20 October 2003

Senator George Campbell
Parliament House
Canberra ACT 2600

Dear Senator,

Re: Employment, Workplace Relations and Education References Committee

Thank you for the opportunity to provide information in regard to the matters referred to your Committee in October last year. The comments I will make largely relate to generic, core skills that all young people need if Australia is to have a flexible, skilled workforce. Key to these is literacy but this is closely followed by mathematics.

The Australian Mathematical Sciences Institute has a commitment to improving the mathematical sciences in Australia whether in education, research or industry. AMSI believes that all young people in a modern, technology-driven world need quite high levels of mathematical knowledge to fully participate in work and manage their everyday lives.

In the modern world, jobs are not for life. Post-compulsory schooling, whether in the TAFE/VET sector or in the universities, needs to equip young people to cope with changes in the world of work. There are core skills that people need to cope with workplace and career change and fundamental are high levels of literacy and a sound grounding in mathematics.

In examining the need for particular skills for Australia, care needs to be taken to ensure that these are not short-term measures fitting young people for immediate needs but paying scant attention to whether they will be equipped for the jobs of the future. A good example of what this means is a motor mechanic—it is not that long ago that many people felt competent to undertake most repairs themselves. The modern car is now a complex piece of machinery that requires complex tools and knowledge if it is to be properly maintained.

The level of literacy required by any given trade or profession can often be judged by the trade and professional journals or manuals that are associated with it. While there has been a shift to icon driven menus that are sometimes less dependent on words in many situations, more complex instructions and procedures invariably involve advanced literacy skills. In the workplace, inadequate literacy skills can be a major issue in occupational health and safety.

Further, the advent of computers has not lessened the requirement for mathematics. Rather the world has become more mathematical and, while computational skills may be less needed, understanding of mathematical and statistical concepts has become more important.

Further, in the real world mathematics is often embedded in text. One of the least understood aspects of reading and mathematics, is that extracting mathematics from text and translating it into a

111 Barry Street
Carlton South

Mailing address:
c/- The University of Melbourne
Victoria 3010

Tel. +61 3 8344 1771
Fax +61 3 9349 4106
http://www.amsi.org.au

form where calculations can be completed is far more complex than reading prose or solving a numerical problem as it draws on both literacy and mathematical knowledge.

Further, poor literacy or mathematical skills can have a serious effect on young peoples' self-esteem. Rather than dealing with these skills there is a tendency to see VET or other vocational training, including apprenticeships, as a solution to employment for these young people. Within these programs, further development of literacy and mathematics is often inadequate. As a result they may show considerable competence and confidence in the practical aspects of their courses or apprenticeship but fail to complete when once again confronted with their weaknesses in fundamental skills.

LITERACY AND MATHEMATICS IN POST-COMPULSORY EDUCATION

Far too many young people go on to university with inadequate literacy and mathematics. The failure rate in courses where mathematics is compulsory tends to be higher than when it is not. However, the mathematics is not required for trivial reasons—it is usually fundamental to other aspects of the course. The school system, and a lack of clear definition of the pre-requisites from the universities, can accept much of the blame for mathematical under-preparation in the universities.

In the VET/TAFE/Apprenticeship area it is essential that there be an acceptance that literacy and mathematical skills must be built into programs. However, much more could be done earlier in schooling to spell out for young people the literacy and mathematical needs of various components of the labour market.

It must still be accepted that in this sector there are many young people going into courses because they are failing academically because of poor literacy and mathematical skills. They often enter courses where these weaknesses do not become immediately apparent. Further, the training packages approach has led to a fragmented curriculum where core, underlying skills are often not developed.

Above all, meeting the skills needs of Australia depends on teachers, and especially on teachers with the necessary skills and education to meet the needs of many of the young people with special needs in the VET/TAFE/Apprenticeship area.

TEACHERS

Australia has a serious problem with the supply of mathematics teachers. However, there is also a major problem with the supply of teachers in basic education. Teaching literacy and mathematics to young people who have been failing in the school system is a difficult task and requires special training and expertise.

The TAFE sector has not valued its teachers in core skills areas and both literacy and mathematics programs have too many sessional and part-time staff. These areas need to be given priority, as does the training of teachers to work in these areas.

A recent report prepared for the Mathematical Association of Victoria (MAV) paints a bleak picture with many teachers reaching retirement and very little available in the way of professional development. The diversity of needs, and the small numbers of teachers involved, suggests that the MAV alone cannot provide the kind of professional development these teachers need.

Compounding this is the overall situation in relation to the supply of mathematics teachers. The situation in schools is critical and the TAFE sector will be affected. The needs of the TAFE sector have been largely ignored in the recent review of Teaching and Teacher Education (available from

DEST web site). However, the seriousness of the situation can be judged from data in volume of this report dealing with *Background Data and Analysis*. Table 18 on page 45 shows the course completions by secondary specialists for 2001. Only 7.1% graduated as mathematics teachers yet mathematics has about 14-15% of time in the curriculum.

This is a problem that can only be addressed by retraining of existing teachers who are teaching out of field, funding for career change mature applicants to teacher education courses and solving the problem of the crisis in mathematics in the universities. The first two of these would require funding but are possible with goodwill and cooperation between the State and Federal governments.

The third, the situation regarding mathematics in the universities is more problematic. Australian mathematical sciences departments now have such a poor reputation overseas that not only do they need more funding within the universities—not mooted in the current version of *Backing Australia's Future*—but actions that say mathematics in Australia is valued and will be supported.

Basically, Australia is facing a major mathematical sciences skills shortage that spans the full range of the mathematics underpinning trades to research. In between there skills shortfalls in medical research, modelling of all kinds, most of the newer sciences and technologies and a host of other areas.

Thank you for the opportunity to put this before your Committee.

Yours sincerely,

Jan Thomas
Executive Officer

jan.thomas@amsi.org.au
Phone: 61-3-8344-1774 Mobile: 041-900-6205