

Recipient Details

Name of organisation or individual: [O] The Australian Association of Mathematics Teachers Inc. (AAMT)

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Responses

Curriculum and assessment

needs to be better attuned to the needs of students in the 21st Century; assessment needs to be better aligned with the goals of education.

The contexts of communities and schools in regional, rural and remote Australia require greater flexibility in the content of the curriculum than what is currently exercised in many schools. Whilst the current Australian Curriculum purports to provide this flexibility, its implementation in many jurisdictions does not follow through. The upcoming review of the Australian Curriculum needs to seek views and direction on this matter. Building schools' capacity to make good decisions within an adequately flexible curriculum should be a priority.

Rating: 5

Teachers and teaching

AAMT takes the view that it is the strength of the teaching group that is the most important in-school determinant of student outcomes. Many factors are known to militate against strong teaching groups in many country locations, including early career teachers, out of field teaching necessary due to small school populations, transience of teachers.

In common with many of the jurisdictions, AAMT sees that the most effective location for teacher development and professional learning is in the schools themselves. The efforts of principals and other local leaders need to be supported by quality input from outside. AAMT is responding to this through the development of the Dimensions Portal of Mathematics Professional Resources. This will provide leaders and teachers in schools with high quality input on important topics in mathematics teaching and learning. The materials will be tailored to their needs, with as targetted support to provide the next best thing to having the experts working directly with them. The Association sees this as a game changing resource that will overcome the tyranny of isolation experienced by many teachers and schools in country Australia. In partnership with its affiliate associations in each jurisdiction, AAMT is determined to support the uptake of Dimensions materials and approaches in regional, rural and remote Australia.

Dimensions will be fully operational from 2018; it may provide a model for other curriculum areas.

AAMT is also critical of the piecemeal approach to the career structure in place for teachers in general, and mathematics teachers in particular. In our submission to the TEMAG inquiry in 2014, AAMT proposed a more coherent approach than the current sub-optimal situation – universities producing graduates and having little further contact, inadequate welcoming of graduates into the profession, lack of support and accountability for progressing in the profession. Teachers and schools in country areas would stand to gain significantly from a concerted and supported approach

to coherent support and accountability for teachers throughout their careers, especially in the crucial early years of a teacher's career where attrition runs at unsustainably high rates (up to 40% in the first five years).

Rating: 7

Leaders and leadership

In country schools, the term 'leaders' includes both principals and other 'positional' leaders, as well as other staff who 'step up' and take leadership responsibilities, often because 'there is no-one else'. Their collective efforts are critical to the well-being of the school, in particular to the improvements in quality of the work of the teaching group.

AAMT has no particular insights around the support required for principals in country schools, except to note that as they can often be in the early stages of being a principal when in these schools, some extra mentoring and support is clearly warranted. The Dimensions portal discussed earlier is directed at leaders in mathematics and numeracy. It will provide practical, high quality support for their leadership in the subject, thereby contributing to the quality of education and student outcomes.

Rating: 6

School and Community

AAMT supports efforts to engage schools, communities and industry in forming partnerships that lead to more connected curriculum and learning. In relation to school-industry partnerships the recent report of the Australian Industry Group (AIGroup; 'Strengthening School-Industry STEM Skills Partnerships') provides some principles and approaches that will be very valuable in this area.

AAMT has had significant experience in the past 20 years working on initiatives to improve mathematics learning for Indigenous students. In line with the findings of many others, we have clearly identified community connections as central to this work. It does require extensive and respectful consultation with community members, but the eventual pay-off is highly dependent on that investment.

Another finding that is as true for large population centres as it is in remote communities is the importance of engaging and involving Aboriginal assistant teachers (people who have many labels across the country) in the work. They are and can be powerful in connecting with the children around mathematics. Indeed, we have found, as have others, that investing in building their knowledge and capacity in mathematics leads to significant gains.

Rating: 5

Information and Communication Technology

It is well understood that for regional, rural and remote Australia ICT provides a key mechanism for provision of education to students. AAMT supports further development of effective practices as a matter of equity for these students.

The internet is also a key means for supporting teachers in their work through delivery of professional learning from the Dimensions portal and other providers. Further, the networking of teachers, whether formally as 'virtual faculties' or informally through groups of teachers virtually 'getting together' in groups for professional purposes provides important support for teachers. These means are both a way of encouraging and enabling teachers in country areas to work together as well as a way for country based teachers to work with colleagues in metropolitan areas. The latter

provides scope for supporting less experienced teachers in the country through contact with more established colleagues in formal and informal mentoring arrangements.

AAMT and its affiliates in the jurisdictions have experience and expertise in networking teachers of mathematics (e.g. the recent Connect with Maths project). This could be leveraged through collaborative, low cost initiatives with the education authorities in the states and territories.

AAMT often arranges online events (webinars etc.) out of school hours. This allows teachers to participate without interference with their teaching duties. This means that these teachers' homes need reasonable internet speeds and bandwidth, something that has caused problems in more remote locations – and some others – in the past. Ensuring all teachers in country areas, especially the more remote locations, have access to appropriate internet speeds and bandwidths from their homes would enable them to take advantage of professional opportunities at times that are suitable for themselves.

Rating: 6

Entrepreneurship and schools

This is not an area with which AAMT has much direct experience and expertise. In broad terms, it seems that the Discussion Paper sees entrepreneurship in schools as being underpinned by the so-called '21st century skills'. Another term in common use is 'soft skills'; the Foundation for Young Australia talks about 'enterprise skills'. Whatever the nomenclature, it is clear that the needs of young people today include these skills in order to participate effectively in society. Hence they need to be given increasing focus in their education. Students also need knowledge and skills in the disciplines (such as mathematics). Rather than these being seen as competing, AAMT prefers the notion that the 21st century skills be taught by adopting appropriate approaches to curriculum and pedagogy within the disciplines.

It is arguable that schools in country areas with a more established 'sense of community' will be better placed to take the lead in developing entrepreneurship, especially when based on strong partnerships with local industry and the community.

Rating: 4

Improving access – enrolments, clusters, distance education and boarding

This is not an area with which AAMT has much direct experience and expertise. 'Improving access' is something that AAMT strongly supports as a matter of equity. If opportunities arise to assist in this area the association would be happy to assist where it can.

Rating for enrolments: 5

Rating for clusters: 6

Rating for distance education: 6

Rating for boarding: 3

Diversity

Meeting the needs of all students is a significant challenge in Australian education generally, and no more so than in mathematics where traditional practice has tended to be relatively narrow. In one effort to address this, AAMT is working with the Australian Academy of Science on the reSolve: Mathematics by Inquiry project (funded by the Australian Government). The project is developing resources and professional learning for teachers. The reSolve Protocol provides the principles for the

project. One of the three elements of the Protocol is that mathematics tasks should be both challenging and accessible for all students. hence, uptake of reSolve resources and approaches will go some way to addressing diversity in classrooms.

The reSolve project is training a cadre of Champions (currently nearly 300) whose role will be to 'spread the word' and engage colleagues with reSolve after the development phase of the project concludes in mid-2018. A number of the current Champions are in non-metropolitan areas; a focussed and supported effort to recruit and train more Champions in country locations would be a practical way to support better and more inclusive teaching of mathematics. It would have minimal cost as a result of the model being used for the training.

This submission has mentioned AAMT's long record of work in the area of Indigenous students and mathematics. The Association is always open to opportunities to continue this vital work, based on what we know already about effective approaches.

Rating: 6

Transitioning beyond school

The project Identifying and Supporting Quantitative Skills of 21st Century Workers (AAMT and AIGroup; 2014) identified the mathematical demands placed on young workers in contemporary workplaces. It concluded:

"The application of mathematics in the workplace is not straightforward and goes beyond a command of 'core' or basic mathematical content. Workers perform sophisticated functions which require confidence to identify, use and apply mathematical skills in problem-solving situations and knowledge of the consequences of the procedures. Workers need a blend of the following:

- ability to recognise and identify how and when mathematics is used in the workplace;
- an understanding of mathematical concepts, procedures and skills;
- an understanding of the kinds of practical tasks they need to perform; and
- the strategic processes they should be able to use in using and applying mathematics."

(Tackling the School-Industry Mathematics Divide [Project Report Summary], p.1)

AAMT believes that this report and its recommendations has much to recommend it in the 'transitioning beyond school' space. Given that the discussion paper highlights this as a particular matter of concern for students in regional, rural and remote Australia, it may provide useful guidance to the Review. AAMT will be happy to elaborate further, and, ultimately to establish or support initiatives involving country schools that are based on the findings of the previous project.

Rating: 6

Additional Comments

This submission has mentioned a number of AAMT's current and previous initiatives that are seen to be relevant to the concerns of this Review. The format for the submission has restricted what can be said about this work; more detail can be provided on request.

It is acknowledged that much of this work has not had a specific focus on the education in mathematics of students in regional, rural and remote locations. However, it is unlikely that the work is not applicable in these settings. Some refinement and refocussing may be necessary, but

given the impetus that can come for the Review this would be warranted in order to build on work already in the public arena.

Finally, the AAMT acknowledges that its emphasis is on the mathematics education of our young people and that this is one part of the wider education enterprise. In many instances mathematics in schools has been seen as the 'hard nut to crack' in order to make progress. We would therefore argue that the Review needs to make mathematics a key part of the solution going forward; otherwise it will remain a part of the problem.