



Initial Teacher Education Review

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Thank you for the opportunity to offer feedback to the Initial Teacher Education Review.

Science & Technology Australia is the nation's peak body for the science and technology sectors. Through our 90+ member organisations, we represent more than 88,000 scientists, mathematicians, engineers and technologists. Our members include specialist scientific societies, research institutes, groups of maths and science educators, and research strategy bodies such as councils of deans.

Teaching is a stimulating and inspiring career choice. Teachers do one of the most important jobs in our communities. They nurture the next generations of young minds, give students a strong foundation of knowledge, and instil a lifelong love of learning. However the teaching profession is not yet as rewarded, recognised and respected as it needs to be to attract high-quality teachers. We need to tackle this to give Australian children the very best start in life.

One of the biggest concerns is the level of out-of-field teaching in Australian maths and science. Around one in four Year 8 students (23 per cent) is taught by out-of-field maths teachers and one in ten (9 per cent) by out-of-field science teachers. Yet the evidence is clear: when students are taught by out-of-field teachers, their enthusiasm and desire to continue in these subjects often drops (Teacher Education Ministerial Advisory Group 2014).

To improve high-quality teaching in Australia, STA has nine recommendations to attract high-quality teachers, lift completion rates for teaching degrees, and boost specialist teacher supply in STEM.

To assist this review's proposals, STA recommends that Governments:

- develop a national plan through the Education Council to elevate the status of teaching as a profession;
- launch a national campaign to dispel the myths around teaching as a career, with a focus on career advancement and the chance to become a specialist teacher;
- develop a targeted element of this campaign to encourage more men and people from under-represented groups to take up teaching as a career;
- target extra scholarship support for students in initial teacher education qualifications where the current retention challenges are greatest:
 - External or distance-education students;
 - Aboriginal and Torres Strait Islander students;
 - Low Socioeconomic Students (Low-SES)
 - Mature-aged students; and
 - Students with a disability
- expand programs like STEM Professionals in Schools which have a proven record of supporting out-of-field STEM teachers to teach STEM content with more confidence;
- give current specialist STEM teachers an opportunity to work across multiple schools;
- trial stipends for high-achieving students in STEM fields to try education and for high achieving education students to try STEM units as electives during their degrees;
- explore a specialist STEM-specific program similar to Teach for Australia with the remit and reach to retrain STEM-qualified professionals and researchers as school teachers; and
- work with the Career Industry Council of Australia to better inform students about the strong benefits of studying maths for all career paths.

Yours sincerely,

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Attracting high-quality and diverse candidates into teaching

To boost both the quality and diversity of candidates entering the teaching profession, we need to elevate recognition, reward, and respect for teaching.

Grattan Institute research has identified two major disincentives to academic high achievers entering teaching: salary levels and the perceived lack of intellectual challenge/career progression opportunities (Goss, Sonnemann, and Nolan 2019). Other factors that deterred strong prospective candidates included a perceived inability to change careers, and a lack of recognition and reward for good performance (Goss, Sonnemann, and Nolan 2019).

While teacher salaries are the purview of the States and not the Australian Government, strong consideration should be given to a nation-wide initiative to lift teacher salaries. Higher teacher salaries would telegraph the high value our society places on teaching and boost the academic achievement levels of the candidates applying for teaching courses. Even an increase in salary as small as 1 per cent increases the average academic aptitude of students entering teaching by 0.6 ATAR percentile ranks (Leigh 2012).

STA recommends: develop a national plan through the Education Council to elevate the status of teaching as a profession.

Another disincentive for academic high achievers to go into teaching is the perception that it does not offer intellectual challenges or career progression on the same scale as other career options. One of the high-achieving respondents to the Grattan Institute survey said they would be ‘bored teaching the same thing year after year’ (Goss, Sonnemann, and Nolan 2019). To solve this problem, teaching needs to be reframed as the intellectually challenging career that it is. This requires clear pathways for advancement into roles as specialist teachers - where teachers are supported and rewarded to improve teaching practice in their fields.

STA recommends: launch a national campaign to dispel the myths around teaching as a career with a focus on career advancement and the opportunities to become a specialist teacher.

In Australian society, teaching is a highly feminised workplace. In any workforce where there is an overwhelming gender imbalance, it is harder for people from demographics that are under-represented to see themselves reflected in that workforce - or to see it as an option for them (Tani 2019). This is one of the factors driving low numbers of male applicants for teaching qualifications - which leaves an entire demographic of high-quality candidates even less likely to apply for teaching. Fixing this perception is a long-term and challenging problem, but one we should set out to solve. There is a strong upside benefit to doing so: it could encourage an entire demographic of high-quality candidates into teaching that may not have considered it previously.

STA recommends: develop a targeted element of this campaign to encourage more men and people from under-represented groups to take up teaching as a career.

Teacher training completion rates

The discussion paper outlines that the people currently least likely to complete their teaching degree and enter the workforce are:

- External or distance education students;
- Aboriginal and Torres Strait Islander students;
- Mature-aged students; and

- Students with a disability.

These groups of students have something in common: responsibilities beyond their studies. These include cultural, caring, financial, work, and health-related obligations. All of these can impede a student's capacity to focus on their studies and complete their qualification. The 5-yearly Student Finances Survey by Universities Australia also highlights the particularly acute cost-of-living pressures on students in these demographics (Universities Australia 2018).

Issues of non-completion in university education have been examined thoroughly in recent years. Research by the National Centre for Student Equity in Higher Education in 2015 looked in detail at student attrition and key factors that drive it. It found a lack of support for students in need was the single greatest predictor of non-completion (Edwards and McMillan 2015). While this study was across all degrees, the same factors undoubtedly play a role in teacher education.

To arrest and reverse this fall in teacher training completion rates, targeted scholarships would make a powerful difference to enable more students to complete their studies. STA has previously proposed stronger financial support for students, particularly in regional universities, and bolstering equity support funds dispersed by student organisations.

Students who are able to study full-time are more likely to complete their degrees. To this end, STA has also previously recommended scholarships be offered to students with a Bachelor level maths or science degrees for them to retrain as school teachers (Science & Technology Australia 2018). Many of those who do seek to retrain as teachers have to study part-time and support themselves with paid work. Scholarships would enable more of them to study fulltime and drop paid work - boosting their chances of completion.

STA recommends: target extra scholarship support for students in initial teacher education qualifications where the current retention challenges are greatest:

- **External or distance education students;**
- **Aboriginal and Torres Strait Islander students;**
- **Low Socioeconomic Students (Low-SES)**
- **Mature-aged students; and**
- **Students with a disability**

Teacher supply and areas of need

The discussion paper highlights a particular need for maths and science skills in the teaching profession. Australian Mathematical Sciences Institute research highlights that, at the current rate of training, it would take 20 years to ensure that every Australian student is taught by a maths teacher with specialist training (Australian Mathematical Sciences Institute 2020). Such a delay would only exacerbate the recent slides in maths and science abilities of Australian students relative to their peers in our competitor nations.

To ensure teacher supply in areas of need like maths and science, we need to pursue short, medium, and long-term strategies.

In the short-term, teachers who are currently teaching out-of-field in maths and science need to be equipped with the resources and incentives to develop their expertise in these areas. There are already programs that provide teachers with access to maths and scientists to transfer this expertise in science and maths, but these programs need more support to reach more teachers. As one example, [STEM Professionals in Schools](#) gives teachers and students the opportunity to engage with

scientists from over 300 institutions. An expansion of this program and mathematics programs like [MathsCraft](#) could be one novel approach to address out-of-field teaching in the short-term.

Another short-term solution to fix the immediate shortage of specialist STEM teachers is to give current specialist STEM teachers an opportunity to work across multiple schools. State Education Departments and the independent school system should explore this option. Care would need to be taken to manage workload between multiple employing schools. The extra benefit to such a solution is that specialist teachers would be exposed to different teaching methods across multiple schools. This would also help to accelerate career paths for those teachers, create more full-time or larger time fraction positions, and elevate the status of teaching.

STA recommends: expand programs like STEM Professionals in Schools which have a proven record of supporting out-of-field STEM teachers to teach STEM content with more confidence.

STA recommends: give current specialist STEM teachers an opportunity to work across multiple schools.

Students currently studying maths and science are expected to take on broadening units as part of their degree. For universities that have undergraduate teaching courses, financial incentives could be trialled to encourage these students to try out teaching. There would also be strong benefit in encouraging students enrolled in teaching degrees to take science and maths units as part of their teaching degrees with a targeted stipend. The evidence shows clearly that a stipend to help with the cost-of-living, and not a HECS discount, would be most effective. Incentives like this would boost the number of maths and science teachers entering the profession in the more medium-term. This approach has already been shown to be successful in New Zealand.

STA recommends: trial stipends for high-achieving students in STEM fields to try education and for high achieving education students to try STEM units as electives during their degrees.

As a result of the COVID-19 pandemic, and the dramatic loss of international student income, universities have announced major job losses (more than 17,000 FTE so far) over the past year (Universities Australia 2021). More job losses are expected in the coming years. Those who have lost jobs include STEM professionals, researchers and university tutors, and casual teaching staff.

There is an opportunity to recruit these talented skilled STEM professionals into teaching - and in doing so help to tackle the shortages of specialist STEM teachers in schools, including in regional Australia. This cohort, who have some experience in higher education teaching already, would require a modest level of further training to be prepared to teach effectively at a high school level.

To prepare this workforce, a STEM-specialist program similar to Teach for Australia could be developed and delivered by a national STEM organisation with ready access to this specialist workforce. It would be able to assess STEM professionals for their experience and suitability for an intensive teaching program. Such a program could also be expanded in the future to provide opportunities for STEM educators to engage with STEM professionals as part of their career progression.

STA recommends: explore a specialist STEM-specific program similar to Teach for Australia with the remit and reach to retrain STEM-qualified professionals and researchers as school teachers.

Teacher supply in maths and science also faces a long-term problem. We need to start work urgently to fix this long-term outlook. Throughout Australia, students are choosing not to study maths at high school or to study intermediate rather than expert maths. This drop in the desire to study maths is

not only an immediate problem - but one that will do long-term damage to our workforce capabilities. All of the big new emerging technologies poised to revolutionise our lives and economy - artificial intelligence, machine learning and quantum computing - will need a highly-trained workforce with strong maths skills if Australia is to build and maintain strong sovereign capabilities. To fix this problem, careers education and advice needs to provide broader information to students about the strong benefits of studying maths.

STA recommends: work with the Career Industry Council of Australia to better inform students about the strong benefits of studying maths for all career paths.

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