Actuaries seek policy change to deliver better maths outcomes for Australians

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- **Maths and numeracy should be compulsory in all high schools, including for senior students.**
- **Maths subjects should be a prerequisite for some university courses.**
- **There should be better and continual training, plus incentives, for maths teachers.**
- **STEM industries should work closely with schools to develop relevant maths curricula.**

Australian students' aspirations and their awareness of the value of STEM skills and the breadth of STEM careers is declining because they don't understand how maths is relevant to every-day life, according to a public policy paper issued today by the Actuaries Institute.

"Effective maths education is vital for young Australians to help them confidently apply maths to everyday tasks and to create high level capabilities that support the growth of science, technology, engineering, and mathematics (STEM) industries in Australia," said Martin Mulcare, who developed the policy paper with a team of actuaries.

Actuaries Institute Chief Executive Elayne Grace said Australian actuaries depend on the development of deep maths skills to work across a very broad range of industries.
"The bedrock of those skills is taught in school, and then university," Ms Grace said. Actuaries work in risk assessment in sectors that include insurance, superannuation, climate change and data analytics. They look at deep data sets and hope to deliver the best possible outcomes for the greatest number of people.

"Proficiency in maths opens doors to many careers," said Actuaries Institute President, Jefferson Gibbs.

"Having maths skills creates opportunities that are otherwise closed off. These skills are important not just for Australia's rankings, in terms of education and workforce standards, but also for opportunities that open up for individuals," Mr Gibbs said.

The paper states only 20.5% of Year 12 students currently choose to study intermediate maths and only 10.1% study maths at a higher level, rates that have declined from 23.3% and 11.6%, respectively, in 2008. Fewer girls (7%) than boys (12%) study higher level maths, and there are stark differences between maths and numeracy rates between city and regional kids.

The Actuaries paper, *Mastering Mathematics for Australia's Future*, states every Australian school leaver should be able to demonstrate a minimum standard of numeracy and the education system should be accountable for delivering that outcome with a range of suitable courses.

The aim of the paper is to make public policy recommendations that will lead to more students studying maths, and at higher levels. The paper acknowledges that education policy is complex but says Australians are falling behind on national and international learning benchmarks.

"Like many Australian professions, strong mathematic skills are a crucial enabler for the analysis and advice that actuaries provide to a broad range of industries," the paper states.

"Making mathematics more relevant and interesting may also uncover students with the ability and interest to study mathematics, giving a wider cohort the confidence and ability to choose a wider range of degrees at university."

Without a concerted campaign to reinvigorate student interest in maths and a realignment of some resources, Australians will continue to fall against international benchmarks.

For women, the problem of inequality is further exacerbated: males are more than one-and-a-half-times more likely to study higher level maths than females. "This contributes to the under-representation in mathematics-intensive STEM careers, which exacerbates gender wage inequality."

The paper states the shortfall among girls happens despite males and females achieving similar results in Year 12 maths subjects. It says a lack of confidence among girls, few role models and entrenched stereotypes - beliefs held by students, teachers and parents - contribute to lower participation in maths among girls.

The Actuaries Institute makes six recommendations:

- Compulsory maths and numeracy for all students to the end of year 12
- STEM industries should support Australia's maths curriculum with real-life examples
- There should be advanced training for maths teachers and incentives to keep good teachers learning and teaching
- Higher level maths subjects should be prerequisites for admission to STEM-related university courses
- University admissions should recognise and reward students who take higher level maths subjects
- The gap between girls and boys studying higher level maths should be closed with mentoring programs and other initiatives.

Existing evidence-based research underpins the Actuaries Institute public policy paper. The authors sought the views of educators and stakeholders, including the Australian Mathematical Sciences Institute and the Australian Council for Educational Research.

It acknowledges that innovation and technology will increasingly drive Australia's economy as it moves away from current commodity-based industries.

Ms Grace said: "We need to ensure the way maths is taught encourages continued learning and enjoyment. And students who take on harder subjects at school, like higher level maths, should be rewarded by universities for doing so."

Mr Mulcare said students should get a clear signal, from both school and universities, that maths matters. "Students should know the importance of having a foundational knowledge of higher level mathematics."

Mr Mulcare is available for interview. The paper is available here.

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About the Actuaries Institute

As the sole professional body for Members in Australia and overseas, the Actuaries Institute represents the interests of the profession to government, business and the community. Actuaries assess risks through long-term analyses, modelling and scenario planning across a wide range of business problems. This unrivalled expertise enables the profession to comment on a range of business-related issues including enterprise risk management and prudential regulation, retirement income policy, finance and investment, general insurance, life insurance and health financing.

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