



## Submission to the Senate Inquiry into Rural and Regional Access to Secondary and Tertiary Education Opportunities

### Introduction

The Australian Association of Mathematics Teachers (AAMT) is the premier national professional organisation involved in school mathematics education. The AAMT exists to:

- support and enhance the work of teachers;
- promote the learning of mathematics; and
- represent and promote interests in mathematics education.

Further information about the AAMT can be found in Appendix 1.

The AAMT welcomes the opportunity to make a submission to inform the deliberations of the Senate Rural and Regional Affairs and Transport Reference Committee in relation to this matter. As an organisation involved specifically in school mathematics education, our submission is confined to a limited number of the Terms of Reference that relate to our area of interest and expertise.

### Some general comments

One needs only to look at the Melbourne Declaration on Educational Goals for Young Australians to appreciate the high level commitment to achieving equity in and through education – the needs of students in rural and regional Australia must be in the foreground of our attention. The ‘elephant in the room’ when considering equitable education provision for rural and regional Australia is cost. However, the question, in the AAMT’s view, should not be “How much does it cost to provide quality mathematics (or any other) education in rural and regional communities?”, but rather should be “How much does it cost to **not** provide quality mathematics (or any other) education in rural and regional communities?” Young people who do not fulfill their educational potential represent a substantial loss of economic and social capital that this nation simply cannot afford. That a greater number of these young people live outside of metropolitan areas that should be the case makes change and improvement a national imperative.

The AAMT believes that the Inquiry should take careful note of the work of the Science, ICT and Mathematics for Rural and Regional Australia (SiMERR) organisation over the last few years. SiMERR has a track record of research and development in support of these crucial curriculum areas in rural and regional schools. The SiMERR National Centre is based at the University of New England (Prof. John Pegg as Director), and there is a national network of Hubs in universities in each state and territory. In addition, the AAMT

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and other relevant teacher professional associations have had close working relationships with SiMERR since its inception. This reflects a recognition by SiMERR that professional associations play an important role in supporting the work of teachers and the quality of students' learning. The SiMERR extended network of Hubs and professional associations therefore provides an already existing infrastructure that will be able to support many of the policy and program directions that are likely to flow from the work of this Inquiry.

One of the important contributions made by SiMERR was the conduct of its National Survey (Lyons, T., Cooksey, R., Panizzon, D., Parnell, A. & Pegg, J. (2006). Science, ICT and Mathematics Education in Rural and Regional Australia: The SiMERR National Survey. DEST: Canberra; available at <http://www.une.edu.au/simerr/pages/projects/1nationalsurvey/Report/index.html>) which reported on, and made recommendations about improving education in these fields in rural and regional schools. This submission is greatly informed by the SiMERR national Survey. Officers of the AAMT were involved in the project to conduct and analyse the SiMERR National Survey – the Association endorses the findings of the survey, and is committed to the recommendations as providing a constructive basis for improving the provision of education in mathematics, science and ICT in regional and rural Australia.

## Responses to the terms of Reference

### ***b. the education alternatives for rural and regional students wanting to study in regional areas.***

A key issue identified in the SiMERR National Survey is that students in smaller high schools in regional and rural locations have a restricted range of options for mathematics study. Typically, due to low numbers, schools are often unable to offer the higher levels of senior secondary mathematics subjects.

The decreased numbers of students in these subjects is a national issue (Barrington, F. 2006. Participation in Year 12 Mathematics across Australia 1995-2004. Australian Mathematical Sciences Institute: Melbourne), just at a time when Australia faces a critical skills shortage in areas that rely on this kind of basis in mathematics (engineers, scientists, technicians and technical trades). For students in many regional and rural areas, the small size of the school they attend is a structural impediment to them studying these types of subject.

Schools and education authorities do try to address the issue. One approach is to enable students to take these subjects in distance mode, typically through the distance education sections or 'schools' of education departments. This could be an appealing solution, given the rapidly improving online means for learning that are becoming increasingly available to schools. However, this kind of distance delivery needs to be adequately supported – adequate bandwidth, high quality learning design and supporting resources, and a range of support for the schools and students involved to maximise learning through distance delivery. Further investment in distance delivery in the schools sector is required. The AAMT notes that the advent of the Australian Curriculum (i.e. the new national curriculum) provides an opportunity to move to a coherent, national approach to distance education that draws on the best of what is currently available to build a leading-edge provision.

Another strategy that shows promise is the clustering of small schools to generate a sufficient number of students to establish a class to study higher level mathematics. Examples of this are in the Mid North Secondary Education Cluster in South Australia (MNSEC), and some clusters in western New South Wales. The mathematic teachers in these schools form a 'virtual faculty' that not only teaches the higher level mathematics subjects, but also engages in all the other professional work undertaken by faculties in larger schools. If well-supported, these arrangements can be effective ways of supporting improved quality in the teaching and learning of mathematics in settings where it would otherwise be at risk.

There is a range of outreach education services located in metropolitan areas. These include museums, botanic gardens and a host of other scientific organisations that see education as an important part of their role. These groups typically have programs for students to visit their facilities, as well as schemes that see them visit schools to work with students. The benefits of these programs include inspiring and enthusing young people to take on studies and careers in the sciences and technical areas that rely on good grounding in mathematics. Distance and cost substantially limit the access of rural and regional students to these organisations and their work.

Some programs, such as Questacon, are being supported to overcome this problem and take their programs to country Australia – more support like this is needed for more of the many valuable programs that are currently working well in city locations. The newly established CSIRO Mathematicians in Schools program has the potential to also bridge the gap – this new program should be encouraged and supported to actively create partnerships between mathematicians and schools in rural and regional locations. Making effective use of communication technologies can augment programs of visits and help establish ongoing relationships to support student learning.

#### ***f. the educational needs of rural and regional students***

A core issue in the mathematics learning of students in rural and regional Australia is the adequate supply of suitably qualified teachers of mathematics. This is well established as the largest single contributor to the quality of student learning of all the factors that are not related to the students themselves. A well qualified, committed and well supported mathematics teacher is what every student in rural and regional schools needs in order to be able to fulfill their potential in the subject, and thereby have access to the wide range of career trajectories that require mathematics. Whilst the supply of mathematics teachers is an issue for metropolitan schools and students, it is most acute in rural and regional areas.

Another key issue is the ongoing support for teachers of mathematics (and other subjects) in rural and regional schools – the SiMERR national Survey clearly identified this 'professional isolation' and its effects. Distance from colleagues and opportunities for professional development is an obvious element in this. Even when these can be addressed – for instance by using localised models for professional learning that utilise communications technologies – professional learning still takes time. In many rural and regional areas there are few – and sometimes no – relieving teachers who can enable teachers to be released from classes to undertake professional development. This is a serious problem in many schools.

The solutions to these and other issues are multi-faceted, and difficult to achieve. Recommendations 1 through 19 of the SiMERR National Survey (see pp. ix-xv) would go a long way to addressing issues of preparation, attraction and retention (Recs 1-8); isolation

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and in-service professional learning (Recs 9-11); support personnel and resources for learning (Recs 13-19). **The AAMT reiterates its support for the Recommendations of the SiMERR National Survey.**

In addition to the recommendations of the SiMERR National Survey it is important to note that as the national association of teachers of mathematics, the AAMT – and its affiliates in all the states and territories – have significant potential to assist teachers and students in rural and regional locations. We can do this through accessing our extensive networks of committed professionals, and strengthening our contacts with key teachers in rural and regional locations. We can also work to make our existing programs more available through the use of ICTs. However, initiatives like this have a significant cost, especially when much of the work is done by already overstretched volunteers. Some targeted support for relevant national professional teacher associations is likely to result in a significant multiplication of effect on teachers' professionalism, their practices and student learning.

# Appendix 1

## About the Australian Association of Mathematics Teachers Inc.

The Australian Association of Mathematics Teachers Inc. was founded in 1966 as a 'federation' of mathematics teacher professional associations in the states and territories. The AAMT is the nation's pre-eminent professional association in school mathematics and numeracy education. It exists to:

- support and enhance the work of teachers;
- promote the learning of mathematics; and
- promote progress in mathematics and numeracy education.

The nature of the organisation has enabled the AAMT to play a significant role of national leadership in mathematics and numeracy education over many years.

### Membership

The Association's members come from all states and territories and all levels of government and non-government schools. They form an extensive network of committed and enthusiastic mathematics and numeracy education professionals including teachers, academics, policy leaders and administrators.

Currently the Association has approximately 5,500 members — 2,400 of these are individual teachers. The rest are Institutional members (schools), this giving the AAMT direct contact with more than 25,000 teachers and others.

### Governance and funding

The Council of the AAMT is the decision-making body (like the 'board of directors') The Council consists of two members from each state and territory, plus the Executive elected by the Council. The Executive has responsibility for the day-to-day conduct of the Association's affairs.

A secretariat of six paid staff (1.5 FTE 'professional'; 2.8 Administrative and Technical) works in the AAMT's headquarters in suburban Adelaide.

The AAMT is a not-for-profit organization with ATO charitable status. The Association is funded through membership fees and its other activities. There is no annual funding from any government. Average annual turnover is around \$1 million.

### Activities

Through the work of its many volunteer members and highly skilled staff, the AAMT provides a range of services for teachers and schools that includes:

- Three refereed journals (primary, middle school and senior secondary)
- Annual Activities that promote the learning of mathematics by students and teachers, including the *National Mathematics Day*, *National Mathematics Talent Quest* and numeracy activities as part of *National Literacy and Numeracy Week*.
- An extensive catalogue of teaching materials

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- Professional Development activities including electronic networking of teachers and biennial conferences.
- Projects to undertake research, and curriculum and professional development (see below for a listing of some relevant recent projects)

Since 1999 the AAMT's work on the development and implementation of advanced teaching standards in mathematics has been an important and valued contribution to the professional work of teachers of mathematics. This work continues to inform wider efforts in the area of teaching standards. The partnership with the Catholic Education Office of Melbourne for 2008-12 for the *Recognising Excellence* project (below) represents significant, high level recognition of this work and its potential to contribute to the professionalism of teachers.

The Association conducts national 'special interest' conferences that use current best practice in schools as the basis for developing policy and program advice for governments and others. These are *Students, mathematics and graphics calculators* (2000); *Springboards into numeracy* (2002); and *Quality mathematics in the middle years* (2005).

Significant current and recent projects include:

- *Turn the page: Mathematics and numeracy for Indigenous students* project (2009-12) to develop models of whole school practices that result in significant improvement in Indigenous students' achievement in mathematics and numeracy (funded by the Australian Government as part of the *Closing the Gap* initiative).
- *Recognising Excellence: Highly Accomplished Teachers of Mathematics* project (2008-12) in which the Catholic Education Office of Melbourne (CEOM) is supporting annual groups of up to 12 teachers to undertake the process for assessment against the AAMT *Standards for Excellence in Teaching Mathematics in Australian Schools* (funded by CEOM).
- *Online PD Project* (2009-10) to pilot and evaluate various approaches to providing and enabling professional development for teachers of mathematics at distance – through capitalising on internet and other electronic technologies (funded by the Australian Government as part of the *Digital Education Revolution* program).
- Two projects in collaboration with The Le@rning Federation (2008-9) – one to develop a suite of mathematically oriented digital resources with associated teaching support and another to develop around 30 classroom ready units of work that incorporate digital and other resources (funded by The Le@rning Federation).
- AAMT-SiMERR project to provide professional learning, leadership and infrastructure development for teaching mathematics in rural and regional Australia (2006-2008) (funded by the Science, ICT and Mathematics Education for Rural and Regional Australia [SiMERR] National Centre).
- *Mathematics? Why not?* project to investigate factors affecting students' decisions on study pathways in senior mathematics (2006-2007) (funded by the Australian Government through DEST)
- *Professional Learning Using the Mathematics Standards* (PLUMS) project (use of professional standards in in-school professional learning projects) (2005-6) (funded by Teaching Australia)
- *Teaching Standards Assessment Evaluation Project* (mechanisms for measuring and improving the quality of mathematics teaching, 2003-4) (funded by the Australian Government through DEST)

- *Excellence in teaching mathematics: Professional standards* project, a Strategic Partnerships with Industry for Research and Training (SPIRT) project undertaken by the AAMT and the Faculty of Education at Monash University (1999-2001) (funded by the Australian Government through DETYA)
- *Indigenous Students Achieving in Numeracy (ISAN)* project (1998-9) to examine and develop innovative teaching and assessment strategies (funded by DETYA)

For more information, go to <http://www.aamt.edu.au>