

Three things we must do to improve maths education



More year 12 students should be studying maths, says the Australian Academy of Science.

by Tim Dodd

The case for STEM (science, technology, engineering and maths) education has been won. Not a week passes by that a new report or education program is not being announced to general approval.

But even if parents, teachers and schools are persuaded that STEM education is critical for the jobs our children will be doing one day, is this high degree of awareness really being translated into the sort of education they need?

Not yet. And particularly not in the discipline which lies at the heart of STEM – mathematics.

Last week the Australian Academy of Science presented its [10-year plan](#) for maths education, in which it detailed the problems and put forward some solutions. And the extent to which Australia is falling behind other comparable nations in maths education is truly worrying.

Only 0.4 per cent of Australian students entering university enrol in maths or statistics degrees – less than half the OECD average of 1 per cent.

FALLING STUDENT NUMBERS

And it identified a key problem: the declining percentage of year 12 students who are studying maths at intermediate and advanced level – down from 41 per cent in 1995 to 29 per cent in 2012.

Universities deserve much of the blame for this, as only a minority of engineering degrees and very few science or commerce degrees have a prerequisite of intermediate or advanced year 12 maths. The academy called on universities to restore this requirement.

LOWER TEACHING STANDARDS

The academy also fingered another problem – the declining standard of maths teachers in Australian high schools. Of year 11 and 12 maths teachers, 28 per cent are not qualified to teach maths. In years 7 to 10, an even higher proportion of teachers (40 per cent) are unqualified in the subject.

The academy called on governments, schools and universities to “urgently increase their provision of professional development” for these out-of-field teachers, and to try much harder to recruit and retain qualified maths teachers.

Doing the latter is difficult because of the relative paucity of maths graduates in Australia – there are only 27,000 graduates in maths and statistics. Obviously many other graduates are maths trained, but we have a very low number of people with degrees in the subject.

And because of the falling popularity of advanced maths at year 12, the number of maths graduates is not likely to increase in the near future.

RESEARCH CENTRE

The academy also had a third major recommendation: to set up a new national research centre in the mathematical sciences – likely to be linked to the existing Australian Mathematical Sciences Institute – to boost research efforts and build connections with industry.

Such an institute, the academy says, is needed to support Australia's small mathematics research community, particularly in developing international collaboration.

The academy's report, [The Mathematical Sciences in Australia: A Vision for 2025](#), also cites figures to demonstrate the dependence of a modern economy on maths.

It says that advances in mathematical sciences are estimated to directly support about \$57 billion of economic activity, including \$5.4 billion in banking, \$4.8 billion in computer system design, \$4.6 billion in the wired telecommunications network, \$3.8 billion in insurance, \$3.7 billion in road freight transport, \$2.9 billion in other telecommunications networks, \$2.8 billion in electricity distribution and \$2.2 billion in financial asset investment.

This is only going to increase. Big data is entirely reliant on mathematics and statistics. Services in a knowledge economy are also heavily reliant on maths, as is the growing trend towards quantification and measurement in all industries.

Can we afford not to make the effort to restore quality to our maths education?

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