Submission

Subject:	Education and Training Workforce Study – Vocational Education and Training
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About the MAV

The Mathematical Association of Victoria is a membership driven professional teacher association which provides a voice, leadership and professional support for mathematical education. Its principle statement is *valuing mathematics in society*. Its mission is *the continuous review and improvement of mathematical education and the professional teachers of mathematics*. The Mathematical Association of Victoria does this by:

- being a leading voice in mathematics education,
- supporting mathematics teachers and educators,
- listening and responding to members and the broader mathematics community about their professional needs,
- celebrating excellence in mathematics education,
- defining the profession of the mathematics educator,
- promoting best practice in mathematics education,
- influencing policy and practice in mathematics education, and
- promoting the importance of mathematics in careers and daily life.

Background

The Mathematical Association of Victoria (MAV) first met in July 1906. Its charter then, as it is today, was the development of mathematics and the mathematical sciences in Victoria through education, demonstration, promotion, support for research and cooperation with the great educational institutions of the age such as the University and the thirty-eight year old Education Department.

The Association has since developed over time into a large professional teacher association with over 1,600 institutional and individual members in schools in all systems across Victoria and provides a voice, leadership and professional support for mathematical education. 63% of members are based in Greater Melbourne, 37% in regional Victoria. 68% of members are based at State schools, 19% in the Catholic system and 13% from independent schools. 52% of members work at the primary school level, 46% at the secondary level with the remainder at TAFE and universities.

The MAV is a not-for-profit company limited by guarantee. A Council elected on an annual basis by members governs the MAV. The Council meets monthly and is advised by seven committees. The Councillors and a staff of eleven work together to plan and deliver specific services to members, such as professional learning programs; publications; public lectures; student enrichment activities like VCE revision days, camps, games days and project based quests; an annual metropolitan conference attended by over 2,000 teachers; a regional conference attended by over 300 teachers; policy development and advice to members, Government and the Victorian Curriculum and Assessment Authority; and advocacy and information services.

Over the past three years almost 9,000 teachers have participated in the many and varied mathematics and numeracy orientated professional learning programs offered across the State by the MAV and each year just on 17,000 students have participated in mathematics education activities arranged by the Association. The profile of these participants generally reflects the membership profile quoted above, that is, as an example, over 65% of all teachers and students participating in MAV activities and programs came from State schools.

The importance of numeracy and Mathematics

The MAV would like to bring to the attention of the Commission the role and importance that numeracy and mathematics plays in both the in the VET sector and the wider Australian community. This role is often not recognised or acknowledged in terms of policy or programs.

The importance of numeracy and mathematics was recognised in the COAG National Numeracy Review Report: "*Our review of national and international research and practice informs us that the mathematical knowledge, skill and understanding people need today, if they are to be truly numerate, involves considerably more than the acquisition of mathematical routines and algorithms, no matter how well they are learned. Students need to learn mathematics in ways that enable them to recognise when mathematics might help to interpret information or solve practical problems, apply their knowledge appropriately in contexts where they will have to use mathematical reasoning processes, choose mathematics that makes sense in the circumstances, make assumptions, resolve ambiguity and judge what is reasonable.*" (COAG, 2008).

The Adult Literacy and Lifeskills survey (ALLS) was conducted in Australia by the Australian Bureau of Statistics (ABS) in 2006 and early 2007 and the first results were released in November 2007 (ABS, 2007). The data and results provide a broad perspective of the assessed literacy and numeracy skills of the Australian adult population against a wide range of factors and perspectives. In terms of numeracy, there were almost 8 million adults (52.5%) considered to not have the skills necessary for work and life in the 21st century. The data shows that these adults are the ones most likely to need to access further education and training, which will mainly be through the VET sector.

The Australian Industry Group (AIG) National Workforce Literacy Project (AIG, 2010) recently released a report which considered the impact of these low literacy and numeracy levels on the workplace. A key finding in the report was that more than 75% of employers who responded to the AIG survey reported that their businesses were affected by low levels of literacy and numeracy. The survey also revealed that 45% of employers nominated labourers and process workers as the occupational group most affected by low levels.

The recent Skills Australia report *Australian Workforce Futures* also emphasised the impact of the lack of foundation skills - language, literacy and numeracy. The report recommended that the Australian Government develop and implement a national adult language, literacy and numeracy strategy. The report also states: "*We need also to ensure education and training providers have the skills and networks to identify and address these core skill needs*" (Executive Summary p. 4).

There are also now a number of studies that have analysed the way that mathematics or numeracy competence of adults impacts in an economic and social capital sense or how mathematics or numeracy skills are used in the workplace (although this field of research is new and underdeveloped).

In one such research report, *Does Numeracy Matter?* (Bynner & Parsons, 1997), and in their 2005 follow up study (Bynner & Parsons, 2005), the researchers found that poor numeracy skills did have a major impact on an adult's life. Their reports also point out that numeracy potentially plays a stronger role than literacy. Literacy has often taken the lead and been given priority over numeracy in policies, programs and practice. Some of Bynner and Parsons statements in relation to their research include:

> People without numeracy skills suffered worse disadvantage in employment than those with poor literacy skills alone. They left school early, frequently without qualifications, and had more difficulty in getting and maintaining full-time employment. The jobs entered were generally low grade with limited training opportunities and poor pay prospects. Women with numeracy difficulties appeared especially vulnerable to exclusion from the clerical and sales jobs to which they aspired (Bynner & Parsons, 1997, p. 27).
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> For women, while the impact of low literacy and low numeracy is substantial, low numeracy has the greatest negative effect, even when it is combined with competent literacy. … Poor numeracy skills make it difficult to function effectively in all areas of modern life, particularly for women. (Bynner & Parsons, 2005, p. 7)

Recent NCVER research also highlights the importance of numeracy as an essential workplace skill. Two such reports challenge the training system and training organisations to provide numeracy training which makes links directly to workplace contexts as well as to mathematical concepts (Learning numeracy on the job: a case study of chemical handling and spraying (FitzSimons et al. 2005) and Thinking beyond numbers: learning numeracy for the future workforce (Marr & Hagston 2007)

This research indicates that numeracy and mathematics skills are crucial skills and underpin much learning and training across the VET sector and yet the above research indicates that adults', and hence many potential or existing VET students' numeracy abilities and skills are extremely low.

The MAV would therefore like to ask that the Commission seriously consider in its research, findings and recommendations the significant and crucial role that numeracy and mathematics plays in relation to issues impacting on the VET workforce. The MAV believes that addressing how to improve the numeracy and mathematics outcomes of participants in the VET sector has the potential for significant economic and social benefits for Australia.

Below are some specific comments in relation to some of the key factors being addressed by the Commission.

Factors affecting the current and future demand for the VET workforce, and the required mix of skills and knowledge:

The research quoted above means that the demand for the VET workforce to have skills, knowledge and understanding of the roles that numeracy and mathematics plays is crucial in terms of current and future demand for the VET workforce, and the required mix of skills and knowledge of professionals working in the sector. It is our belief that the understanding and skills of the current VET workforce in relation to mathematics and numeracy is well below that which is desirable, and needs to be explicitly addressed and supported in policy and program terms.

Even in relation to existing programs such as the Federal Workplace English Language and Literacy (WELL) program, which has recently been expanded, there is a need to promote numeracy and mathematics as at least an equal partner to literacy and language as the majority of delivery and resource development in WELL in the past has had literacy and language as the main focus.

The current and future supply of the VET workforce

In early 2003 the MAV embarked on a research project which in part looked at mathematics teaching within the teaching workforce in the VET sector, including TAFE and ACE providers, in Victoria (Street Ryan, 2003). This study found that it was hard to locate teachers of mathematics and/or numeracy in the sector, they were often teaching in other courses. A significant proportion of the numeracy and maths TAFE/VET teachers interviewed felt isolated, and under-resourced in their mathematics teaching role. They had concerns over several issues associated with teaching mathematics in the TAFE/VET sector. The main issues of concern raised and found were:

- students not having pre-requisite maths competencies
- curriculum packages not having sufficient guidelines
- limited opportunities for professional development.

A major issue in relation to mathematics and numeracy teaching in general is the shortage of qualified maths and numeracy teachers. It is well known that in the school sector more and more teachers without appropriate preparation in mathematics are taking maths classes especially in the junior high school years. This is also the situation in the VET sector where it may be even more exaggerated as many teachers of subjects and courses which include numeracy and mathematics are not trained at all in the teaching of mathematics. This shortage of qualified maths teachers across all education sectors is an urgent issue that needs to be addressed.

Another related major issue in relation to teaching and training in mathematics and numeracy in the VET sector is the inadequacy of support of high-quality professional practice, which includes a lack of practitioner qualifications and teaching and training standards for practitioners across all VET sectors.

There have only ever been sporadic opportunities for training in the teaching of adult numeracy or mathematics within VET, often dependent on Federal Government initiatives. We argue that all VET teachers should be able to identify student's skills in numeracy and mathematics, and have the pedagogical knowledge and methodology to develop these skills. In many courses maths skills will be a fundamental and underpinning component of the course being taught. There is the need to support all VET teachers to learn numeracy and mathematics content and pedagogy knowledge. This could vary from basic level maths skills related to, for example, numbers, measurement and location and direction applicable to a

wide range of courses such as hospitality, retail, construction etc through to much higher level maths skills in trade and technical courses in areas such as electro-technology. In this latter case students need access to qualified teachers and trainers with an understanding of the underpinning maths skills and empathy for explaining and demonstrating the real-world applications of mathematics. At present VET teachers need to only have the Certificate IV in Workplace Training and Assessment (TAA) to teach accredited courses, and the only literacy and numeracy Unit in the TAA is an optional unit. This could at least be made compulsory in order to support the core need for all VET teachers to have an awareness of, and at least some skills in identifying student's skills in numeracy. Much more maths based and focussed courses need to be made available however.

The newly accredited Vocational Graduate qualifications in Language, Literacy and Numeracy in the new Training and Education Training Package (TAE10), which have outcomes similar to those undertaken at a Bachelor degree level, are the Vocational Graduate Certificate in Adult Language, Literacy and Numeracy Practice and the Vocational Graduate Diploma of Adult Language, Literacy and Numeracy Leadership. These courses, which include core numeracy units, are example of training courses that provide a solid foundation for a range of VET teachers and trainers to teach numeracy and maths as part of VET courses and should be considered by the Commission in their consideration of how to upskill the VET workforce in relation to numeracy and mathematics. The main issue to be addressed though is how VET teachers and trainers can be supported to access such courses.

The MAV believes that numeracy and mathematics, for the range of reasons outlined above, needs to be explicitly addressed and made key components of any future programs to support the VET workforce in Australia.

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