



ENGINEERS
AUSTRALIA

Attachment 1: Case studies

Meeting Australia's Future Skills Needs

Engineers Australia *Strengthening the engineering workforce report*¹ was the culmination of an 18-month research project looking at the dynamics of the supply and demand of engineering skills in Australia. The report highlights how as a country we are in a skill crisis. Reports of ongoing structural and cyclical skills shortages are exacerbated by the underutilisation of engineering migrant engineers.

Here Engineers Australia identified several factors which are influencing engineering graduation rates in Australia. Several recommendations from this report will assist in strengthening the pipeline of engineering graduates and reach the target of at least 60,000 additional engineering graduates by 2033.

These recommendations include for Government to:

- Incentivise contractors to provide graduate programs and internships for engineers through procurement processes.
- Offer engineering internships and graduate programs in agencies and departments which have an engineering capability.
- Provide Commonwealth Supported Places (CSP) for accredited engineering masters qualifications to help articulate other STEM bachelor qualifications to the level of professional engineers and to help retain engineers in the workforce by upskilling them in new and emerging fields.
- Increase the financial support available to engineering students to help lift engineering study completion rates and reduce time-to-completion. This includes Austudy and Youth Allowance.
- Incentivise school outreach programs which promote STEM through university funding models.
- Strengthen maths education in schools through more application-based learning utilising engineering principles and problems. Efforts should also be made to increase the number of maths and science teachers with relevant qualifications. For out-of-field maths and science teachers' effective resources should be provided.

Industry is also a critical partner to meet national engineering skills targets. Industry can and should:

- Offer scholarships to engineering students to help lift engineering study completion rates, reduce time-to-completion and retain engineers in the engineering workforce.
- Offer supportive graduate programs to recent graduates. Many engineering students, especially the high-performing students, secure a non-engineering job in their third or final year of studies. Engineering organisations need to compete with these organisations by providing attractive internship and graduate program opportunities.
- Provide supportive and paid – either fully or through co-contributions – internship opportunities to engineering students.

¹ Bell M, Briggs P, et al. 'Strengthening the engineering workforce in Australia' *Engineers Australia*
<https://www.engineersaustralia.org.au/publications/strengthening-engineering-workforce-australia>

Models for cooperation

CASE STUDY: CHARLES STURT UNIVERSITY BACHELOR OF TECHNOLOGY (CIVIL)/MASTER OF ENGINEERING (CIVIL)

Engineers Australia points to the Charles Sturt University Bachelor of Technology (Civil)/Master of Engineering (Civil) to showcase innovation in engineering study. This program is accredited by Engineers Australia and has been identified in a report by the Massachusetts Institute of Technology (MIT) as one of the top four emerging engineering courses in the world.

The course allows students to explore and apply their engineering learnings through authentic problems via four year-long paid placements in the workforce. The program doesn't involve traditional lectures or exams. Instead, it centres on project-based challenges with student mentored by a diverse academic team.² This program has been recognised for its strong program level focus on exposure to professional practice dealing with real-world complex problems and nurturing a blend of technical and general skills.³

This course is provided to showcase how innovative qualifications can still be accredited.

Further to this, a 2017 a report commissioned by the Department of Education and Training looked at professional course accreditation practice in Australian higher education. This report specifically calls out Engineers Australia as an agency which actively encourages innovation and an exemplar of good practice because of the focus on quality improvement.⁴ Professional accreditation:

- is outcomes based for engineering and therefore can incorporate innovative program structures
- provides for international mobility (engineering is an exemplar in this area)
- holds universities to account by requiring the degree/curriculum to be 'designed'.

The report further showed a review of accounting qualifications showed out of 20 universities qualifications, there was no excessive conformity in core subjects taught and there was adequate opportunity to undertake elective study.⁵

CASE STUDY: ENGINEERING EDUCATION AUSTRALIA PROFESSIONAL YEAR PROGRAM

Engineering Education Australia offers a Professional Year program for international graduates, which bridges the gap between full time study and employment and prepares participants for an engineering job. It is a 12-month program developing graduates' skills and local experience and provides participants migration points upon completion. Analysis shows participants of this program achieve similar employment outcomes as domestic engineering graduates.

This type of program is a good case study to show our graduate programs can be effective in supporting graduates become more jobs ready.

CASE STUDY: ENGINEERS AUSTRALIA'S INTERNSHIPS HUB – AN INDUSTRY BASED JOBS BROKER

Engagement with professional practice is a requirement for accredited engineering programs⁶. The related accreditation criteria provides options for how this can be achieved and is often mis-interpreted as 'requiring' a 12-week placement.

While engagement with professional practice can be achieved in multiple ways, the value of authentic placements and internships to develop professional identity has been demonstrated over an extended period. Engineers Australia's internships hub⁷ was developed as a resource to provide answers to

² Charles Sturt University 'CSU named one of the top emerging engineering schools in world' (accessed 22 August 2022 <https://news.csu.edu.au/latest-news/business-and-commerce/csu-named-one-of-top-emerging-engineering-schools-in-the-world>)

³Caroline Crosthwaite 'Engineering Futures 2035: Engineering Education Programs, Priorities and Pedagogies' *Australian Council of Engineering Deans* (February 2021) <https://www.aced.edu.au/downloads/Engineering%20Futures%202035%20R2%20report%20to%20ACED.pdf>

⁴ PhillipsKPA 'Professional Accreditation: Mapping the territory' (Final Report February 2017)

⁵ PhillipsKPA 'Professional Accreditation: Mapping the territory' (Final Report February 2017)

⁶ Section 3.4 AMS-MAN-10 Accreditation Criteria User Guide – Higher Education https://www.engineersaustralia.org.au/sites/default/files/2019-09/AMS-MAN-10_Accreditation_Criteria_User_Guide-Higher_Education_v2.0.pdf

⁷ Internships Hub *Engineers Australia* <https://yea.engineersaustralia.org.au/internship-hub>

commonly asked questions and exclusive content for students and industry to articulate the value of internships for all participants and to support creating successful internships.

For students the hub provides information and resources on early internship opportunities, student case studies, access to a work readiness series helping students close the gap between studies and professional work, a directory of internship opportunities and a jobs board.

Information is provided to industry to support with their understanding of successful work integrated learning opportunities. Engineers Australia has also developed guidelines on providing work experience to engineering students. These guidelines identify why industry is a crucial part of the puzzle, the benefits to both industry and students and best practice to make it a meaningful experience.

Engineers Australia's *Strengthening the engineering workforce* report further calls for work experience to be provided to school students who are interested in finding out more about our profession.

Engineers Australia have previously been approached by third party placement providers for endorsement. Engineers Australia does not endorse such programs due to the variation in model and because we are unable to confirm their quality. We are aware that some include a fee for service, potentially increasing the cost burden to student.

CASE STUDY: INDUSTRY ASSOCIATIONS SUPPORTING WORK INTEGRATED LEARNING

To support the panel, Engineers Australia points to the *Work Integrated Learning* offering of the Chamber of Commerce and Industry WA (CCIWA).⁸ CCIWA provide a free service facilitating university placements for businesses. CCIWA staff work with the business to define the project or role so that it meets placement guidelines, assist in the administration side of a placement and provide information, such as insurance requirements. Engaging professional and industry associations in this will help to make these services more accessible and reduce the burden from both industry and the higher education sector.

⁸ Chamber of Commerce and Industry WA 'Work integrated learning' (accessed 22 August 2022) <https://cciwa.com/how-we-can-help/work-integrated-learning/#1652682256820-bc41a2c7-6667>