

RELIEVING OUT OF FIELD TEACHING IN AUSTRALIAN SECONDARY MATHEMATICS

SUBMISSION TO THE ECONOMIC REFORM ROUND TABLE

Australia's acute maths teacher
shortage undermines economic
competitiveness and productivity

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Australia's acute maths teacher shortage undermines economic competitiveness and productivity

Australia faces a critical skills shortage that threatens our economic competitiveness: two in five secondary mathematics teachers lack proper qualifications, directly undermining the mathematical literacy essential for our technology-driven economy. Strategies for addressing this shortage are hampered by jurisdictional barriers and inefficiencies. This represents a **productivity crisis** that demands immediate national action.

Research by a consortium of Australia's leading mathematical associations reveals that increased support for upgrading the qualifications of out-of-field (OOF) mathematics teachers is essential to improve education outcomes for Australia's students. The consortium includes the Actuaries Institute, Australian Mathematical Sciences Institute (AMSI), the Australian Mathematical Society (Aust MS), the Mathematics Education Research Group of Australasia (MERGA), Science and Technology Australia (STA), and the Statistical Society of Australia (SSA).

The economic case for action

The mathematical sciences (mathematics, statistics, data science) contribute **hundreds of billions of dollars annually** to Australia's economy across the finance, AI, data science, mining, telecommunications, and logistics sectors. But Australia increasingly lags behind other sophisticated economies in technological innovation and investment in R&D ([OECD Science, Technology and Innovation Scoreboard](#)). Our failure to adequately prepare students in mathematics directly undermines economic capacity in these high-value industries.

Australia's skills pipeline is under threat. The nation faces critical challenges, including:

- **Declining student participation:** Year 12 advanced and intermediate mathematics enrolment has fallen from over 30% a decade ago to just 25% in 2023.
- **Shrinking maths teacher workforce:** 75% of Year 7-10 students are taught maths by OOF teachers. Graduate recruitment alone cannot solve this problem – rapid upskilling of the existing OOF teacher workforce must take priority.
- **Innovation capacity:** Without strong mathematical foundations, students cannot pursue careers in emerging technologies, data science, and AI - the engines of innovation and economic prosperity.

Productivity implications

A workforce lacking mathematical skills creates systemic inefficiencies:

- Reduced capacity for data-driven decision making
- Limited ability to adopt new technologies and respond to global challenges
- Decreased financial literacy affecting economic participation
- Barriers to re-skilling as industries evolve.

The equity-economic nexus

The out-of-field mathematics teaching crisis disproportionately affects disadvantaged students. Given that data indicates students taught maths by OOF teachers generally demonstrate poorer maths outcomes, this creates a **dual economic burden**:

- **Talent waste:** Low-SES students (31% taught by OOF teachers vs 15% in high-SES schools) represent untapped human capital.

- **Intergenerational economic mobility:** Poor mathematics outcomes limit career pathways and earning potential.

Recommended National Strategy

1. Teacher Upskilling Program

Establish a **nationally coordinated program** to upskill out-of-field mathematics teachers to the level of teachers with a maths specialisation:

- **Scale:** Target the existing teacher workforce rather than waiting a decade for new graduates
- **Delivery:** University consortium ensuring consistent quality and national reach
- **Support:** Remove barriers (cost, time, recognition) that prevent teacher participation
- **Economic rationale:** Faster workforce impact to supplement traditional recruitment.

2. Data Infrastructure for Workforce Planning

Implement a **nationally consistent data collection** process to understand teacher qualifications and their teaching assignments:

- **University partnerships:** Track mathematics specialisations of teaching graduates
- **Registration authorities:** Record and monitor teacher subject qualifications
- **Economic benefit:** Enable targeted resource allocation and measure program effectiveness.

3. Implementation Framework

The program would be overseen by a **National Steering Group**, which would coordinate:

- Stakeholder engagement across education and industry sectors
- Development of scalable, nationally consistent postgraduate qualification framework
- Integration with existing skills and workforce development initiatives
- Alignment with national productivity and innovation strategies.

Expected economic returns

- **Immediate:** Enhanced mathematical competency in 75% of secondary students currently underserved
- **Medium-term:** Increased participation in STEM higher education and vocational pathways
- **Long-term:** Strengthened skills pipeline for high-value industries driving economic prosperity
- **Productivity gains:** A more mathematically literate workforce capable of leveraging technological advances.

A national economic imperative

Addressing the mathematics teacher shortage is not just an education policy issue – it is an **economic imperative**. The cost of inaction will be reduced innovation capacity and diminished economic competitiveness that undermines national productivity. National coordination and investment in mathematics education quality will yield dividends across all sectors of Australia's economy.

Researchers are available to discuss policy reform and approaches to implementation and can be contacted at:

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