

VALUING MATHEMATICS IN SOCIETY: A DISCUSSION PAPER

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OVERVIEW

The Mathematical Association of Victoria (MAV), has been a leading contributor to mathematics education in Victoria for over 100 years. In recent decades its key concern has been to support teachers of mathematics in their practice, through the provision of high-quality professional learning opportunities, student activities, teaching and learning resources, annual conferences and other valued programs and services.

VALUING MATHEMATICS IN SOCIETY

MAV is a membership-driven association that provides a voice, leadership and professional support for mathematics education.

MAV works within an evolving context, and at a crucial time in education:

- Education is changing, and MAV must lead the way in supporting mathematics educators to have the best impact possible.
- The mathematics curriculum needs to respond to these changes: from the VCE and VCAL to the early years of school, including kindergarten.
- Teachers require professional support and resources to develop in students the numeracy capabilities needed in their personal, professional and civic life.
- It is critical that students are prepared for life after school, progression to further study and for career pathways in a world that is data and information rich and technologically advanced.

A CALL TO ACTION

The following pages outline areas for discussion and action within four broad categories:

- Society and government
- School leaders
- Teachers as individuals and team members
- Students and families.

These focus areas are sourced from member surveys and feedback, Board discussions and other contributors.

This paper will elaborate on the selected areas as a discussion starter, identifying areas where together we can advance mathematics education in Victoria for the decades ahead.

Further papers that take a deep dive into specific areas will follow over time. This will allow stakeholders to engage in considered debate and action where required.

WE VALUE YOUR RESPONSE

MAV would like to hear your thoughts about the content of this paper and the areas identified for action. After reading this paper please head online to complete a short survey, providing your feedback to help inform our next steps.

Can you spare 4 minutes? Complete MAV's survey before 31 October 2019:

<https://www.surveymonkey.com/r/mavpp>

SOCIETY AND GOVERNMENT

Mathematics is integral to the prosperity of society, including the current STEM agenda.

Positive perceptions of and engagement with mathematics must be a priority for government and the community. MAV is working to deliver on its vision of 'Valuing mathematics in society', which is always front of mind. This includes addressing disadvantage in education and providing opportunities for all to achieve their potential.

Policy decisions need to be informed by a proper understanding of what is happening 'on the ground' in schools. MAV maintains positive working relationships with the Victorian Department of Education, the Victorian Curriculum and Assessment Authority, the Australian Associations of Mathematics Teachers (AAMT) and other parties. MAV must continue to use these relationships to share and advance the views of its members and educators, in order to facilitate positive advances in mathematics education.

MAV works with government authorities to develop appropriate and high-quality resources and programs for numeracy and mathematics to support school leadership, teaching and learning.

MAV upholds the profession and looks for ways to enhance its standing. Teaching is a professional career, requiring a host of attributes for success. We must ensure society values teaching as a career and strive to enhance teacher status. We must find ways to recruit, retain and develop the best teachers.

'Maths first – maths as the language of science. Maths as the language of progress! Maths as the pre-requisite for learning, and for life'. - Dr Alan Finkel, Chief Scientist⁵

Areas for action

- Developing positive perceptions of mathematics and its capacity to enhance societal well-being including personal and economic prosperity
- Creating opportunities for all students, teachers and members of society to experience mathematics positively
- Supporting STEM and career opportunities and readiness
- Building mathematical literacy for society, such as algorithmic thinking, problem solving, financial skills and numeracy for life.
- Ensuring effective attitudes to and regulation of University prerequisites, ATAR, and recommended mathematics subjects
- Developing appropriate perceptions and use of PISA/ TIMSS, NAPLAN and other system level and comparative testing data
- Developing new curriculum, assessment, pedagogy and resources to support change and policy
- Enhancing teacher status and recognition of the teaching profession
- Recruiting, retaining and developing the best teachers, recognise and reward excellence and growth.



SCHOOL LEADERS

School improvement requires school leadership to continually review and assess their practices. It also requires an understanding and application of evidence-based practices that enhance learning outcomes in mathematics.

There are many exemplars showing best practice, innovation and stories. MAV facilitates opportunities for sharing best practice and stories of change through conferences and events.

Such opportunities allow schools and leaders to share their successes and challenges, and strengthen their understanding of what works well in different contexts. In turn, this facilitates the building of networks and communities of practice.

MAV provides formal whole school development programs, involving school leaders and utilising evidence-based approaches. MAV consulting gives schools direct access to leadership expertise, and objective professional advice to support school improvement plans.

'Maths has got to be a priority for every student, from kindergarten to graduation'.

- Dr Alan Finkel, Chief Scientist⁵

Areas for action

- Providing the tools to lead whole school change, measure success, and create collaborative professional learning communities
- Utilising principals as resource providers for 21st Century learning: collaboration, problem solving resilience, critical and creative thinking
- Ensuring that mathematics leaders, careers counsellors, and mathematics teachers consider mathematics subject selection in relationship to both the ATAR and ensuring students are prepared well for mathematics success in tertiary courses and careers
- Building collegiality: faculties working together to ensure shared goals and success
- Reducing variation within and between schools by providing equitable support and opportunity for all learners
- Supporting the implementation of new curriculum, assessment and pedagogical changes
- Providing a variety of opportunities that support professional learning, networking and sharing of best practice leadership.



TEACHERS AS INDIVIDUALS AND TEAM MEMBERS

We must focus on the development of teacher capability, provide the best possible tools and access to opportunities for growth.

Working together and sharing ideas is essential to developing teacher practice that meet the needs of all learners. When teachers are given the time and the trust to collaborate they grow professionally and personally, leading to better outcomes for their students.

We must ensure that teachers of mathematics have a deep understanding not only of the curriculum, but also of the process of designing learning programs and the pedagogical approaches that will best communicate the ideas behind the curriculum.²

The TEMAG⁴ report 'Action Now, Classroom ready teachers', indicates that primary teachers were challenged in confidently teaching certain areas of the curriculum including mathematics.

'Out-of-field' teaching is far too common in our schools as indicated in the 2018 AMSI³ paper, and seems to involve a disproportionate number of early career and regional teachers. Support is required to ensure students learn alongside experienced mathematics teachers.

Teachers must assume ownership of their own professional learning journey. They must have the opportunity to select professional learning relevant to their needs at each point in time in their career. MAV delivers successful and evolving models for both in and out of school professional learning responding to the needs of teachers and schools. MAV also provides conferences and events for networking, showcasing innovation and sharing best practice.

There are a myriad of new programs, requirements, publications, resources and websites that offer advantage in the mathematics education space. It is challenging for teachers to keep up with all of these developments. MAV evaluates selected resources and programs, providing guidance to members through its resources, website and newsletters.

'That is the role of the teacher: to make the subject not just compulsory, but compelling'.

- Dr Alan Finkel, Chief Scientist⁵



Areas for action

- Helping educators create and maintain effective collaborative professional learning communities within and across schools
- Providing a variety of opportunities that support diverse professional learning opportunities, networking and sharing of best practice
- Developing teachers as reflective practitioners: using evidence-based improvement and data to make decisions
- Allowing teachers control of their professional learning journey based on their developmental needs
- Equipping teachers with the tools to support best-practice delivery of curriculum, assessment and feedback, personalised learning and other new opportunities
- Supporting effective pedagogy including differentiation and individualisation, and use of digital technologies to enhance students' experience and promote positive mindsets towards mathematics
- Supporting the needs of out-of-field teachers
- Supporting the development of numeracy across the curriculum

STUDENTS AND FAMILIES

At the heart of education are the students and their families. When students feel good about themselves as learners they are more likely to choose suitable mathematics courses at Years 11 and 12, and thereby open up rewarding opportunities via their post-school studies.

Parents and students need to develop positive mindsets towards mathematics from the early years onwards. MAV has strong industry and workplace links in order to prepare students for future careers including STEM, and to help teachers apply real life contexts to engage students.

MAV provides information and events that contribute to student success and engagement, including engaging with students of high potential.

MAV's 'Maths Active' Accredited Schools engage with the community, and demonstrate best practice approaches to teaching and learning. They are showcase schools that encourage improvement, and recognise excellence.

'Some children seem to fall in love with maths at birth and ... are hungry to be taught. Others need help to turn an arranged marriage with maths into a genuine passion'.

- Dr Alan Finkel, Chief Scientist⁵



Areas for action

- Providing the right approaches at Early Years, a critical time for educators and parents to ensure students get a good start
- Maintaining engagement at transitions: from early childhood to primary, secondary, VCE/VCAL/VET, tertiary, the workplace and through other pathways
- Supporting parents and students with appropriate and accurate information for course and career decisions
- Challenging and supporting all students and providing opportunities for engagement and success through appropriate pedagogies, and real-world applications
- Developing appropriate support and programs for high potential students
- Engaging with the public to develop positive mindsets towards mathematics
- Ensuring students develop the mathematics and numeracy required for success in their personal, professional and civic life.

REFERENCES

1. AITSL Standards www.aitsl.edu.au/teach/standards
2. ACER: www.teachermagazine.com.au/columnists/andreas-schleicher/elevating-the-teaching-profession
3. AMSI: Crunching the numbers on out-of-field teaching <https://amsi.org.au/media/AMSI-Occasional-Paper-Out-of-Field-Maths-Teaching.pdf>
4. https://docs.education.gov.au/system/files/doc/other/action_now_classroom_ready_teachers_accessible.pdf
5. Dr Alan Finkel www.chiefscientist.gov.au/wp-content/uploads/MERGA-speech.pdf

MAV: SUPPORTING THE PROFESSION

There are many different dimensions to the relationship between a professional association and its members. The Australian Professional Standards for Teachers set out the expectations of the profession as shown in the table below¹.

MAV provides programs that support all aspects of these standards.

Domains of teaching	Standards	Annual conference and Primary and Early Childhood conference	Professional Learning events, regional network days	VCE Professional Learning program	Professional advice	Professional and classroom resources	In-school consulting	Maths Collaborative 2 year program	Maths Active schools	Maths Talent Quest	Maths Games Days	VCE Revision lectures	Girls in STEM, industry based maths Camps
Professional knowledge	1. Know students and how they learn	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
	2. Know the content and how to teach it	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Professional practice	3. Plan for and implement effective teaching and learning	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
	4. Create and maintain supportive and safe learning environments	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
	5. Assess, provide feedback and report on student learning	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Professional engagement	6. Engage in professional learning	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	7. Engage professionally with colleagues, parents/carers and the community	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓