# AAMT position paper on Digital Learning in School Mathematics

The Australian Association of Mathematics Teachers Inc.

## Digital Learning

### Preamble

This position paper is for parents and teachers of mathematics. In this document, "digital" refers to technologies such as graphics calculators, computers, iPads, mobile devices, tablet computers, 3D printing, internet and future developments in computer software and hardware. Acknowledging that there are rapid advances in technology, it is intended that this policy, dated 2014, will be revised within five years.

Digital learning supports and can provide feedback on personalised learning of students in school mathematics at all levels. The responsible use of relevant technologies by students is a significant contribution to enhancing the skills of all members of Australian society, with information and communication technologies as human-centred means of enhancing our personal and working lives. Access to technologies in school mathematics raises important issues for curriculum design, teaching, and assessment of learning, and for the capacity of schools to provide and support the use of such technologies.

Social networking tools and online learning in virtual environments are important parts of teaching and learning in mathematics. Classrooms are beyond school walls and this impacts on pedagogies and student learning styles. The web platforms offer opportunities for collaboration, and the proliferation of resources on the internet requires students to make critical judgements on the accuracy of information.

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## Why is their use valuable?

Many of the potential benefits have already been realised in Australian classrooms. Overall these are exemplars of the mathematics classroom as a 'community of inquiry'. The use of technologies has been a catalyst for pedagogical change. When technologies are used intelligently, classrooms are examples of world class teaching and learning of important mathematics. Technology affords a diversity of teaching and learning styles and in particular allows mathematical ideas to be explored visually.

In these classrooms:

- the curriculum is characterised by challenging and relevant learning experiences, rigour and suitable emphasis on process ;

- teaching and learning are characterised by approaches that include investigation, using real world data to bring the world into the classroom;

- modelling and simulation are used to enable students to ask "what if?" questions, to predict changes then check their predictions;

- students are engaged in individual and collaborative modes of working and there is an emphasis on developing an understanding of mathematics as richly connected concepts. The use of technologies encourages and enhances these processes, enriching the learning of the students who engage in them.

## Technologies and their use

It is recommended that:

1. All students have ready access to appropriate technology and the associated virtual learning environments and communities that support and extend their mathematics learning experiences.

2. Teachers at all levels are actively involved in exploring ways to take full advantage of the potential of technology for mathematics learning within the total curriculum. Professional learning should focus on new pedagogies for teaching mathematics

3. Students will be assessed in their understanding of mathematics both with, and without, digital technologies; and in their awareness of when to choose to use digital technologies

4. Education authorities make available to teachers, professional development opportunities to support the development of knowledge and skills necessary for the successful use of technologies in classrooms.

## Equity

All students should have access to tools which enhance the learning of mathematics. In the case of technologies, this means that students should have appropriate access at all times.  This includes access whilst at school and outside school hours, so that students can take advantage of 'blended learning', a combination of learning face-to-face and online. Additionally, students need teachers who are competent and confident digital users of technologies. All students need access to relevant virtual learning environments and communities.

## Teacher Support

Teachers' knowledge and skills are acknowledged as the most important influence on student learning. Hence, the advantages to students' learning through using technologies will be maximised when there is sustained, multifaceted support for teaching and teachers' professional growth.

Teachers are most influenced when they are active participants in approaches which enable the sharing of exemplary classroom practice through:

- materials for learning and assessment;
- applied and classroom based research;
- ongoing professional development processes which respond to needs as they are identified;
- collaborative online mathematics communities with access to local and global education and industry experts, mathematicians, mentors in mathematics, and opportunities for authentic learning.

Supporting the extensive teacher development that is needed for the widespread use of technologies in mathematics teaching and learning is a priority this will contribute significantly to a major reconstruction of mathematics as experienced by our young people in the 21st century.

## Curriculum Development

Teachers and educational leaders will be involved in:

- critical review of content and sequencing; and
- curriculum design that takes explicit advantage of available technologies for learning, doing and communicating mathematics, as well as learning across the curriculum.

## Through enhanced approaches to learning and teaching, teachers and educational leaders

- Develop and disseminate examples of rich learning experiences which incorporate effective use of technologies to assist teachers in creating engaging, dynamic and productive learning environments.
- Enable technologies to be used in ways which enhance classroom interactions and dynamics.
- Develop strategies to enable students with different learning styles to take advantage of the multi-representational nature of technologies.
- Promote models for integrating use of technologies into teaching and learning goals and processes which emphasise conceptual understanding.
- Emphasise the importance of students becoming critical users of technologies calculators through explicit teaching goals and strategies.

## Through enhanced approaches to assessment, teachers and educational leaders

- Exploit the use of technologies to support the assessment of the full range of curriculum goals.

- Ensure that technology used in assessment processes reflects their use in the classroom.

- Contribute to the research and development of more effective assessment processes.

## Conclusion

The use of digital technology can enhance student learning.  It is important that technology is a part of student classrooms and shows that mathematics learnt at school is relevant and prepares students to be active participants in their communities.

## About AAMT

The Australian Association of Mathematics Teachers, founded in 1966, is the nation's premier organisation of mathematics educators. It aims to:

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

AAMT is a federation of eight associations of teachers of mathematics from each Australian State and Territory and has approximately 5000 individual and institutional members. AAMT actively serves the needs of members and others in the mathematics education community.

To become a member of AAMT, you must join one of its affiliated State/Territory associations (annual membership); you are then automatically a member of AAMT and can take advantage of the services and discounts that the Association has to offer.

For more information about AAMT go to: www.aamt.edu.au

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