

THE STATE OF **MATHEMATICAL SCIENCES** 2024

8th Discipline Profile of Mathematics & Statistics in Australia

Summary of Findings

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INTRODUCTION

AMSI's periodic [Discipline Profile](#) provides a detailed snapshot of the condition of the mathematical sciences in Australia at all stages of the continuum – from the classroom and higher education through to research and development, workforce utilisation and innovation by commerce and industry. The publication brings together diverse information from many sources, complemented with AMSI research.

The mathematical sciences—spanning mathematics, statistics, and data science—are critical in addressing the complex challenges of the 21st century. The discipline's role is indispensable across key industries, including finance, healthcare, artificial intelligence, and machine learning. These disciplines provide the analytical frameworks that drive technological innovation and shape decision-making processes in sectors that rely on precision, efficiency, and data insights.

AMSI's Discipline Profile 2024 details the critical role of mathematical sciences in shaping the future of various sectors in Australia, the challenges in education and workforce preparation, and the need for sustained investment in research to maintain Australia's global competitiveness. The following is a summary of findings.

SCHOOL EDUCATION CHALLENGES

Mathematics and numeracy education in Australia faces significant challenges, particularly post-COVID-19. According to the OECD's (2022) Programme for International Student Assessment (PISA) results, overall student performance has stabilised. However, disparities persist, especially among students from lower socio-economic backgrounds and regional and remote areas, and the gap between low-performing and high-performing 15-year-old students is widening, reflecting growing inequity and worsening educational outcomes.

Socio-economic background and geographic location significantly affect student performance, and students from remote areas lag up to four years behind. This particularly impacts First Nations students - although some progress has been made. More First Nations students still require additional numeracy support compared to non-First Nations students.

Gender differences are also evident, with male students generally outperforming females in mathematics. However, first-generation and foreign-born students often surpass their Australian-born peers. Independent schools show higher achievement levels, but these differences diminish when socio-economic factors are considered.

Out-of-field mathematics teaching remains a significant issue in secondary schools, with up to 40 percent of teachers delivering mathematics without proper qualifications. This contributes to lower student engagement, with half of Year 8 students in Australia reporting they do not enjoy studying mathematics. There is a direct correlation between enjoyment and achievement in mathematics, making it crucial to improve the quality of instruction and student attitudes toward the subject.

[Year 12 participation rates](#) in higher and intermediate level mathematics are at an all-time low, at 9 percent and 17.7 percent, respectively in 2022. With mathematics a fundamental component of STEM degrees and careers, this long-term trend of declining enrolment needs urgent attention if Australia is to meet future workforce demands and maintain its competitive edge globally.

HIGHER EDUCATION TRENDS

In higher education, there has been a positive increase in the number of students enrolling in mathematical sciences degrees, particularly at the postgraduate level. Enrolments in coursework master's programs in mathematical sciences have surged by 223 percent since 2015. Most of this growth is attributable to international students.

The growth of data science degrees reflects the increasing recognition of the value of these interdisciplinary fields. Despite the pandemic's impact on international student numbers and departmental teaching loads, enrolments are recovering. However, international student caps introduced in 2024 threaten to further impact mathematical sciences departments.

Challenges also remain in student engagement. While mathematical sciences students report high satisfaction with teaching quality, engagement and skills development are consistently rated lower compared to other fields. Gender disparities also persist in mathematical sciences departments, although there has been an increase in female representation at senior academic levels.

WORKFORCE IMPACT

The workforce landscape for mathematical sciences is evolving rapidly. Occupations in data science and other information-related professions have grown by nearly 1300 percent over the past five years, and mathematical sciences graduates are seeing substantial increases in starting salaries, particularly those with master's degrees.

The ageing workforce is being revitalised by young professionals, many of whom are international students who have pursued their education in Australia. Despite these positive developments, gender imbalances continue, with fewer females entering mathematical sciences careers compared to male counterparts.

Strong numeracy skills are linked to better employment prospects, higher wages, and improved health outcomes. Although most Australian adults possess basic numeracy skills, a significant gap exists between those with low and advanced skills, highlighting the need for improved educational outreach and training.

RESEARCH AND FUNDING CONCERNS

The decline in research funding is an ongoing challenge. Higher Education Research and Development (HERD) funding for mathematical sciences has dropped to its lowest level since 2008, representing just 1.26 percent of total funding in 2022. Industry contributions to mathematical sciences research is minimal, despite growing scope and demand for mathematical expertise in various industry sectors.

The number of Australian Research Council (ARC) funded projects in the mathematical sciences has declined by 53 percent since 2012. This reduction in support is especially apparent in pure and applied mathematics research, which have seen funding decline the most since 2012.

Nevertheless, Australian universities continue to excel in mathematical sciences research. Institutions such as the University of New South Wales, Australian National University, The University of Melbourne, and Monash University are consistently ranked among the top in Australia for mathematics and statistics, according to the 2024 QS World University Rankings.

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