

SUBMISSION

Submission to the Australian Universities Accord Panel

Submission to the Australian Universities Accord Discussion Paper Consultation

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The Australian Academy of Technological Sciences and Engineering (ATSE) is a Learned Academy of independent, non-political experts helping Australians understand and use technology to solve complex problems. Bringing together Australia's leading thinkers in applied science, technology and engineering, ATSE provides impartial, practical and evidence-based advice on how to achieve sustainable solutions and advance prosperity.

ATSE welcomes the opportunity to provide a submission to the Universities Accord Panel on the discussion paper. The Australian university sector plays a vital role in addressing national and international problems and educating the next generation. The Australian Universities Accord provides an opportunity for some big-picture thinking about the role and purpose of the university sector, and how we can make it work better for students and to make the most of its crucial role in advancing society as well as solving our most complex challenges. We must ensure that Australia's higher education system is flexible enough to meet our students' needs both now and into the future, supports improved student outcomes and makes university education and research more accessible to a diverse range of people. Constant student-focused pedagogical improvement should guide our approach to university reform. We'll benefit most from our university sector coordinating and harnessing universities' comparative strengths in both teaching and research, developing stronger institutional specialisations and industry connections that together as a sector support a thriving research and tertiary teaching ecosystem. By combining this with greater cross-institutional collaboration, in both research and teaching, and greater job security for early career academics, Australia can achieve excellence across the university sector. This will require government leadership, support and targeted investment to ensure that both research and teaching are properly funded to disincentivise cross-subsidisation of research from funds earmarked for teaching.

Effecting these changes will require vision and commitment to long-term transformation of the sector. The Australian Universities Accord is an opportunity to bring this vision and kick-start these changes. ATSE's submission focuses on the short to medium term cultural and investment changes necessary to allow the university sector to be more flexible and adaptive to changing societal and student expectations, and give the sector the breathing room to engage in this long-term transformation. To this end, ATSE makes the following recommendations:

Recommendation 1: The Accord Panel reviews university and grant metrics to better reflect the value of activities that promote engagement and collaboration between the university sector and outside groups including industry, government, and local communities – including supporting researchers to exit and re-enter the system without penalty.

Recommendation 2: The Australian Government works with universities to develop greater availability of cross-institutional study pathways, based around centres of teaching excellence.

Recommendation 3: The Australian Government works with State and Territory Governments to develop and implement a national strategy to increase the cooperation and integration of vocational education and the university sector.

Recommendation 4: The Australian Government develops a tertiary student resourcing standard that includes loadings for factors that impact the cost of teaching (such as field of study, university location, student demographic factors etc.) and uses this standard to fund teaching activities in Australian higher education.

Recommendation 5: The Australian Universities Accord includes long-term funding provisions to develop research specialisations within universities.

Recommendation 6: The Australian Universities Accord includes an Australian Government supported mechanism to require universities to invest in providing career stability to early and mid-career researchers.

Recommendation 7: The Australian Government develops a fully funded, whole of sector strategy to consolidate diversity and inclusion programs in academia and promote those programs and initiatives that can demonstrate their efficacy at improving inclusion and diversity.

Changing the culture of higher education

The role of universities goes well beyond teaching and research. Universities are increasingly expected to engage with their local communities, industry, and governments. This leads to advantages for all involved, with governments and industry gaining access to subject-matter experts to help solve hard-to-address problems, local communities benefitting from the application of research and greater understanding of issues, and researchers building community networks to support their research and generate new ideas (e.g., via citizen science). Nonetheless, this engagement is highly time consuming. It is usually considered to be unpaid labour, and disproportionately performed by women. It is rarely reflected in the metrics by which universities and researchers are assessed. While these metrics are intended as measurement tools, they often become the outcomes universities and researchers strive to meet, particularly in tight fiscal environments. As such, it is critical that the metrics by which both researchers and universities are assessed match the community expectations of the sector.

Researchers moving between industry and academia often have a much more difficult time in university employment and promotion processes. Typically, industry experience is less well recognised by universities than traditional academic metrics, despite the advantages industry experience brings in building critical collaborations between industry and academia. Collaboration of researchers with industry is similarly undervalued. While industry collaborations can contribute greatly to the economic growth of the nation, they are difficult to establish, and typically do not yield traditional academic outputs that are prioritised in assessing the performance of academics (Verreyne et al., 2021). As a result academics are often hesitant about engaging in industry collaboration and lack institutional support for industry engagement (Verreyne et al., 2021).

Similarly, community outreach and societal impact are rarely reflected in prizes and promotions, which are heavily weighted towards traditional academic outputs such as publication and citation counts. Changing the criteria for awards and promotions within universities to better reflect the diversity of roles universities are increasingly expected to play in Australian society, and to reward strategic engagement with application and translation of research outside the university sector, will help to support a broader engagement and integration between the university sector and government, industry, and local communities.

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Increasing flexibility and integration for widening student participation

Teaching and learning in higher education is at a point of flux. Increasing student numbers, the adoption of digital teaching tools and the push towards micro-credentialing are providing new opportunities and challenges for Australian universities to improve the quality of their educational offering. The higher education sector must flexibly adapt to these changing circumstances to meet evolving student needs.

The growth in student numbers has resulted in more regimented and discrete teaching practices, with university units often designed as independent packages of information aimed at the “average” student (within one standard deviation of the mean), failing to meet the needs of neurologically, culturally and ethnically diverse people. The growth in enrolments has also widened diversity in higher education participation. Growing numbers of students are required to work long hours to support their studies or have caring responsibilities. These new student groups often have different needs and expectations from universities that the sector must continue to adapt to. University courses must be designed in a manner that is flexible and accommodating of individual differences and develops a holistic approach where learning in prior units can be built upon and integrated into a more comprehensive educational experience. Enhancing flexibility to enable increased participation will require relying less on traditional modes of teaching, such as lectures at set times, by employing a combination of technological advancements, such as virtual tutorials and recorded content, with a flexible student-focused approach guided by pedagogical best practice. It should be noted that many students value the opportunity to learn face-to-face rather than virtually. This approach should not be lost in the rush to digital teaching options and highlights to requirement of universities to meet the needs of a diverse student body.

Technological options provide opportunities for a greater range of cross-institutional study, supporting universities that evolve from competitors to collaborators. The prestigious European [Erasmus Mundus Joint](#)

Master's Program adopts this approach, with students completing a Master's degree across at least two institutions, allowing institutions to specialise their teaching programs while still providing a broad offering. While this program has students physically attend each university, modern teaching is no longer limited by proximity, making it possible for students to gain the educational advantage of multi-institutional teaching while remaining based at a university that is convenient for them. Adopting this approach could (for example) support a student to study physics by taking units in thermodynamics, nuclear physics, and quantum physics from separate Australian universities that have specialised in teaching those topics, with these units being combined into a single integrated degree program. Universities could also work with community partners to strengthen teaching in vital areas. For example, universities could work with local Aboriginal and Torres Strait Islander peoples to help facilitate the integration of Traditional Knowledges into their curriculums. Adopting this approach will require centralised support, to build cross-institutional agreements and facilitate integrated course design.

Flexibility must extend beyond individual courses or programs and allow greater integration between groups of higher education providers. The Australian Tertiary Entrance Ranking (ATAR) has long been criticised as a poor measure of individual ability, with socioeconomic disadvantage being closely correlated with ATAR results. Many students therefore rely on alternative pathways to university, with 60% of students enrolled in university being admitted on pathways other than the ATAR (Pilcher & Torii, 2018). As such, the university sector needs to be aligned with the vocational education and training (VET) sector to ensure that students have access the relevant and useful pathways to university. Crucially, this pathway must not be unidirectional. The VET sector in New South Wales alone trains tens of thousands of university graduates every year (TAFE NSW, n.d.), necessitating that university courses be designed with these educational pathways in mind. This should involve consideration of greater access to work integrated learning and practical skills training within university courses. Pathways to VET, both from schooling and university, should be promoted and the value of VET-taught skills highlighted. The VET sector is the largest provider of STEM qualifications, with more than 3.5 million Australians holding a STEM qualification from the VET sector (compared with 3.1 million from the university sector; Office of the Chief Scientist, 2020). The Australian Government should adopt a strategic approach to help connect educational providers together, developing cross-institutional networks and helping to meet the needs of an increasingly mobile workforce.

Recommendation 2: The Australian Government works with universities to develop greater availability of cross-institutional study pathways, based around centres of teaching excellence.

Recommendation 3: The Australian Government works with State and Territory Governments to develop and implement a national strategy to increase the cooperation and integration of vocational education the university sector.

Investing in the higher education sector for better educational outcomes

The higher education sector funding model needs to be developed in a manner that accurately reflects the costs of teaching students. Funding for teaching activities is currently provided through a combination of student fees and government funding (primarily in the form of Commonwealth Supported Places). Changes made under the Job-ready Graduates Scheme attempted to use student fees to direct student study choices but resulted in reduced overall funding to key courses while having little impact on student choices (Norton, 2022). The current funding model bears little relationship to the actual cost of teaching (Bradley et al., 2008), which can vary substantially. For example, the cost of teaching an engineering degree was estimated to be \$22,723 in 2010, while a teaching humanities degree cost about half that (\$10,211; Lomax-Smith et al., 2011). The funding model also does not consider the additional cost of teaching and providing pastoral support to certain students. For example, students from regional areas, Aboriginal and Torres Strait Islander students and first-in-family students regularly require additional support and more flexible teaching methods to overcome additional difficulties they face and higher drop-out rates (Grattan Institute, 2018). This incurs an additional cost on universities, which is often not recognised by current funding arrangements. Regional universities are particularly disadvantaged by a funding model that provides funding based on average costs (Norton, 2020).

In primary and secondary schooling, Commonwealth funding is determined using the Schooling Resource Standard (SRS). The SRS includes a base funding rate, as well as additional loadings for factors such as the number of Aboriginal or Torres Strait Islander students, socio-economic disadvantage, English

proficiency, location, and school size (Department of Education, n.d.). This model helps to account for the major factors that impact teaching costs in schools in a way that isn't reflect in current university funding models. A similar model could be applied to the higher education sector with baseline funding augmented by loadings to account for the increased cost of teaching certain students and/or certain fields. Student fees could be used to reduce the burden of this cost on the Federal Government, as is already the case, with students paying a set proportion of the baseline funding. Students should not bear the burden of covering the additional loadings, to not penalise students who need additional resources and ensure equitable access for all students, and funding should be earmarked for teaching and related administration activities. This would enable the funding model for the university sector to match the full cost of teaching all students, and the enable better care and support for students who require it.

Recommendation 4: The Australian Government develops a tertiary student resourcing standard that includes loadings for factors that impact the cost of teaching (such as field of study, university location, student demographic factors etc.) and uses this standard to fund teaching activities in Australian higher education.

Reforming the higher education sector for better research outcomes

In addition to funding reform for teaching activities, research funding in Australia needs to be examined. ATSE's [2023/24 Pre-Budget Submission](#) argued that a wide-reaching review of the research funding is required, with an aim to increase the overall research and development spending to internationally comparable levels. Research in Australia is primarily funded through competitive grants, which impose unnecessarily heavy administrative burdens on researchers (Australian Academy of Technological Science and Engineering, 2022). These grants are not sufficient to meet the needs of research institutions, particularly those seeking to rise through international rankings. Universities have therefore relied on international student fees to help cover this funding gap (Bennett, 2022). This reliance on international students' fees creates an even greater incentive to rise in international rankings, creating a feedback loop of ever-growing demand for international students to enable funding for research in Australian universities. To attract these international students, Australian universities have been forced to generalise their educational offerings to allow for the widest range of degrees that appeal to the largest number of students.

An alternative model of research funding, considered within a broader research funding review, could focus on supporting research specialisation within universities. For example, the Universities of Excellence program in Germany provides research funding to an institution, with the aim of recognising areas of research strength and building capacity within critical research areas (Vogel, 2006). While this represents only one possible model for developing research specialisation within universities, the program utilises a tiered approach to developing specialisation, building on their Clusters of Excellence program, which allows universities to build their capacity over time. In Australia, a similar model could be adopted by utilising the existing ARC Centres of Excellence as the initial tier (equivalent to the German Clusters of Excellence), with universities where several Centres of Excellence in related fields exist provided additional recognition and support. If a similar scheme is adopted in Australia, this should be supported by long-term funding (rather than short-term grants) that enable the stability necessary to develop a research community around these specialist research areas. Focusing research efforts into areas of strength will help to avoid unnecessary duplications of research efforts and bring more researchers together to tackle wicked problems. Crucially, specialisation should not mean a siloing of research. Instead, these centres should act as a central point to develop collaborations, both across institutions and across disciplines, bringing together expertise to build our nation's research strengths. Developing research specialisations within universities, as part of a broader modernisation of research funding in Australia, would contribute to securing and enhancing Australia's position as a world-leading research nation.

Longer term investment may also help to provide career stability to the most vulnerable researchers, those earliest in their careers. Australia's research sector is prevented from reaching its full potential by a system that fails to support job security for early- and mid-career researchers. Recent research shows that 65% of Australian early career researchers (ECRs) thought that it was not a good time for young people to aspire to

an academic career, while 73% of ECRs between 4- and 10-years post-PhD would not recommend science as a career (Christian et al., 2021). This research also showed that 77% of ECRs believe that if they left academia, it would be because of a lack of job security (Christian et al., 2021). Recently, the global pandemic has exacerbated this issue with 37.6% of ECRs feeling less secure in their employment compared to pre-pandemic (Jamali et al., 2023). ECRs are usually supported on the back of highly competitive, short-term, grants funded through the Australian Research Council or National Health and Medical Research Council. This 'hunger games' approach that requires the most vulnerable university researchers to constantly compete against each other for limited resources, and repeatedly justify their own existence to their university employers, is wasting good people with exceptional talent. It also takes our researchers away from the ground-breaking work they should be doing and putting them into a cycle of unproductive grant writing. Australia is already short of the tertiary-educated STEM research and development workforce we need to be able to meet our vital international commitments on climate change, and to achieve our ambitions to become a knowledge and manufacturing economy with exports that add value to our vast mineral wealth. Universities must act swiftly to end the attrition of early- and mid-career researchers by enhancing job security.

Recommendation 5: The Australian Universities Accord includes long-term funding provisions to develop research specialisations within universities.

Recommendation 6: The Australian Universities Accord includes an Australian Government supported mechanism to require universities to invest in providing career stability to early and mid-career researchers.

Improving gender equity in Australian universities

While 48% of all Australian academic staff in 2021 are women, only 37% of academic leadership positions are filled by women (Calderon, 2022). Across the Group of Eight universities, this falls to just 22% (Calderon, 2022). While this is rising, at current rates, gender parity won't be achieved for over a decade (Calderon, 2022). Even these dire figures mask many of the structural issues that women face in academia, and discipline specific parity issues. Approximately 60% of casual academic staff, were women, and women typically spend a greater proportion of their academic careers in casual positions (May, 2011). Over 70% of STEM laboratories are led by men, and women are up to 20% less likely to be a principal investigator than men (Shah et al., 2021). This needs to change.

ATSE notes the work currently being undertaken through the [Diversity in STEM review](#) to address many of the issues that are specific to the STEM sector, and will work with the review to help remove barriers for women in STEM. There are hundreds of programs already in place to address this issue, though these are mostly disconnected from each other and lack evidence of their efficacy. There needs to be a sector-wide approach to advancing diversity and inclusion in academia, including but not limited to gender equity, that is based on evidence-based programs that have been shown to successfully promote inclusion and diversity. The Government can lead this work, setting the standards by which all universities must abide.

Recommendation 7: The Australian Government develops a fully funded, whole of sector strategy to consolidate diversity and inclusion programs in academia and promote those programs and initiatives that can demonstrate their efficacy at improving inclusion and diversity.

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