

Recipient Details

Name of organisation or individual: [O] The Mathematical Association of Victoria (The MAV)

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Responses

Curriculum and assessment

NAPLAN: Not supporting regional students and in fact has issues for many mainstream non-regional students as it is traditional in approach (eg time based, question based, not contextual to local needs).

Assessment -School based: allows for rich tasks and contextualized learning that can bring relevance to students.

Curriculum has most teachers focused on 'content'. Other elements of the curriculum allow for development of skills and thinking such as critical and creative thinking which are priorities in Victoria. But the curriculum does not mandate contextual approaches with rich tasks, and particularly at secondary school learning is still subject based. Therefore, secondary students in particular are not making the connections they potentially could across subject areas, within real world contexts. The emphasis on testing, such as NAPLAN, sometimes means focus is taken away from rich learning opportunities as these can be deprioritized for a testing focus.

Schools could be using more project based approaches that teach the skills and content in an integrated and enriching way and many students; regional or otherwise, are missing out on experiencing the true potential of education. It also leaves teachers more likely working by themselves, rather than with others across subjects. Community and business links that could be made are often negated also by a curriculum content focus. Imagine reconceptualising a teaching approach around the desired outcomes, not the content to be taught.

Proficiencies in the Curriculum (i.e. in mathematics; fluency, understanding, reasoning, problem solving) is also not a key focus of many schools, who focus on content, while they do not often understand how to teach proficiency.

That said, The MAV supports a curriculum that is not so prescriptive that it locks schools into a dedicated structure, allowing schools to find what works in their context and to innovate. Importantly, the content codes and dot points in the curriculum documents do not represent a mandated teaching sequence. Rather, they are a summary of what students are expected to have learned through their learning experiences.

Therefore, more support for how to best implement the curriculum is required, rather than changes to the curriculum itself.

Rating: 7

Teachers and teaching

Teach for Australia has had a positive impact on supplying some teachers to regional areas. The MAV supports such initiatives.

The MAV works with Schools that have trouble accessing qualified, experienced mathematics teachers in rural and regional areas using Victorian DET funding. The proportion of maths teachers that are not maths-trained is high in these schools. The Australian Council for Educational Research, Out-of-field Teaching in Australian Secondary Schools Policy Insights report (Issue #6, June 2016) demonstrates those out of field, and so lacking content and pedagogical content knowledge is between 30-40% for Year 7-10 teachers.

<https://research.acer.edu.au/cgi/viewcontent.cgi?article=1005&context=policyinsights>

The AMSI discipline profile demonstrates that at least 26 per cent of Year 7 to 10 maths classes don't have a qualified maths teacher <http://amsi.org.au/publications/discipline-profile-mathematical-sciences-2016/>.

There are also the policy suggestions that The MAV recommends are reviewed:

<http://amsi.org.au/publications/securing-australias-mathematical-workforce/>

A key focus of future initiatives should be to attract, train and retain experienced teachers working in their areas of expertise in rural and regional areas.

Most primary teachers are generalists, and require significant support to develop their expertise in teaching mathematics. Teachers leave university underprepared and The MAV's Professional Learning program and consulting in schools is focused on upskilling such teachers. Demand for this service is growing as demonstrated by the introduction of a Primary Mathematics Conference in mid-2017. Teachers in rural and regional areas have much less access to such events and a higher cost of attendance, and should be supported to attend and develop their professional networks and skill. Additional funds for regional schools to allow access to Professional Learning is required.

The cost for The MAV to take such programs to regional areas is much higher than delivering in metropolitan areas. Online learning can help, but does not offer the same opportunities as face-to-face. Associations such as The MAV should be supported to run their programs in regional areas to provide equal opportunities for teachers across the state. One approach could be to fund MAV to have staff in a regional office located in each of the departmental regions; across early years, primary and secondary.

Rating: 7

Leaders and leadership

The MAV supports leaders in schools in regional and rural areas, working with school leadership, including mathematics departments and numeracy coordinators, or various other mathematics leaders to implement whole school changes in how mathematics is taught. Through this experience The MAV understands that leaders in regional areas can feel alone and unsupported. Some leaders of mathematics departments that The MAV supports are themselves out of field teachers, making for a challenging environment.

In support of maths leadership The MAV has been creating networks across various parts of Victoria where opportunities arise. These networks bring together numeracy leaders from nearby primary and secondary schools to host events, and work together to improve outcomes. These networks require support, and funding some of which comes from The MAV. A strong supported network can have positive results including creating communities of practice and a feeling of being supported. There is a very interesting example of a similar approach in the North Coast region in Queensland. They are finding that not only are students showing the benefit of new lesson styles and structures,

but the teachers are flourishing in their experience of working collaboratively both within and across schools. <https://search.informit.org/documentSummary;dn=746584336133493;res=IELHSS>

The MAV believes that such approaches can help ensure that regional and rural teachers stay longer, and have development and collaborative opportunities during the year that allow them to be connected to the latest trends, advice and opportunities. Sustaining a networks takes time and effort. The MAV would like to expand its networks over time if it can resource this opportunity to support regional schools in Victoria. In an ideal world The MAV would have the resources to co-locate, near the Department of Education regional offices, two or three funded positions for mathematics education consultants. This would reduce the 'tyranny of distance' and be a visible expression of a commitment to regional centres.

Rating: 7

School and Community

The MAV runs various programs that link schools to the community. These include family Maths Nights and Students Games Days. The MAV has also supported the Victorian DET to take its Victorian Maths Challenge in 2016 to regional areas. This included running community based maths challenge events, bringing families together at school for an engaging and fun Mathematics based experience.

Most of the MAVs Student Games Days and Family Maths Nights are held in metropolitan areas, but there is demand for these in regional and rural areas. The issue for The MAV is how to resource and deliver these, given their higher cost both financially and in time.

The MAV sees positive results of these programs including a great appreciation of mathematics and engagement with the subject for its sake, helping to overcome the stigma of maths being hard. Given that mathematics develops core skills required for essentially all professions, it is important to work with communities to overcome their biases about mathematics, and ensure that mathematics is seen as an important and worthy subject.

The MAV would also like to expand its mathematics camp, and industry-related programs outlined under our response to theme 6.6 in regional areas, and for example run Girls in STEM days across the state. Such programs can bring schools and the community together including local industry, and engage students positively around career opportunities and the importance of continued learning at school.

A heartening example of a school working effectively with its community, under a fine leader in John Richmond, is Birchip P-12 School.

www.buloke.vic.gov.au/ArticleDocuments/327/Buloke_FactSheet_Career.pdf.aspx

Its instructional model is rich, relevant, collaborative and effective.

http://www.birchip.vic.edu.au/Instructional_Model.pdf

Rating: 7

Information and Communication Technology

The MAV believes that ICT has role to play in rural and regional schools, and that they should have equal access to devices, systems and online services as metropolitan schools. This is currently a significant barrier for many rural and regional schools. As AI and data services increase and are linked to learning, information will be able to be used to better inform approaches and individualise programs for students, providing improved learning opportunities.

The MAV also sees a role for ICT to be used for teacher development and ongoing learning in similar ways, and should be part of the toolkit available to regional and rural schools. The MAV offers a small number of webinars and online Professional Learning to help all teachers have access to such services regardless of location. The MAV plans to expand this service over time.

Information and communications technology, and all related digital technologies as they are now better known, are an enabler that should be considered carefully, and when used appropriately can add massive value.

Rating: 7

Entrepreneurship and schools

The most recent report from the Foundation for Young Australians, *The New Work Smarts, Thriving in the new work order* (<http://www.fya.org.au/report/the-new-work-smarts/>) released in July 2017 indicates that today's 15-year-olds will likely navigate 17 changes in employer across 5 different careers, and that automation is going to impact what we do in every occupation.

The report describes the type of skills required as 'enterprise skills', also known as 21st Century skills: transferable skills including problem solving, communication, teamwork and creative and critical thinking.

Programs must be delivered that develop these skills. As stated under the Curriculum and Assessment response, the curriculum does not ensure that programs develop these enterprise skills, and teachers can slip back to focussing on content and a step based approach to repetitive problem solving in mathematics. One way that the MAV has been supporting success in this area is through industry links.

The MAV runs programs including a Girls in STEM day with industry speakers. The MAV also runs a mathematics camp funded by the Victorian Department of Education and Training under the Strategic Partnership Program (2015 to 2017). The mathematics camp brings together high potential rural and regional students to experience what a career in some of the most exciting organisations in the STEM industry look like.

Students work in groups to find a possible solution to a problem. They receive mentoring by mathematicians and industry representatives and develop their presentation and solution as a team, developing entrepreneurial skills. The open-ended projects stretch the application of mathematics past students' usual experience and challenge them to come up with innovative solutions. The week culminates in students presenting their findings to industry partners, invited guests and parents. All participants visit each industry partner's facilities, and are exposed to mathematicians and STEM-based career opportunities providing motivation for future studies.

These programs linking with Industry have demonstrated the value that comes from schools working with industry, to directly demonstrate to students how the mathematics they learn in school can be applied to the workplace, in real world contexts. The MAV hopes to continue and expand such valuable programs.

Rating: 6

Improving access – enrolments, clusters, distance education and boarding

As explained, The MAV believes that to expand the opportunities available to regional, rural and remote students to access high quality education involves firstly developing teacher's capacity,

having teachers who are experienced in their teaching subjects and providing them opportunities to continually develop by improving access to networks and Professional Learning opportunities.

The MAV also believes that having equitable access to adequate technology including infrastructure so that limitations of geography can be overcome is important in relation to improving access.

Rating for enrolments: 5

Rating for clusters: 7

Rating for distance education: 4

Rating for boarding: 4

Diversity

As the national and international data shows clearly, the issues facing regional communities are magnified in remote locations. A necessary pre-condition to meeting their needs is that there must be a bi-partisan commitment to the proper application of the Gonski principles for school funding.

Rating: 7

Transitioning beyond school

The Victorian Department of Education and Training alongside VET courses and certification, also offers a VCAL (Victorian Certificate of Applied Learning- <http://www.vcaa.vic.edu.au/Pages/vcal/index.aspx>). The MAV recently consulted on the re-development of the curriculum for the Numeracy component of this course, and believe it takes a strong approach to ensuring students are developing relevant workplace skills in numeracy and mathematics. This is achieved in VCAL through contextualized learning of mathematics, within industry based contexts and ones that are specifically related wherever possible to student interests. As stated by the Victorian DET, 'The Victorian Certificate of Applied Learning (VCAL) is a hands-on option for students in Years 11 and 12. The VCAL gives you practical work-related experience, as well as literacy and numeracy skills and the opportunity to build personal skills that are important for life and work.'

The VCAL course is a unique opportunity for the whole of Australia to learn from this initiative that is all about preparing students for school to work transition and linking to industry. The courses measure the 'gain' students make, and preparedness for the workplace. The program includes information for employers taking VCAL students into the workplace, to support school to work transition. If this program is used in regional areas and linked to local employers and industry there may be some opportunity to retain students in local areas as they transition to the workforce.

The MAV's work in linking with industry has had positive impacts in relation to the experience and information that students get around the real world of work. The MAV supports the work of AMSI (Australian Mathematical Sciences Institute) who also produce materials for showcasing and raising awareness of careers in mathematics. The MAV is now well placed to produce such materials subject to funding opportunities. It is a vital part of the work required to demonstrate to students the opportunities available in STEM generally.

The MAV encourages and recommends investment in this area, to help ensure parents and students are better informed of the opportunities in career areas that are the future of our economy.

Rating: 7

Additional Comments

The Mathematical Association of Victoria (The MAV).

The MAV also supports the AAMT submission to this inquiry.

The Mathematical Association of Victoria is an innovative membership driven association. Through its programs and services, The MAV promotes the importance of mathematics to society. Our Association has over 1400 members from all sectors of education including individuals, schools, universities and other institutions. The MAV reaches up to 17000 people through its newsletter. The MAV has been an active not-for-profit professional Association for more than 100 years.

The MAV supports its members by working with experts including leading academics, education consultants, exemplary classroom teachers, the Victorian Department of Education, The Victorian Curriculum and Assessment Authority (VCAA) and industry partners to provide professional learning, resources and advocacy in the interests of members and the wider community. This highly respected, proactive professional association fosters the promotion of mathematics education.

Core Statement: Valuing mathematics in society

Mission Statement: The MAV is a membership driven association which provides a voice, leadership and professional support for mathematical education.

The MAV is an Affiliate of the Australian Association of Mathematics Teachers (AAMT).

www.mav.vic.edu.au