains in terms of mathematics preparation, particularly in the construction and content of primary teacher education courses as a result of this Review. It is likely that most, if not all of those gains have been eroded over time. This would be a useful issue for the Committee to research.

<sup>2</sup> This teacher may be unaware of the programs out in place by the Australian Government in relation to the 2003 Report of the Review of Teaching and Teacher Education. In any case, these programs fall well short of what was signalled as necessary in the AAMT submission quoted above.

## **Responses to the Terms of Reference**

### **1. Criteria for selecting students for pre-service teacher education courses<sup>3</sup>**

The AAMT notes that many undergraduate teacher education courses are reporting that cut-off scores for entry into Education degrees have been increasing over the past few years. This is not universal, however, and it has been reported that the cut-off TER score for the BEd course at one university is 52, a figure that suggests that this university is enrolling people with poor academic results.

The student's TER is not the only indicator of potential success in an education degree, and is largely irrelevant in determining the individual's potential as a teacher. However, the students must have adequate intellectual capacity to succeed in the course. A possible downside of the TER cut-off score rising too high that has been identified is that a high cut-off score works against students from regional, rural and remote Australia becoming teachers. These students traditionally do worse in end of school assessments<sup>4</sup>. Yet students from these areas are more likely to return to and stay in non-metropolitan teaching postings, thus addressing the issue of the difficulty of staffing country schools.

The AAMT is also aware of anecdotal reports that entrants into post-graduate pre-service diplomas etc. consistently include very well qualified individuals (Masters and PhD). However, in some cases it has been reported that often students in 'middle school' programs have little interest or background in mathematics, even though many will be required to teach mathematics up to year 10 level.

We also have reports that there are good numbers of mid-career entrants with good degrees and valuable experience outside of education. The issue of mid-career entrants has been identified as a major shift in the intake of secondary teacher education students, in particular. One of our members outlined some important differences that need to be considered.

*Generally mature-aged entrants differ from recent school-leavers who enter education faculties in a number of important respects.*

- 1. Mature-aged entrants often make the best students*
- 2. The very fact that they are back studying indicates that they have a genuine desire to keep learning (irrespective of why they might have left formal studies in mathematics at some earlier stage in their life).*
- 3. They have more knowledge of the vocational value of the mathematics they are teaching than someone who has studied mathematics purely to be a teacher of mathematics.*
- 4. They have developed teaching skills through parenting and experience in other areas of employment.*
- 5. They have often developed mathematical skills and a deeper understanding of mathematics through its application.*

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<sup>3</sup> Teacher 'education' is the preferred terminology in the AAMT.

<sup>4</sup> This has recently been acknowledged by the establishment by the Australian Government of the National Centre for Science, ICT and Mathematics Education for Regional and Rural Australia (SiMERR) at the University of New England.

6. *They may have improved their knowledge and skills in mathematics at the secondary school level through helping their own children with their mathematics homework.*
7. *They sometimes have higher degrees and have written a thesis in which mathematics (particularly statistics) has been used but they do not necessarily have an undergraduate major in mathematics.*
8. *When they graduate, they choose a teaching position that is close to home. They are unlikely to want to uproot their families to move to some difficult-to-staff location.*
9. *If they are women, they often prefer a part-time position.*
10. *I believe this major change in those taking up the profession has important ramifications.*

Teacher, NSW

Hence it seems that the career/employment 'market forces' currently working somewhat in favour of teaching in general, and teachers of mathematics in particular. This comment needs to be viewed in the context, however, that there is, and will continue to be, a serious shortage of appropriately prepared teachers of secondary mathematics for many years to come.

Maintaining the positivity of these forces will rely in part on the experiences of new teachers as they enter the workforce. The AAMT sees a role for itself and its state and territory affiliates in this process<sup>5</sup>, and urges others to take up the recommendations of *Report of the Review of Teaching and Teacher Education* ('Kwong Lee Dow' report; 2003) as they relate to structures that welcome entrants into the profession.

While the overall academic attainment of entrants appears in most cases to be at a relatively high level, there are concerns in relation to entrants into primary teacher education courses. These are that many of these students have

- a poor level of mathematical understanding and knowledge in relation to the mathematics they will be expected to teach; and
- negative attitudes towards mathematics in general.

In some institutions entrants need to have at least a specified level of Year 12 mathematics for entry into a primary pre-service course. It is not clear whether enforcing such a requirement is appropriate. On the one hand the mathematics of the year 12 course is likely to be unconnected with the teaching that the student will end up undertaking<sup>6</sup>. Doing such a course while at school may only fuel negativity towards mathematics. On the other hand, a person who has opted out of study of mathematics during their schooling — for whatever reason — is probably less likely to become an effective teacher of mathematics. They are very likely to lack the requisite enthusiasm for the task and their own continuing development as a teacher of mathematics.

The resolution of this problem may be found in some sort of national standards for year 12 equivalent mathematics as a pre-requisite for entry into

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<sup>5</sup> The AAMT Council resolved in January 2005 to extend free membership to those teacher education students provided free membership of their local association, affiliated to the AAMT. The aim is to provide a 'bridge' into the profession, and to give them a point of reference in the challenging early years of teaching mathematics.

<sup>6</sup> The reality for primary education students is that they need to develop deep knowledge of the fundamentals of mathematics — concepts, connections and applications — rather than merely elementary processes. One respondent argued that year 12 mathematics is likely to be more about gaining a general knowledge of advanced topics.

primary pre-service teaching courses. There would be issues with this approach in terms of equity for mature age entrants (who may have left school before completing year 12) and the relevance of the course. The AAMT has been alerted to another approach as a result of seeking input from members. The Australian Council for Educational Research (ACER) is working with the Department of Science and Mathematics Education at the University of Melbourne to develop the ACER Teacher Education Mathematics Test (TEMT) as a tool to aid selection into primary teacher education courses. The developers report that TEMT will test the mathematical attainment of beginning primary teacher education students and uncovers errors, misconceptions and strategies in order to provide diagnostic feedback. The work is based on research on children's and teachers' knowledge<sup>7</sup>. The TEMT would seem to have the advantage of being a 'purpose designed' instrument<sup>8</sup>.

One respondent acknowledged the issue of negativity towards mathematics and outlined how her institution addresses this issue in the context of the mathematical preparation provided for their students:

*It is true that some students enter into teacher education with mathematics anxiety. My personal experience is that a constructivist approach to mathematics methods topics for junior primary/primary teaching students with many opportunities to personally explore and develop and understanding of mathematics, results in a positive change for the majority of students. Increasing the entry requirement to some Year 12 mathematics would not necessarily achieve the aim you are looking for. The mathematics they may do in Year 12 may be very stressful for some students and only prevent them from getting in to teaching, when in fact they have great teaching qualities. Perhaps more support to provide additional relevant mathematics experiences for students lacking Year 12 or identifying as mathematics anxious would be appropriate.*

In terms of entry into secondary teaching courses (whether in the form of concurrent programs or postgraduate programs) it is typical that entry into 'methods' courses in mathematics requires some level of mathematics in the initial award. Given that a major methods component is seen as an indicator that a person is suitably qualified to teach senior mathematics, the AAMT believes the national standard for a mathematics 'major method' should be an undergraduate major in mathematics. Similarly, the AAMT believes that entry into a 'minor method' course that is sufficient for teaching mathematics in junior secondary or middle years classes should require, nationally, a 'minor' in mathematics (ie some mathematics beyond first year level).

## **2. The extent to which pre-service teacher education programs can attract high quality students**

As indicated above, there is evidence that many pre-service teacher education courses are currently attracting high quality entrants. We note again that this is a priority into the future. For these courses to continue to do so will require action and initiatives on a number of fronts as 'fashions' in student trajectories at the end of their schooling clearly vary over time.

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<sup>7</sup> Information provided by Barry McCrae at ACER.

<sup>8</sup> In this vein, the public reporting of the work at the UNE to identify primary education students' weaknesses in mathematics when they entered their courses was unfortunate, to say the least (see *The Australian* Editorial January 18 2005). This was research to assist the teaching of these students during their four year course to ensure that weaknesses identified were addressed before graduation. It is hoped that the TEMT results will not be similarly distorted.

There is a continuing and concerning attrition of teachers in the first years of their careers. As one of our respondents put it

*... teachers under the age of 30 are leaving in droves. Teaching is not seen as a viable profession by many secondary students (and young teachers). Mainly because of lack of a career path and the ability to make money unlike other occupations. Double the wage, take some holidays away and something may happen.*

Teacher, Queensland

Other respondents similarly referred to the perceptions that teacher salaries were insufficient to attract and retain mathematics teachers, with the latter problem exaggerated by the plateauing of most teacher salaries after less than a decade in the job. This is a major factor in retaining teachers, and seems likely to influence negatively the attractiveness of teaching as a profession:

*A structure is needed in schools which allows advancement in salary whilst remaining in the classroom. This would enable talented teachers to avoid administrative roles if they chose to do so, since they might conceivably gain a middle management position, or more, by demonstrating an appropriate standard of teaching.*

Teacher, Tasmania

The experiences of new entrants will be important in promoting teaching as a viable and worthy profession. Many experienced teachers would see the benefits in mentoring and otherwise supporting entrants to the profession. However, the pressures of the job mean that something needs to change to make this actually feasible:

*From a school viewpoint, it is becoming increasingly hard for any teacher to commit to mentoring new teachers, as much as we really want to. It is hard to describe the enormity of the teaching role in our school, and in most others, I am sure. We have huge pastoral care duties, extra curricula supervision of sporting teams, planning and Professional Development meetings for two hours every Wednesday to come to terms with the Review of our Years 11 and 12 programs in the state and the introduction to the new Essential Learnings package which is being introduced in all Secondary Schools. These encompass a change in teaching philosophy and involve hours of planning to devise transdisciplinary programs which cover the curriculum (and require an even greater knowledge of subject areas; contrary to the commonly held view that this will spell the end of subject specialists). We have regular PD relating to new computer software which arrives every year with the students' upgraded computers. All of the above is compulsory for all fulltime staff and is in addition to preparing our classes, word-processing and photocopying assignments & tests, marking, writing progress checks and reports. I might add that most of us accept this, however, there is much discontent, burnout and bitterness. It is ultra difficult for young teachers who still have young families at home, since there is this constant feeling of not being able to cope or "have a life". As silly as it seems, it is not even a case of needing better time management skills.*

*The only way this situation can be improved is if more teachers are employed so that the extra-curricula duties can be reduced. The abundance of dysfunctional families in our society means that we teachers realise the vital importance of pastoral care for our students. No learning can take place by any emotionally disturbed student, no matter how good the teaching may be. Teachers need endless patience and understanding of children, teenagers and adolescents. To this end, being a parent who has experienced all of these stages is invaluable training ... .but of course there is a lot more!*

Teacher, Tasmania

Clearly for this committed and experienced teacher the possibility of helping new teachers enter the profession is appealing and would be rewarding work. However, programs for mentoring and related activity requires time that they simply do not have under current arrangements. It is clear to the AAMT that significant resources would need to be provided for adequate mentoring programs to be instituted and maintained within schools

Also important in attracting high quality students will be the more general efforts to raise the status of teachers and teaching in the eyes of the general

public. The AAMT believes its work on defining and using nationally agreed professional standards for teaching mathematics is an important contribution to these efforts. The AAMT has developed its *Standards for Excellence in Teaching Mathematics in Australian Schools* and is implementing them as the national framework for teacher professional learning in mathematics, culminating in our voluntary assessment and credentialing process for Highly Accomplished Teachers of Mathematics (HAToM). The Association looks forward to the work of the recently established National Institute for Quality Teaching and School Leadership (NIQTSL) in this regard, and stands ready to play its part in improving the professionalism and status of teachers of mathematics.

### **3. Attrition rates from teaching courses**

The AAMT notes that individuals who are not suitable to be teachers for whatever reason should become aware of this as early as practical in their course. Teaching is a demanding and frequently challenging profession, so that it is inevitable that some teacher education students will not realise that they are unsuited to it until some way through their studies. Whilst it is true that these people leaving the course will be seen as contributing to the 'attrition rate', it is also true that this is in everyone's best interests. Hence, driving the attrition rate down to zero is not a desirable goal.

### **4. Criteria for selecting and rewarding education faculty members**

It is true that most members of education faculties are former teachers. The fact that for many their classroom experience occurred some time ago — in many cases decade(s). Hence it would seem that flexibility across the school-university interface (ie people working in schools to move into universities for a time and vice versa) would be an excellent goal in maintaining the currency of the staff and programs, and connections with the realities of contemporary school education. The fact that entry-level salaries for university staff are not on a par with those of senior people in schools mitigates against this flexibility.

*Suitable teachers must be found for Education Faculties; BUT this can only happen if suitable salaries are paid. It is desirable to have a mix of education researchers, subject specialists and rotating (mentoring) teachers who may be seconded for a year from a school. This ensures that the new students meet with the most up to date school practices. Each of these academics should be equally remunerated so that each is seen as important. (There seems to be a tendency in our Uni to try to employ teachers to provide workshops for nothing or very nearly nothing.) This detracts from their feeling of worth, no matter how happy they are to help. The universities' funding focus for research at the expense of teaching is regrettable.*

Teacher, Tasmania

### **5. Educational philosophy underpinning teacher education courses**

The AAMT has no capacity to respond to this Term of Reference.

### **6. Interaction and relationships between teacher education courses and other university faculties**

The AAMT has anecdotal evidence that the relationships between the education and mathematics faculties in universities are variable. It is likely that the restructuring of many universities to move away from identifiable

mathematics faculties has had a negative effect on these relationships. There are few examples of undergraduate mathematics units tailored to the particular needs of potential teachers of mathematics, designed and taught jointly by staff in mathematics and education faculties. Work of this kind would be desirable, and the recognition of study of such units as a legitimate part of an undergraduate mathematics degree ought be considered.

One group of respondents (four secondary teachers in regional Queensland) reported an unfortunate experience with the staff of their local university:

*Lecturers in some key areas are not staying up to date with the changes made to the senior syllabus. For example, Mathematics B & C (in QLD), Chemistry & Physics. Nor are they aware of the latest in educational trends. This means they have the same expectations of students as they did 20 years ago. As a QAMT local branch we had some discussions with the [local] Mathematics Department and they were astounded at the subject matter in the Maths B & Maths C syllabus; the restrictions on face to face time in the secondary classroom; and the mandatory (syllabus) incorporation of higher technology into the programs in schools. For example the minimum level of higher technology for use in the learning experiences and therefore assessment is the graphic calculator in both Maths B & C, but the University Maths Department does not allow any use of graphic calculator or computer software in their first year subjects.*

Four mathematics teachers, Qld.

Reports of this kind are regularly heard at professional meetings of mathematics teachers, suggesting that there continues to be a need for better communication, cooperation and consistency among mathematics faculties, education faculties and mathematics teachers in schools.

## 7. The preparation of primary and secondary teaching graduates

The first thing to note is that, for secondary teachers there is no category provided along the lines of *Teach within their speciality(ies)*. This is, in our view, a serious flaw in the design of the Terms of Reference. It is hoped that it was an inadvertent flaw — teaching within the disciplines remains central to the enterprise of schooling, and is the core business of most secondary teachers.

Nevertheless, some of our respondents have commented on this and their input is included. Several teachers who have been involved in supervising final year or first and second year students had a range of concerns:

*Final year Pre-Service students are unaware of our syllabus or they are unaware of their importance to schools who have to develop an accredited work program (senior only at present) from these documents then teach to this document, because student work is compared to the syllabus exit criteria to determine levels of achievement. These judgments are verified by the appropriate district panel of teachers. Also there are other policy documents which should be considered in writing the school work program. Most students appear unaware that they may be expected to write a work program if appointed to a remote locality in western Queensland. Footsteps are not always left by those who have moved on.*

*The contact hours at university are insufficient to develop quality teachers. This refers to time spent learning how to teach the key concepts in mathematics and how to plan the development of these concepts. Too much of this appears to be left to teachers supervising on their practicum. The textbook is not the syllabus.*

*Again, for students training to be teachers, the subject matter in university mathematics and science seems to go way beyond what they will be asked to teach. Meanwhile there seems to be very few links between the mathematics they might have to teach and the subject matter of education courses. E.g. Mathematics A.*

Four mathematics teachers, Qld.

Many believe that students preparing to become secondary mathematics teachers should undertake more practically oriented subjects at university:

*... not only to keep their own basic skills up to speed but also begin to see mathematics can be taught without a textbook. Textbooks provide some nice consolidation but should not drive the way it is taught. Our educational researchers in Australia provide us with wonderful ideas and practical ways to incorporate what they have found about teaching mathematics.*

*As well there should be a subject about preparing to teach which includes taking the syllabus and looking at how a work program (of creditable standard) can be put together; lesson planning from this document and graphic calculator and/or computer skills.*

Four mathematics teachers, Qld.

In recent years, an increasing number of entrants to graduate teacher education programs in mathematics have come from fields other than mathematics, such as engineering, and consequently have the potential to bring significant industrial experience from beyond schools to the profession. There are also potential problems with this trend, as one teacher noted:

*There is a danger that people could be turning to maths teaching for the wrong reasons such as a shortage of qualified teachers, meaning it is easy to get a job or HECS relief. There is no doubt that teachers' life experiences impact greatly on their ability to enthuse students and to this end, it is desirable to employ teachers who have been employed in other professions first. However, they have to have a passion for maths as well! This should mean that they are willing to be continual learners to enhance what could possibly be an 'old style' approach.*

Teacher, Tasmania

In the case of primary teacher preparation it is true that literacy and numeracy are key foci in most, if not all, courses. This reflects the National Goals for Schooling in the 21<sup>st</sup> Century, among other things. However, there is strong anecdotal evidence that the time allocated for the numeracy component of primary teacher education courses has been curtailed in many institutions. Given that many of these students need to learn a significant amount about the concepts and connections in mathematics, and to have the opportunity to develop positive attitudes to mathematics and themselves as 'doers' of mathematics, it is crucial that there be more time, not less.

## **8. The role and input of schools and their staff to the preparation of teachers**

The AAMT interprets this more broadly in terms of *the role and input of professional associations of teachers* to the preparation of teachers. There is at least one AAMT affiliate in each jurisdiction. Typically, those who are involved in professional teacher preparation are members of those bodies (and hence the AAMT) and these contacts do provide the pathway for informal input from associations. However, the connections vary widely.

In general terms, the AAMT would see it as desirable to have more formal involvement of associations in a range of aspects of teacher education courses in mathematics. These would include course monitoring, review and redevelopment, and involvement in some teaching. The latter would enable soon to be practising teachers to be in contact with mathematics teacher associations. It is apparent from a number of responses that there are arrangements along these lines in place in some universities (eg University of Tasmania, Flinders University, although the practice of teachers from teacher associations (and otherwise) making presentations to student teachers may be much more widespread). We see this engagement with professional associations as a vital means for enabling teaching graduates to be aware of, and positively disposed towards, a professional group that can provide much needed support in their formative years as a teacher and beyond.

## 9. The current split between primary and secondary teacher preparation

The AAMT's *Standards for Excellence in Teaching Mathematics in Australian Schools* state that teachers need to know the mathematics relevant to the year levels they are teaching and that this knowledge needs to extend to the students' learning of this mathematics. While this seems to be an obvious requirement, it does link content and pedagogical content knowledge of teachers to the level of schooling. Hence there has to be some differentiation between the educational experiences of teacher education students at the different age levels. Currently this is early childhood/primary/secondary, with some middle years programs in place. This would seem to be a logical and necessary split, in the view of the AAMT.

## 10. Construction, delivery and resourcing of ongoing professional learning for teachers already in the workforce

This topic is part of the 'core business' of the AAMT. Hence there were several respondents who commented on the issue of ongoing professional learning for teachers of mathematics. In line with the general material quoted above, the AAMT has made detailed representations on this matter in a number of ways in the past. What follows is a brief summary of some of what might be said on this topic.

The AAMT shares the view of the Report of the Review of Teaching and Teacher Education that the ongoing professional learning of teachers needs to be *constructed* around agreed, national professional standards (such as, in our view, the AAMT *Standards*). The AAMT has already implemented steps along these lines internally; the Association will shortly establish a project that will determine the efficacy of its *Standards* (written to describe high achievement in teaching mathematics) in the context of in-school professional learning programs in mathematics (which, of necessity, involve a spectrum of teaching expertise)<sup>9</sup>; the AAMT is also in conversation with education faculties to look at ways in which the *Standards* can inform the construction of post-graduate award and non-award programs of professional learning for teachers of mathematics.

The *delivery* of professional learning largely continues to be through face-to-face mode. The Internet has not yet been adequately and extensively used for teacher learning in mathematics (or other areas, for that matter). The AAMT has one signal success in its email list, and has explored other territory with varying results. The development and sharing of 'new knowledge' about how professional associations, in particular, are able to use ICTs for effective professional learning is an urgent need. The AAMT takes the view that this piloting of new strategies, and national sharing of ideas and practices falls naturally into the responsibility of the Australian Government. The Quality Teaching Programme has not over several years reserved sufficient funds for this purpose in its 'national and strategic' element. The vitality of the field is restricted because of this.

The emphasis in professional learning has shifted from the individual to the school. In this context there is much that can be done to support teachers' professional learning:

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<sup>9</sup> Funding for this project has been secured from NIQTSL.

*Teacher professional development should allow teachers to collaborate in their school day both within and between schools ... running maths activities, excursions, sharing and modelling innovative teaching practices and allowing student teachers to access these experiences as observer/participants.*

Teacher, South Australia

The *resourcing* of teacher professional learning in mathematics is extremely patchy around the country. One respondent argued that the vast majority of funding for teacher professional development is 'gobbled up' by funding teacher release, with insufficient left over for the cost of enrolling in a professional development program or workshop etc.

#### **11. Adequacy of funding for teacher education courses by university administrations**

The AAMT has no capacity to respond to this Term of Reference.

**Submitted by**

Barry Kissane

PRESIDENT

15 April 2005