REVIEW OF

UNIVERSITY-INDUSTRY COLLABORATION IN TEACHING AND LEARNING

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and Emeritus Professor Peter Dawkins AO

Australian Government

Department of Education, Skills and Employment

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About

Professors Bean and Dawkins are the former Vice-Chancellors of RMIT University (2015-2021) and Victoria University (2011-2020), respectively. Bean is an Emeritus Professor at RMIT and CEO of the Bean Centre, and Dawkins is an Emeritus Professor of Economics at the Mitchell Institute for Education and Health Policy at Victoria University.

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Acknowledgements

Reference Group

The reviewers convened a Reference Group of experts and leaders from the tertiary sector and industry. The reviewers are very grateful for the participation of Tom Bentley, Jeff Borland, Adam Boyton, Linda Kristjanson, Megan Lilly, Peter Noonan, and Jennifer Westacott/Mike Pope in the Reference Group. We thank them for their expert insights and input throughout the review process.

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Department of Education, Skills and Employment

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Roundtables and wider consultation process

The review benefitted from several roundtables with experts and practitioners, in addition to submissions and consultations with universities and other higher education and industry bodies listed at the end of this report. Thanks also to those individuals and organisations who provided ideas and information to the reviewers over and above the formal consultations.

Handling Notes: Reading the Report

A glossary of terms and abbreviations is provided at the end of the report. However, there are some key terms to highlight that were central to our focus.

Work-based learning models

For the purposes of this report, it is useful to make a distinction between work-integrated learning (WIL) and learning-integrated work (LIW).

Work-Integrated Learning consists of a range of activities that can contribute to an individual's learning. This occurs within a higher education qualification or a micro-credential in the form of placements, work projects, or simulations. WIL can be for-credit or not for-credit.

Learning-Integrated Work occurs when an individual is employed and combines their work with complementary learning: there is an employment contract and an associated formal learning program with an educational institution. Some learning occurs in the classroom or online, some takes place in the workplace. An example referred to in this report is cadetships. Micro-credentials could also play an important role within a cadetship, either on a stand-alone basis or in conjunction with a formal qualification.

Another example, referred to as 'sandwich' courses, is where an employment contract is integrated into a degree, allowing a combination of both WIL and LIW. Several universities in the United Kingdom have created sandwich courses. Over the decades, these were expanded to a wider range of professional areas and resulted in improved outcomes for students.[1] Some Australian universities have also offered sandwich courses.

Micro-credentials

This review has used the definition of micro-credentials proposed by the Australian Qualifications Framework (AQF) Review, developed by Professor Beverley Oliver: "A micro-credential is a certification of assessed learning that is additional, alternative, and complementary to or a component part of a formal qualification."[2] This definition encapsulates 'short courses' and the undergraduate certificate.

1. Further information on sandwich courses and student outcomes is at Appendix 1.

2. Noonan, P., et al. (2019), Review of the Australian Qualifications Framework, p. 56.

Digital badges

Digital badges are visual representations of learning. They are "verifiable and shareable, and … contain detailed information about the achievement and what the recipient did to earn the badge."[3]

Rich skill descriptors

Rich skill descriptors are "machine-readable, searchable data that include the context behind a skill, giving users a common definition for a particular skill, and achieving skills interoperability in credentials, education and training opportunities, job profiles, and learner records."[4] DeMark and Kozyrev provide a good explanation of how rich skill descriptors fit into a modern skill-based architecture.[5] A leading approach to rich skill descriptors is that of the Open Skills Network.[6]

3. IMS Global Learning Consortium. (2021), OpenBadges: Frequently Asked Questions & Glossary.
4. DeMark, S., et al. (2021), Enabling pathways to opportunity through a skills-based architecture, 2021, p. 3.
5. DeMark, S., et al. (2021), Enabling pathways to opportunity through a skills-based architecture, 2021.
6. Open Skills Network. (2021), Rich Skill Descriptors.

Executive Summary

The importance of increasing higher education-industry collaboration

Australia has an internationally renowned higher education system, but there is significant scope to enhance its engagement with industry to improve transitions from education to work and lifelong learning. Enhanced engagement will also help to fill existing and emerging skills gaps in industry and, in turn, increase productivity and economic growth.

Australia's economic development will be enhanced if, in addition to industry, the higher education sector partners with the vocational education (VET) and secondary education sectors to achieve a more equitable and efficient universal tertiary education system – one that supports the entire population. It is critical that we view our tertiary education system as a coordinated national platform capable of developing the knowledge, skills, and capabilities of learners of the whole population, while also enhancing our economy and society.

Now is the time to act

As we come out of the COVID-19 recession, there is a pressing need for the higher education sector and industry to systematically tackle the development of workforce skills urgently required by the Australian economy.

The current pandemic-triggered crisis has made it starkly evident that skills and knowledge are critical to a successful Australian recovery. Access to skilled pathways and employment opportunities for the whole population is vital to ensuring the future health of the Australian economy. The creation of widespread opportunities through collaboration on education and skills development, as our industries and labour market continue to change, is a key to this.

Our review suggests that both higher education and industry have the appetite for increased collaboration. With government support, there are huge opportunities for collaborations that will accelerate Australia's skills agenda in a post-pandemic world.

"It is critical that we view our tertiary education system as a coordinated national platform capable of developing the knowledge, skills, and capabilities of learners of the whole population, while also enhancing our economy and society."

The importance of education for generic employment and life skills, and well as technical skills

It is also important to note that many of the generic skills that employers need from graduates are also the life skills that are necessary for graduates to lead fulfilling and satisfying lives. The social and mental health benefits of meaningful work are also well documented.[7]

Digital technology and skills are vital to the future of our economy and to the successful movement between industry and the tertiary education sectors; ensuring all Australians can access opportunities for skilled, productive work, and contribute to the solutions and services needed in the decade ahead.

So are opportunities to develop the in-demand, industry-relevant experiences and working knowledge that build the capability of learners to be successful in the workplace and develop the connections and mindsets that improve their earnings and opportunities over their lifetime.

The latest employment projections from the National Skills Commission demonstrate how critical a combination of knowledge, skills, connections and direct working experience will be to the future performance of the Australian economy.

In relation to our review's terms of reference, we consider that effectively developing and aligning these opportunities will be crucial to the prospects of both priority groups we were asked to consider: young people looking to make a successful long-term transition from schooling into the skilled workforce, and existing workers looking to upskill and reskill in the face of a rapidly changing landscape of work.

Higher Education play a critical role in providing such knowledge, skills and connections, together with their role in research, innovation, and cross-sector collaboration.

The landscape of skills and workforce development is also changing rapidly, including the redesign of senior secondary education pathways and innovations in work-based training and micro-credentials.

The opportunity for education, industry and government to establish a modern and fit-for-purpose skills, qualifications and credentials architecture

Industry's focus is on skills; education tends to focus on qualifications. We need to bring them together in a common language and unified framework.

Australia has an opportunity for education, industry, and government to work together to align the development of its skills and education systems, by accelerating the use of the Australian Skills Classification, reforming the AQF, and supporting the development of a unified credentials platform. A credentials platform is a secure digital environment that brings together a learner's full range of tertiary qualifications and achievements with the ability to compile and share them with potential employers.

7. Modini, M., et al. (2016), The mental health benefits of employment: Results of a systematic meta-review.

Together with cross-sector investment in the capabilities, technology platforms, industry partnerships and admissions pathways, this will enable the demand for skills to be met over time and give all learners pathways towards skilled and productive work.

"Australia has an opportunity for education, industry, and government to work together to align the development of its skills and education systems..."

Enhancing industry engagement in learning outcomes, micro-credentials, cadetships, and work-integrated learning

As well as continuing to develop and align the high-level, cross-sector architecture of skills, qualifications, credentials and learning pathways, Australia needs to seize new opportunities and meet the growing pressures of shifting workforce demands with high-quality learning experiences in areas of industry demand for skilled workers.

In this rapidly changing future, important gaps to fill include the provision of short, specific high-quality learning experiences accessed through a digitally enabled skills ecosystem, and high-quality, work-based learning in the form of cadetships that help form pathways towards skilled employment. These are two of the key initiatives proposed, as well as continuing to find ways to enhance the engagement of industry in shaping learning outcomes, and promoting high-quality, work-integrated learning, WIL. Given the importance of cross-sectoral collaboration, we also propose a fund to stimulate innovations which promote this outcome.

Seven Short-Term Actions and Four Longer-Term Directions

Overall, the report identifies seven short-term actions which government, higher education providers and industry can take to promote greater collaboration. These actions, if effectively connected and integrated over the next two years and beyond, will help Australia move rapidly towards a system which invests more effectively in building capabilities and skilling the wider workforce through lifelong learning.

Longer-term reform directions, building on the seven short-term actions, are also outlined in this report. We propose that long-term progress in these directions is necessary and desirable for Australia, and encourage active debate and discussion, informed by the evidence, about how they can be achieved.

Seven Short-Term Actions

High-level architectural actions

1. National Skills Taxonomy

Accelerate the development and use of the Australian Skills Classification as an open access national skills taxonomy. This will create a common skills language for industry, higher education and VET to collaborate on education program development, and more effectively meet workforce needs.

Steps:

- Australian Skills Classification to be expanded to cover all occupations in the labour market relevant to VET and higher education.
- Scope out and undertake additional work needed for government, industry, and educators to build a proxy list of rich skill descriptors to underpin the unified credentials platform (see Action 3 below).
- Determine if the Australian Skills Classification, which is already matched to occupations, can be used as a proxy for rich skill descriptors to underpin the credentials platform. This will involve government and the higher education and VET sectors working together with industry to inform a more comprehensive Australian Skills Classification.
- Industry to work with government and educators to use the rich skill descriptors to co-develop required new courses and corresponding digital badges.
- Industry to use rich skill descriptors to assist in recruiting and developing talent and workforce capabilities.
- Wherever possible, skill descriptors should be mapped to open standards.
- Government, industry, higher education, and VET work together in the governance of this process to drive better outcomes for students and industry. This will ensure that it meets their respective needs, for example in the implementation of Actions 2 and 3 below.

"Our review suggests that both higher education and industry have the appetite for increased collaboration. With government support, there are huge opportunities for collaborations that will accelerate Australia's skills agenda in a post-pandemic world."

2. Implement AQF Reform

To assist in the design of qualifications that will meet the needs of industry, expedite reform of the Australian Qualifications Framework (AQF), in order to facilitate better collaboration between higher education providers, VET providers and industry and to also enable the alignment of micro-credentials to the AQF.

Steps:

- The Commonwealth, State and Territory Governments should prioritise AQF reforms (as proposed by the Noonan Review), focusing on general capabilities, the AQF architecture, credit pathways, and principles for institutions that wish to align micro-credentials to qualification types and credit pathways.
- Governments to validate the position of the undergraduate certificate in the AQF and to end the uncertainty for providers and students caused by the sunsetting provisions currently attached to this qualification.
- Government, industry, higher education, and VET, to all be involved in the governance of this reform in a way that is complementary to Actions 1 and 3.

3. Unified Credentials Platform

Build a unified credentials platform to:

- Provide clear evidence of current and emerging skill shortages,
- Provide information, advice, and guidance to individuals to make informed learning decisions, and
- Provide clear links to quality credentials of all types and a bridge to existing labour market opportunities.

Steps:

- Government to articulate a vision for a platform that connects education, employment, and industry information to the user (job seeker, student, lifelong learner etc.), and develop a roadmap to unify and build on existing initiatives, which create a seamless experience for users of all types. The roadmap must identify priority investments and a clear timeline for deliverables.
- Government, industry, and the higher education and VET sectors to be involved in the definition, implementation, and governance of the platform in a way that is also complementary to Actions 1 and 2. As part of the governance, an expert working group must be established to oversee the ongoing development of the platform.
- Ensure the platform is based on global open standards and effectively interoperates with government and non-government platforms across Australia and, where possible, globally.
- Higher education providers to participate in co-design and user testing of the platform, integrate it into their offerings, and promote it to students and alumni.

Investments in collaborative skill development

4. Industry Focused Micro-credentials

Higher education providers and industry work together to build a stronger culture of partnership in the development and delivery of industry-focused micro-credentials. Accelerate progress by investing in a fund which targets areas of national priority, skill shortages or emerging skills.

Steps:

- Higher education providers, industry professional bodies and other industry representative groups to work together to build responsive, industry-focused micro-credentials that offer rapid skilling into defined workplace roles, with corresponding digital badges (aligned to global open standards), as described in Action 1.
- Government to establish a fund to accelerate progress for micro-credentials (0.25 EFTSL) that deliver skills in demand with industry, are assessable for credit, and incorporate rich skill descriptors, as described in Action 1.
  - A micro-credential is defined as "a certification of assessed learning that is additional, alternative, complementary to or a component part of a formal qualification."[8]
  - As the framework for, and delivery of, micro-credentials matures, the Government shoulder consider inclusion of even shorter micro-credentials, such as 0.125 EFTSL, to provide greater responsiveness and flexibility in meeting skills needs.
  - Participating students should receive access to the Higher Education Loan Program (FEE-HELP).
  - Government continue to fund undergraduate and graduate certificates, provided they meet the criteria outlined above.

5. Cadetships

Roll-out a flexible higher education cadetship program combining an employment contract and a learning program, including short 'transition to work' and 'career-change' cadetships (with micro-credentials) and 'sandwich course' cadetships (as part of a degree), along with longer, multi-year cadetships (with diplomas, associate degrees, or degrees). Provide Commonwealth supported places and additional funding to support industry involvement, and establish a reference group to help review and advise on best practice in employment arrangements, curriculum and assessment.

Steps:

- Higher education providers and industry to partner in the development of cadetship models that suit different student cohorts, especially equity groups. Higher education providers should preferably work with multiple employers in individual cadetship programs. Collaboration with VET providers should also be encouraged.

8. This review has used the definition of micro-credentials developed by Emeritus Professor Beverly Oliver. Noonan, P., et al. (2019), Review of the Australian Qualifications Framework, p. 56.

- Government to establish and implement a cadetship program with Commonwealth supported places and additional funding to support industry involvement and, where helpful, intermediaries to bring the partners together. Establish a reference group to review and advise on best practice, including the importance of working through the appropriate employment and industrial arrangements.
  - Program to include short cadetships (with micro-credentials) and longer, multi-year cadetships (with diplomas, associate degrees, or degrees).
- Funding for cadetships should be prioritised in areas where there are gaps for in-demand skills or fields in emerging technology.
- Industry to use cadetships as a LIW model of higher education to improve the job-readiness of graduates and support skills needs.

6. Learning Outcomes and Work-Integrated Learning

Continue to enhance higher education's engagement with industry in the shaping of learning outcomes, and enrich and expand work-integrated learning (WIL) offerings through the National Priority Industry Linkage Fund (NPILF) and the National Strategy on Work-Integrated Learning.

Steps:

Work-Integrated Learning (WIL)

- Higher education providers and industry should continue to work together to improve WIL to ensure students leave study as work-ready as possible. A key priority in improving student outcomes is to continue to work on embedding WIL in the curriculum and in the assessment of all study programs.
- Universities Australia and the Australian Collaborative Education Network (ACEN) to continue to work with the Australian Chamber of Commerce and Industry (ACCI), Ai Group, and the Business Council of Australia (BCA) in championing the National Strategy on Work Integrated Learning, and to consider providing oversight for the feasibility and potential development of a digital marketplace for WIL placements and projects proposed below.
- Higher education providers and industry to work together to streamline the process for higher education providers to access WIL placements and projects, and test the feasibility of establishing a digital marketplace for WIL placements and projects.
- Higher education providers and professional bodies to work together to establish a guidance framework for WIL placements that makes it easier for small and medium enterprises to (1) participate in hosting learners, (2) ensure students' activities provide quality learning outcomes, and (3) participate in assessment where appropriate.
- Industry and higher education providers to design work experiences that meet the needs of the workplace and the curriculum. Provide more opportunities for WIL through placements, projects (including remotely, where appropriate) and industry mentoring of learners – especially in areas like business, arts and social sciences, maths, and science, where WIL has been less prevalent.

Enhancing higher education's engagement with industry in the shaping of learning outcomes

- Through the NPILF, higher education providers should continue to aim for best practice and find new and better ways to work with industry to shape learning outcomes that enhance the relevant skills and capabilities of their students.
- Government should:
  - Review any impediments that may exist in the Higher Education Standards Framework (Threshold Standards) 2021 and their implementation that affect the ability of higher education providers to be effective and agile in meeting changing industry needs.
  - Based on NPILF reporting of each higher education provider, continuously promote best practice to improve WIL on an ongoing basis.

7. Cross-sectoral partnerships

Build stronger cross-sectoral partnerships of higher education and industry, in collaboration with VET and/or schools, including the introduction of a cross-sectoral teaching and learning innovation fund to drive immediate progress in areas of partnerships and pathways.

Steps:

- Higher education providers to review their credit practices and policies against best practice, including recognition of prior learning (RPL), and pursue partnership projects with industry, VET providers and schools to improve outcomes for learners. The projects could include co-designed learning programs and work experience, as well as improved pathways and credit arrangements.
- Higher education providers to be encouraged to include content from the VET sector where industry advises it would be beneficial.
- Higher education providers to work with tertiary admissions agencies to enhance the study pathways available to students as they work towards a future career. This may involve accrediting learning from secondary studies/school towards the course requirements of a tertiary qualification.
- Government to establish an innovation fund to drive collaboration and enhance pathways and partnerships between higher education providers, industry, and the VET and school sectors. Examples of possible areas of investment, and of precedents, include:
  - Programs for secondary school students in Years 10-12, which provide industry experience and credit into higher education programs, such as Central Queensland University's Start Uni Now program.
  - A consortium of providers and industry, such as the NUW Alliance's Aerotropolis Multiversity in New South Wales, collaborating for example on integrated work-ready certifications across sectors. Another example is the New South Wales Institutes of Applied Technology, focusing on areas such as advanced manufacturing, digital media and care industries.
  - Industry and regional cross-sectoral collaborations, such as Federation University's Grampians Region Health and Work Readiness Program, which helps meet the skill needs of regional health authorities with supported pathways from senior secondary school onwards through VET and higher education.

Longer-Term Reform Directions

The review also proposes four longer-term reform directions that are needed to drive greater university and industry collaboration.

1. **Towards an integrated tertiary education sector and seamless pathways from school**: Develop a longer-term policy direction to leverage the reform of the AQF and introduction of a unified credentials platform to move to a more integrated tertiary sector, promoting pathways and partnerships between VET and higher education. As well as ensuring greater alignment of funding and regulatory arrangements, the system must equally value academic and vocational learning to give students the right skills to succeed in the modern workforce. The development of seamless pathways from school to the tertiary education sector should be a policy priority.

2. **Reviewing incentives:** Ensure the right incentives are in place for students, employers and higher education providers to create a socially-optimal level of investment in human capital development, and the required level of industry higher education collaboration. Lifelong learning accounts should be considered as part of this review, alongside possible tax incentives for industry if they make contributions to workforce learning beyond those that provide requisite private returns for their organisation.

3. **Expanding the scale of activity:** If some or all the above seven short-term actions are adopted and when they show signs of success, it will be important to consider how they will be sustainably scaled-up over time.

4. **Extension and possible expansion of the National Priority Industry Linkage Fund (NPILF):** The NPILF Review will examine how to redirect the NPILF funds to reward successful strategies. The review should also consider the progress of new actions that may be undertaken as a result of the recommendations of the review and any adjustments or expansions to policy settings that may be needed. Government should consider providing additional funding to NPILF in 2025 when funding becomes performance-based so that incentives do not rely solely on redistributing static funding between providers.

Introduction

Purpose of the review

The University-Industry Collaboration in Teaching and Learning Review was asked to consider how universities, industry and government can increase industry engagement in teaching and learning through:

- improved course curricula,
- more systemic engagement, and
- expanded opportunities for learners of all ages to gain work experience and industry relevant skills.

This review complements efforts by the Australian Government to improve research commercialisation in Australia through the University Research Commercialisation Scheme. Improved collaboration with industry in teaching and learning can also serve as an important catalyst to improve research commercialisation and innovation outcomes.

The review also aligns with the Australian Government's strategy to support skill development to meet the growing skill gaps in Australian industry. Closer links between higher education providers and industry in teaching and learning will facilitate a deeper understanding of industry's skills needs and how to meet them.

The review considers best practice and innovation across the Australian higher education sector, as well as international experiences. It focuses on two distinct learning cohorts:

1. Young people establishing a foothold in the skilled labour market, and
2. Skilled individuals with career experience looking to upskill or reskill.

The review considers:

1. Short-term actions and supporting activities, and
2. Longer-term reform considerations.

Process and consultations

The review was undertaken on an accelerated timeline to coincide with the complementary work on research commercialisation.

The reviewers undertook consultations with higher education providers, industry peak bodies, employers, professional body associations, experts, and government representatives between June and August 2021. They also received advice and feedback from a Reference Group, comprising tertiary education and industry experts and practitioners.

Individual universities were also invited to make a short submission or provide case studies in response to the review's terms of reference. More than 30 submissions were received from institutions and individuals. The full list of consultations and submissions is listed in the report appendices.

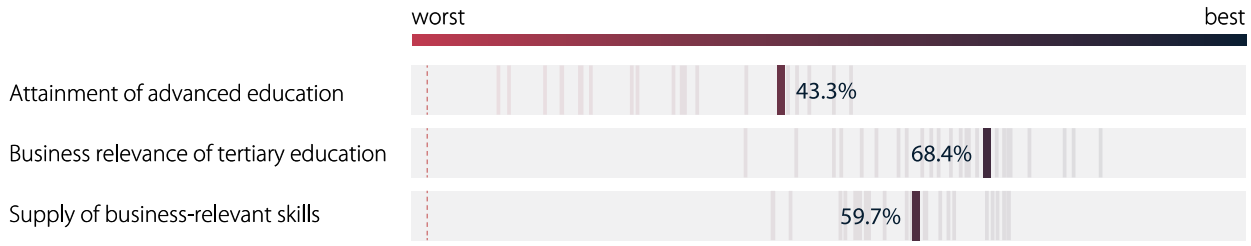
Challenges facing higher education and industry

Higher education and industry partnerships in teaching should be stronger

Australia has a strong higher education sector and we have seen good evidence of some significant industry connections in compiling this review. However, links with industry in teaching and learning are still relatively under-developed by international standards, which limits the impact of higher education providers in areas of innovation, human capital development, and productivity. This report recommends actions that will help move Australia towards best practice, with a view to increasing labour force skills and productivity, an important focus for public policy given the low rates of productivity growth since about 2005.[9]

According to the World Economic Forum (WEF), Australia ranks 6th for attainment of tertiary education, but our ranking drops to 10th for the business relevance of tertiary education and 12th for the supply of business-relevant skills (see Figure 1).[10] As the WEF notes, business relevance means "to what extent graduates possess the skills needed by business", while the supply of business-relevant education means "to what extent can companies find people with the skills required to fill their vacancies." The coloured bars represent Australia's performance in each metric, while the lightly shaded bars show the performance of other countries included in the WEF report.

Figure 1. Australia's relative performance on tertiary educational attainment and business skills



Source: World Economic Forum

This review advocates for improved connections between higher education providers and industry, strengthening pathways from education to employment, enhancing the upskilling and reskilling of the workforce, and hastening the pace of skill development in emerging areas of skills shortages.

9. Productivity Commission. (2020), PC Productivity Insights, Commonwealth of Australia

10. World Economic Forum. (2020), Future of Jobs 2020, p. 69.

Several advanced countries have established work-based learning as a pillar of their tertiary education systems. International examples include the United Kingdom's degree apprenticeship and 'sandwich' model, the United States' and Canada's co-operative model, and Germany's dual study model, which are described in the report appendices. Although these models have distinct features, they are underpinned by the following four key elements, which are characteristic of successful work-based learning programs:

- A significant proportion of the learning program is workplace training: between 25 per cent for co-operative and sandwich models, to 80 per cent for degree apprenticeships.
- The higher education sector and industry collaborate to co-design the learning program.
- Workplace training is formally integrated with the learning program.
- Industry and government co-fund the learning program.

Young people are finding it harder to transition from education to employment

Since the Global Financial Crisis (GFC) of 2008, young people have experienced deteriorating labour market outcomes relative to other age groups. They have been making poorer transitions into the workforce compared to previous generations, finding jobs in lower-scored occupations, working fewer hours, and struggling to move upwards over time.[11] The post-GFC deterioration in employment outcomes for young people has been attributed to the increase in labour supply and the subsequent increase in competition for jobs sought by young people, resulting in them being 'crowded out' of employment.[12]

The Productivity Commission finds that the imbalance between demand and supply of jobs since the GFC is likely to be affecting younger persons more than those older cohorts who were already in full-time employment. According to the Productivity Commission, the imbalance can be attributed to slower economic growth since the GFC, with structural factors such as older workers delaying retirement and strong increases in the number of university graduates also playing a role. The increasing proportion of those with tertiary qualifications and fewer roles has increased competition amongst graduates. This means that some graduates are willing to take fewer hours, work in lower-paying positions or in lower-scored occupations than their education would traditionally allow.[13]

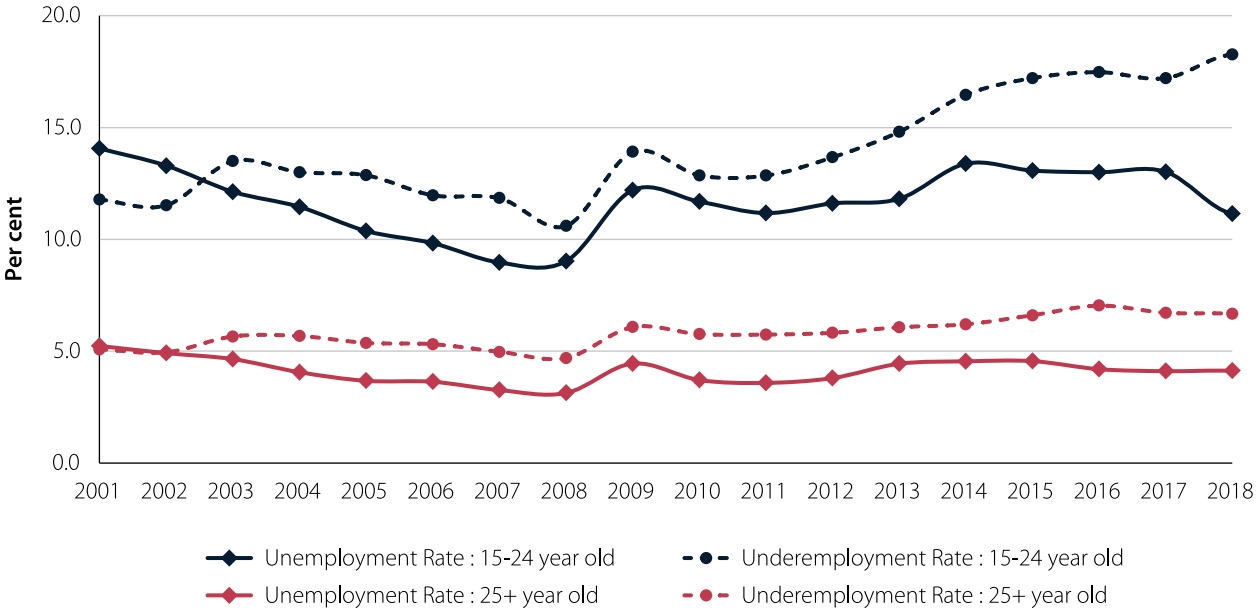
Youth unemployment and underemployment

Youth unemployment (aged 15-24 years) increased following the GFC, peaking in 2014 before falling to its lowest level in seven years in 2018. Unemployment for those aged over 25 years followed a similar trend. However, even in 2018, unemployment rates were still above pre-GFC levels. In 2018, the youth unemployment rate was 11.2 per cent compared to 9 per cent in 2008, while the unemployment rate for over 25s was 4.1 per cent in 2018, compared to 3.1 per cent in 2008.

11. de Fontenay, C., et al. (2020), Climbing the jobs ladder slower: Young people in a weak labour market, p. 24.
12. Borland, J., et al. (2021), Is it 'dog days' for the young in the Australian labour market?
13. Ibid. p. 5.

There has been a marked increase in underemployment among people aged 15-24. Figure 2 shows that between 2008 and 2018, the rate of underemployment for this cohort increased from 10.6 per cent to 18.3 per cent. The Productivity Commission finds that part of the adjustment in labour market outcomes for young people following the GFC is explained by a reduction in working hours. Over this period, hours worked by those aged 15-24 decreased by about 2 per cent. Of this figure, 1.4 percentage points was caused by a shift away from full-time work, with the remainder due to an increase in unemployment.[14] Younger workers are increasingly likely to be employed in casual or part-time work. The Productivity Commission found that the shift away from full-time work can be partly explained by an increase in higher education participation, however most of the shift is attributable to a reduction in working hours of those not undertaking education.[15]

Figure 2: Unemployment and underemployment rate of young people aged 15–24, 2001 to 2018



Source: Table 22. Underutilised persons by Age and Sex - Trend, Seasonally adjusted and Original, 6202.0 Labour Force, Australia, ABS

Youth income

The Productivity Commission found that between 2008 and 2018, the incomes of young people declined in real terms, compared with growth for older cohorts.[16] Figure 3 shows labour income for people aged between 15-24 declined at an annual rate of 1.5 per cent, while for the 25-34 cohort it declined by 0.8 per cent. In contrast, income growth was in the order of around 1.4 per cent per year for people aged 35-64.

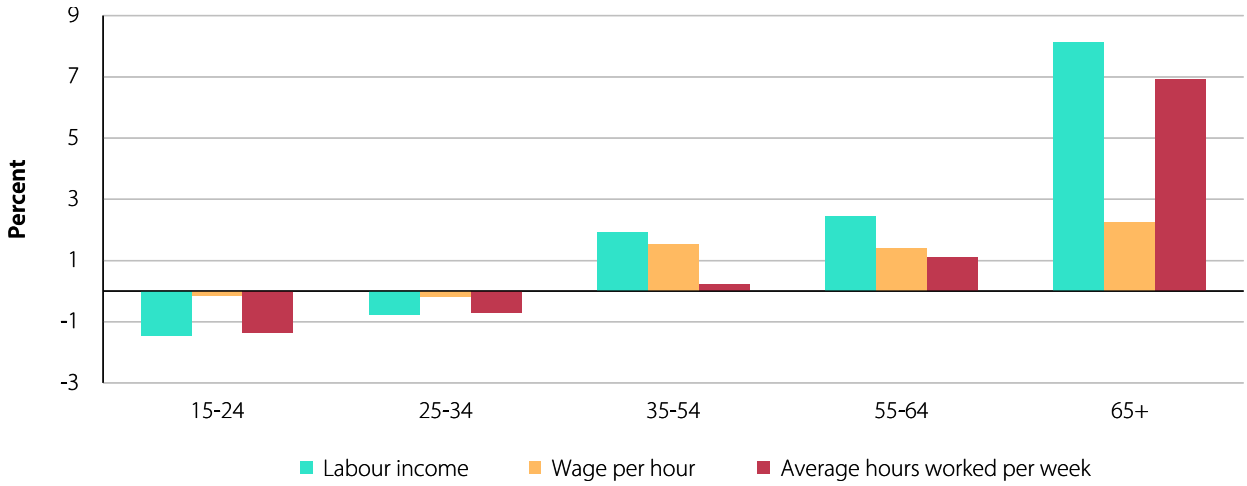
14. Productivity Commission (2020), Why did young people's incomes decline?
15. Ibid.
16. Productivity Commission. (2020), Why did young people's incomes decline?, p. 1.

Income is the product of wage rates and hours worked. The primary driver of the decline in labour income growth for young people is the reduction in hours worked, primarily due to an increase in underemployment. Wage growth for this cohort was also negligible, which can be partly explained by a more competitive labour market. This has resulted in graduates working in lower-paying jobs and lower-scored occupations.

NEETs

The number of young people Not in Education, Employment or Training (NEETs) is identified as a particular concern. The number of NEETs is typically disproportionately increased by an economic downturn, as it was by the GFC and more recently by the COVID-19 recession. The numbers never fully recovered after the GFC, and there was a further large spike caused by the COVID-19 recession. This has since reduced significantly but remains at historically high levels. It is important for industry, government, and the education sector to work together to find ways to engage NEETs in education, employment, or training – or some combination of these.[17]

Figure 3. Average annual growth in labour income, average wage rates and hours worked per person, by age 2008-2018



Source: Productivity Commission

Challenges ahead

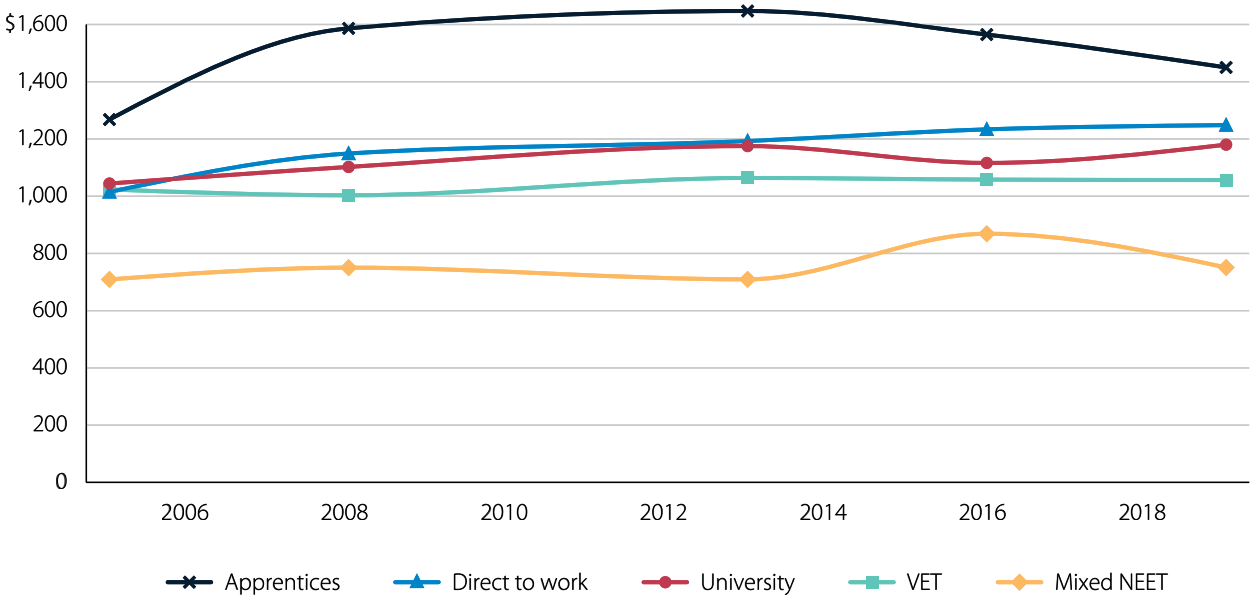
The influence of increased labour market competition will likely remain into the future.[18] The difficulties faced by young people as they transition into work may be lessened by gaining qualifications that are geared towards the needs of industry, and by acquiring relevant employment experience which complements their education and training. In reviewing lessons from the GFC, the Organisation for Economic Co-operation and Development (OECD) has identified creating strong connections between education institutions and employers as a critical measure to protect young people from labour market shocks, such as that caused by the COVID-19 pandemic.[19]

17. Dawkins, P., et al. (2020), Averting an Escalating labour Market Crisis for Young People: A Proposed National Job Cadet Program, p. 9.
18. Ibid.
19. Schoon, I., et al. (2020), School-to-work transitions during coronavirus: Lessons from the 2008 Global Financial Crisis.

Research undertaken for this review by the Mitchell Institute for Education and Health Policy, in association with the Centre for International Research on Education Systems, found that students undertaking skilled work experience in fields with generally a low prevalence of WIL (such as degrees in management and commerce, society and culture, and natural and physical sciences) were up to 20 per cent more likely to be in skilled employment by the age of 25.[20]

This research supports the association between work experience and better employment outcomes, and the idea that work experience is most helpful when it is a genuine learning experience that helps learners to apply what they have learned while developing new skills.[21] The research also used data from the Longitudinal Surveys of Australian Youth (LSAY) to show that by the age of 25, the apprenticeship and traineeship students are the most likely to be working full-time, have higher levels of job satisfaction, and have the highest real average weekly earnings (see Figure 4).[22]

Figure 4. Real average weekly earnings at age 25 by pathway



Source: Hurley et al.

The report also noted that higher education has grown considerably as a pathway for school leavers. Between 2005 and 2019, the proportion of young people using higher education as their primary pathway from school grew by about 14 percentage points. This underscores the importance of finding effective ways for higher education students to gain work experience and employability skills while studying.

20. Hurley, P., et al. (2021), Industry experiences and their role in education to work transitions, p. 4.

21. Billett, S. (2015), Integrating practice-based experiences into higher education, p. 1-26.

22. Hurley, P., et al. (2021), Industry experiences and their role in education to work transitions, p. 29-30

The findings of this research show that work-based learning experience does matter. University graduates in areas of study with a high prevalence of WIL have consistently better labour market outcomes. For many cohorts, young people who have employment in skilled occupations while studying are more likely to attain skilled employment by the age of 25.

"The findings of this research show that work-based learning experience does matter."

Other findings included:

- Individuals whose highest degree included a higher prevalence of WIL (such as degrees in health, agriculture, and education) have better labour market outcomes by the time they reach 25. These individuals are 3-8 per cent more likely to be employed and 15 per cent to 32 per cent more likely to be in a high-skill job, compared to those whose highest degree has a low prevalence of WIL (such as degrees in management and commerce, society and culture, and natural and physical sciences).
- Work experience while studying is associated with better labour outcomes by the age of 25. In 2005, young people who had some employment while studying a degree were 8-10 per cent more likely to be employed at the age of 25 compared to those who had no work experience while studying. By 2019, these young people were between 21-25 per cent more likely to be employed by the age of 25, compared to those who had no work experience while studying.

Higher education must better meet the needs of lifelong learners

Skills shifts in the economy are increasing the demand for lifelong learning. The traditional front-loaded education model does not equip workers with all the skills they will need throughout their career. Some predictions suggest that by 2040, Australians will need to double the share of learning they do after the age of 21 – from 19 to 41 per cent.[23]

When industry is providing training to their employees, employers tend to use informal, rather than formal learning. According to WEF survey data, employers expect to use mostly internal organisational capacity to deliver training (39 per cent), supported by online learning platforms (16 per cent) and external consultants (11 per cent).[24] As could be expected, the COVID-19 pandemic has accelerated the use of online reskilling.

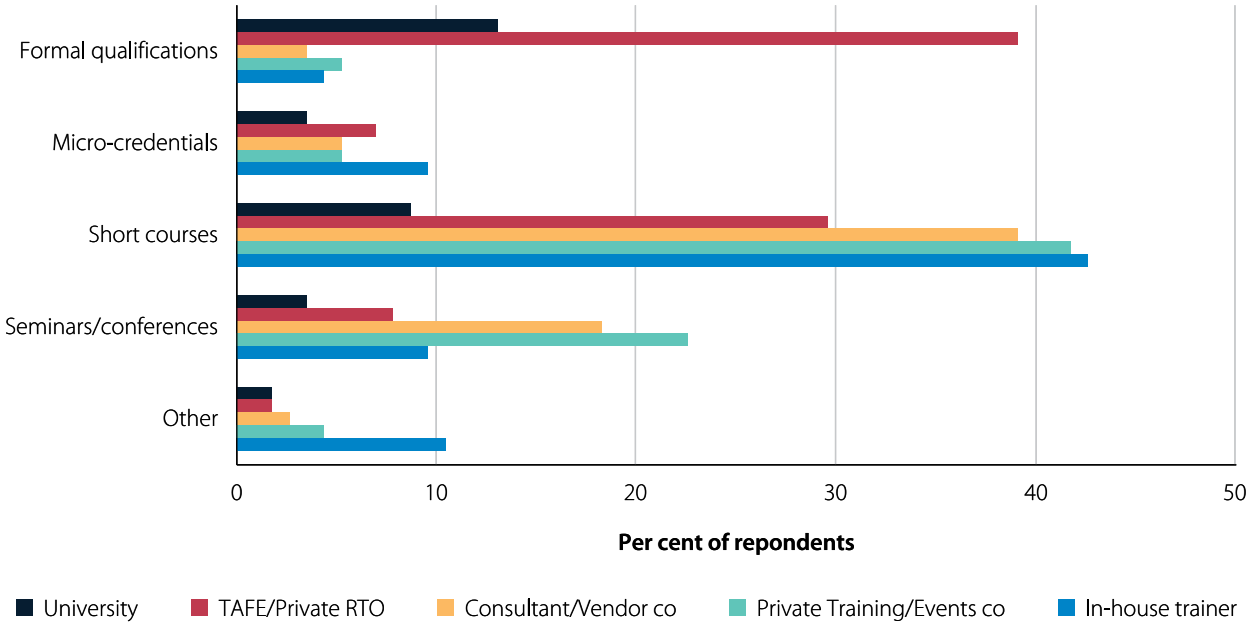
In general, employers are not looking to higher education providers to meet their upskilling and reskilling needs. Figure 5, from the 2021 Ai Group employer survey, shows the type of training and providers that industry intends to use over the next 12 months.

23. AlphaBeta. (2019), Future Skills, p. 5.

24. World Economic Forum. (2020), Future of Jobs 2020, p. 38.

"...the COVID-19 pandemic has accelerated the use of online reskilling."

Figure 5. Surveyed responses to types of training and providers that industry intends to use over the next year

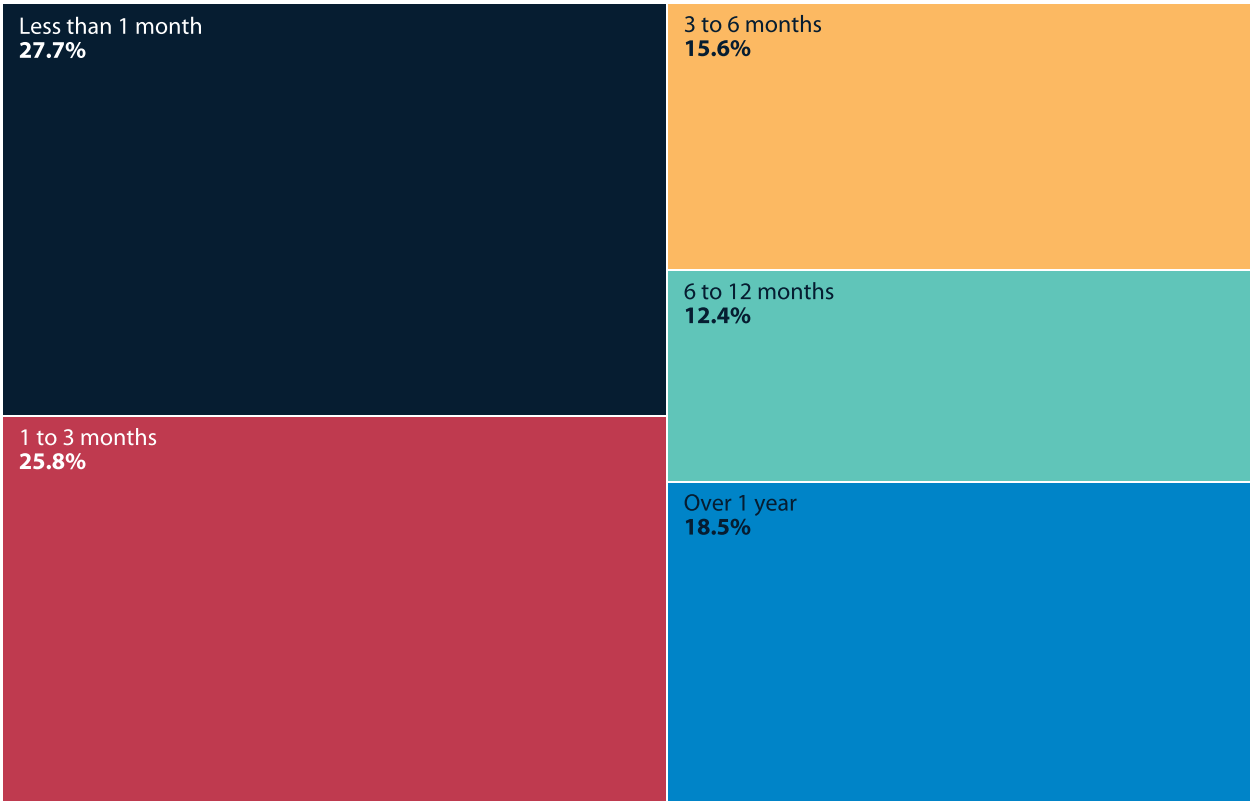


Source: Ai Group[25]

One reason for this lack of reliance on higher education for upskilling is the perceived lack of suitability of higher education offerings for use by industry. When it comes to reskilling, employers indicate a strong preference for short training durations: nearly 70 per cent of Australian employers surveyed by the WEF last year were seeking to reskill workers in less than six months (see Figure 6).[26] Therefore, a change of approach is needed to align what higher education provides with the changing needs of industry, to create value for lifelong learners beyond the traditional model of a baseline qualification and some additional postgraduate study.

25. The Australian Industry Group. (2021), Skills Urgency, p. 22.
26. World Economic Forum. (2020), Future of Jobs 2020, p. 70.

Figure 6. Employers' preferred length of training time to reskill workers



Source: World Economic Forum

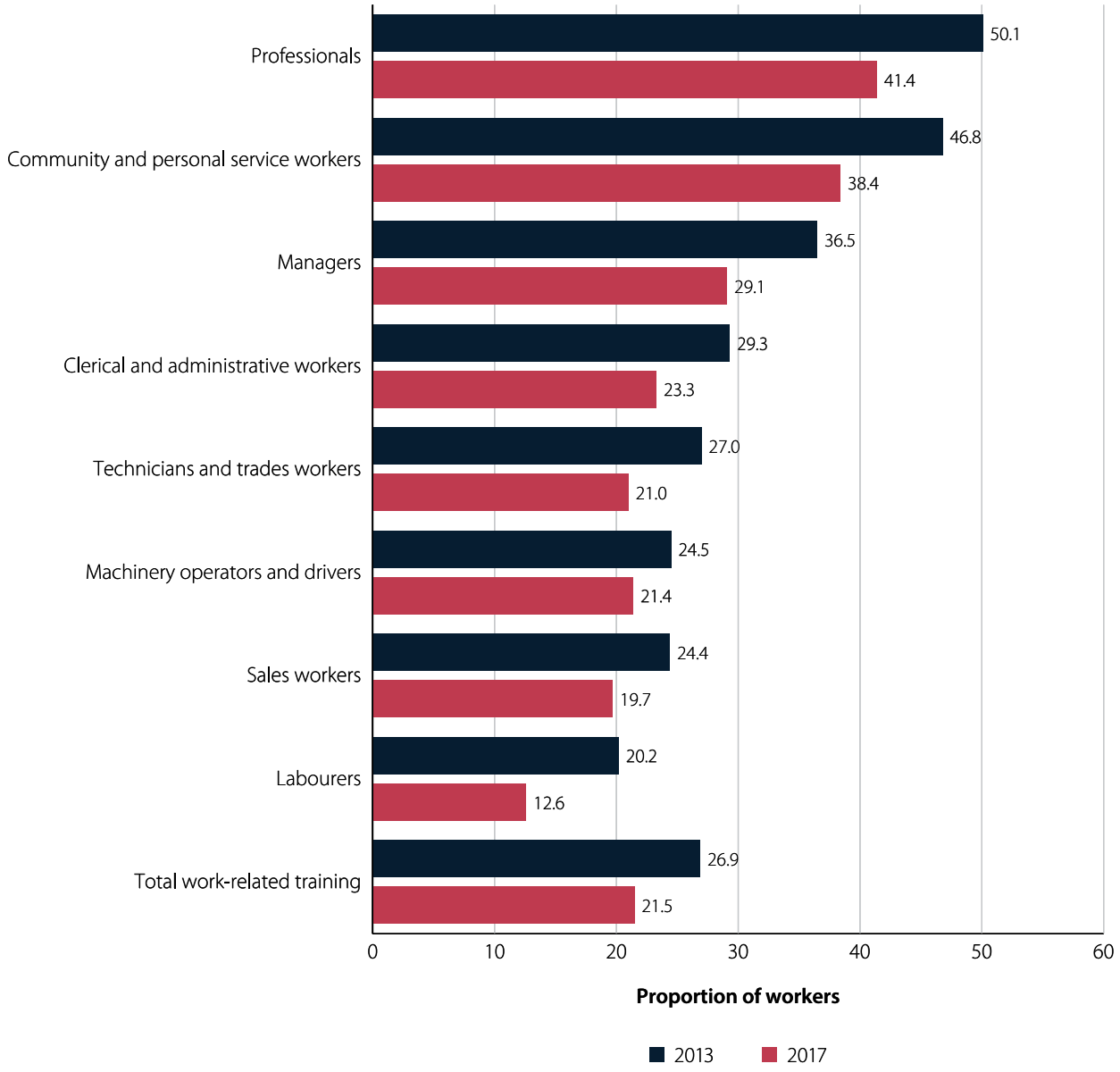
Industry engagement and investment that supports lifelong learning is critical to an adaptable and resilient workforce. Figure 7 shows employer investment in work-related training fell in the last decade.[27] Between 2013 and 2017, participation in work-related training declined from 26.9 per cent to 21.5 per cent. Industry investment in work-related training varies significantly across industries and occupations. Those employed in higher-skilled occupations, such as professionals and managers, participate in significantly higher levels of work-related training compared to those in lower-skilled occupations, such as labourers and sales workers.

The recent trend of decline in work-related training is across most industries and occupations as well as all ages and socio-economic groups. Such a decline can contribute to the erosion of human capital and worker skills across the economy.

27. Australian Bureau of Statistics. (2017), Work-Related Training and Adult Learning.

Individuals, businesses, the higher education sector, and government all have a role to play in fostering a culture of lifelong learning to minimise the potential negative impacts of job transitions, and to ensure the supply of labour is responsive enough to meet changing demand.

Figure 7. Participation in work-related training in current job, by occupation (15 to 74-year old's)



Source: Australian Bureau of Statistics

Australia is facing crucial skill shortages as it emerges from COVID-19

Skills shortages are being driven by rapid changes in the modern workplace, while industry's skills needs have been impacted by the COVID-19 pandemic. The latest Australian Bureau of Statistics data (ABS) shows that more than a quarter of Australian businesses are having difficulties finding suitable staff.[28] While ABS data attributes some of this to international border closures, the most significant factors impacting the ability to find suitable staff are a lack of job applicants and applicants not having the required skills or qualifications. Economic forecasts suggest a strong likelihood over the next two years that further economic growth will create more bottlenecks and skills shortages.

The National Skills Commission's (NSC) list of occupations in national shortage with strong future demand spans a range of sectors, including hospitality and care workers, engineering and science professionals, workers in trades, and business professionals.[29] Repeated lockdowns have forced workplaces to adapt through remote work and increased use of automation, which have also placed new and corresponding demands on workers. The NSC has also projected contributions from different industries to employment growth over the next 5 years, see Figure 8 below. The bars show the projected change in employment, in thousands, with green bars indicating an increase and red bars a decrease. Health care and social assistance has the largest projected growth and the top five growth industries together represent over 70 per cent of the total projected growth.

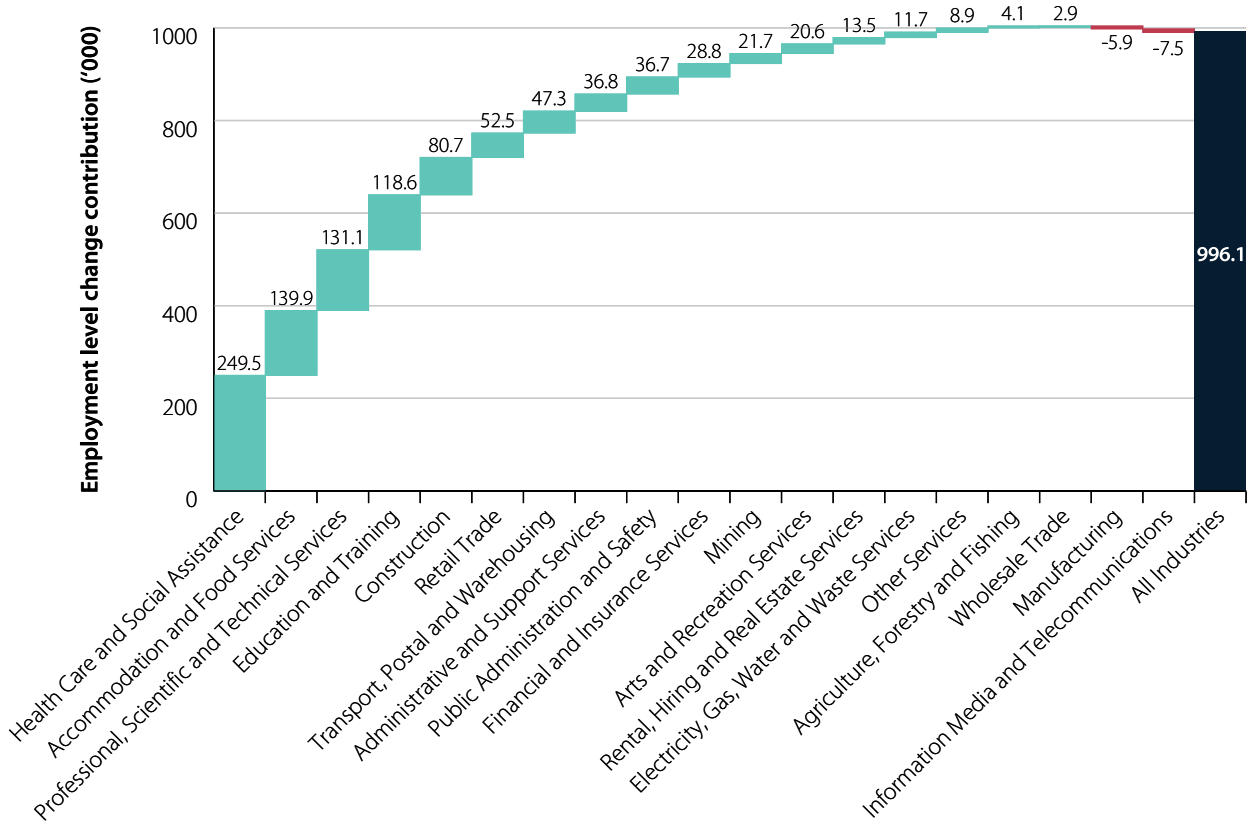
"Repeated lockdowns have forced workplaces to adapt through remote work and increased use of automation, which have also placed new and corresponding demands on workers."

28. Australian Bureau of Statistics. (2021), Business Conditions and Sentiments.

29. National Skills Commission. (2021), Skills Priority List.

Figure 8. Industry contribution to projected employment growth – five years to November 2025

Skills shortages typically occur in areas of employment growth



Source: National Skills Commission[30]

As lockdowns lift and Australia pursues sustainable recovery, this leap towards digital skills and channels, together with an ever-wider range of jobs that are infused and integrated with automated processes, data-driven decision-making, sophisticated collaboration, and problem-solving tasks, will not be reversed.

Government, higher education providers and industry must work together to meet these skills gaps and help Australians fulfil their career ambitions quickly and effectively. Three- and four-year traditional qualifications will continue to have their important place in Australia's tertiary system. However, the system must also consider contemporary and innovative ways to reskill workers to help Australia's economic recovery.

30. National Skills Commission. (2021), Industry Employment Outlook, p. 1.

There should be more collaboration and alignment between the higher education and vocational education sectors

Over the last 15 years, there has been an increase in the proportion of school leavers undertaking higher education as their primary pathway and a decrease in pathways directly into work and VET and training (Figure 9). For students and lifelong learners, pathways through the education system are not always linear; indeed, they are many and varied. It is common for learners to undertake a combination of vocational and higher education qualifications and micro-credentials to acquire skills and knowledge that help them at work, and meet industry demands.

A key issue for the tertiary education sector remains the pathways for students between different qualifications, particularly when that movement is between vocational and higher education sectors. Evidence indicates the recognition of equivalent learning content and assessment within these educational frameworks is a recurring concern for students, VET teachers and higher education lecturers. Even where skills and knowledge in these different areas is complementary and can help learners to access valuable work opportunities, the lack of clearly defined pathways and connections between the vocational and higher education sectors can make it difficult and confusing for students.[31] Policy, regulatory, institutional, administrative and cultural fragmentation impede learners from finding their way into and through pathways that could lead to valued skills and better labour market outcomes, and stifle transitions for students within and between VET and higher education institutions.[32]

Policy research at the Mitchell Institute has suggested that while the demand for higher education rose substantially, an offsetting decline in vocational education resulted in a lack of overall growth in tertiary participation.[33] Dawkins, Hurley and Noonan argued that the dichotomy between higher education and VET, and a lack of coherence across the tertiary sector has, if anything, become starker and that Australia needs a more comprehensive, coherent and inter-connected tertiary education sector that makes better use of both VET and higher education.[34] This type of tertiary education would respond to the challenges facing our students, rather than one based on outdated divisions between academic and vocational learning.

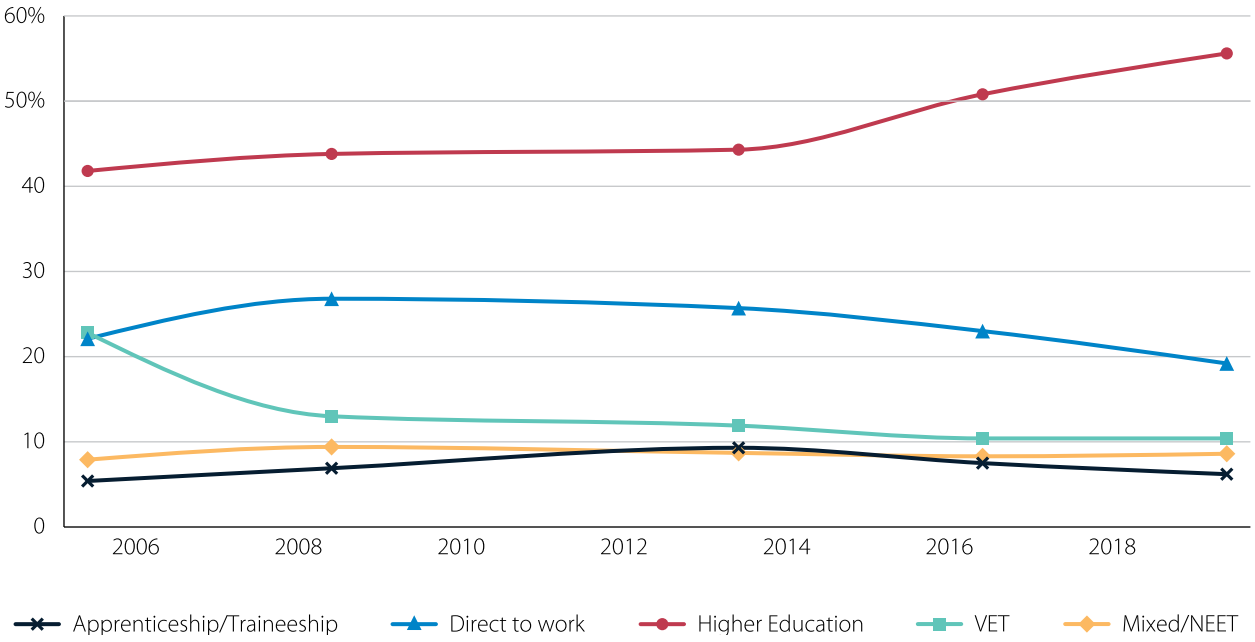
"Australia needs a more comprehensive, coherent and inter-connected tertiary education sector that makes better use of both VET and higher education."

31. University of Tasmania. (2015), Developing Pathways from Vocational to Higher Education Courses: Challenges Faced, p. 1-10.
32. Bogna, F. (2016), Articulation between VET and Higher Education qualifications: enhanced pathways and professional outcomes, p. 2-16.
33. Dawkins, P., et al. (2019), Rethinking and Revitalising Tertiary Education.
34. Ibid.

This was echoed in submissions from Australia's dual-sector universities, which outlined examples of initiatives they had taken to enhance pathways and partnerships between vocational and higher education, while pointing out significant regulatory and funding inhibitors to such partnerships and pathways.[35] They argued for:

- A coherent funding framework for higher education and VET, and cooperation between the Commonwealth and state and territories.
- Ensuring the recent recommended AQF reforms are adopted in full, and that learners are supported in a wide variety of choices and pathways across the continuum of AQF qualifications.
- Further exploring work-based learning opportunities into new and emerging industries and occupations in both VET and higher education, through partnerships with firms, industries, and the labour movement.
- Modernising VET qualifications moving from narrow, task-based competencies, to broader skill requirements to ensure the learners are better prepared for the future workforce.

Figure 9. Main pathway following school for young people at age 25 (by LSAY cohort)



Source: Analysis of LSAY data, Mitchell Institute Victoria University[36]

35. Bartlett, H., et al. (2019), Reforming Post-Secondary Education in Australia: Perspective from Australia's Dual Sector Universities; and Bean, M., et al. (2020), Dual-Sector Paper in Response to VET Funding Reform Discussions : Proposals from Australia's Dual Sector Universities.

36. Mitchell Institute. (2021), Industry experiences and their role in education to work transitions (unpublished).

Seven actions to achieve greater collaboration in teaching and learning

Short-term agenda

This review recommends seven policy actions to strengthen collaboration between higher education and industry and align the focus of collaboration with the development of more valuable skills, knowledge and capability with opportunities for government to drive improvements in the short-term. Some actions will provide an appropriate framework to develop a modern, adaptive higher education sector; others offer targeted measures to drive collaboration now.

For these to be effective, the different sectors and jurisdictions across Australia who share an interest in developing higher levels of skill and capability through lifelong learning must come together. They need to act on the current opportunities to align Australia's emerging skills architecture with qualification reform, vocational pathways, funding, and quality frameworks. This could lead to long-term productivity growth for the Australian economy and sustained growth with innovation for both tertiary education and key industry sectors in Australia.

Central to the recommended actions is the need for higher education and industry to work together in developing workforce skills.

High-Level Architectural Actions

There are three overarching improvements to the architecture of Australia's education system that will support this collaboration.

The first is the continued development of an open access national skills taxonomy including rich skill descriptors to ensure a common language or currency for both industry and the higher education sector, and to align with the continuing direction of reform in the AQF.

The second is to expedite reform of the AQF to enable better collaboration between industry and the higher education sector. Implementing existing reforms to create improved pathways and partnerships, as well as aligning micro-credentials more clearly with the existing qualifications structure, will support immediate collaboration priorities and encourage providers to undertake longer-term realignment.

The third is the development of a unified credentials platform that connects these descriptors to credentials (and therefore students) and holds information on the skills assessed in that credential – increasingly in a digital badge. The platform will drive collaboration between the higher education sector and industry by establishing a single repository that can be used to locate, verify and develop skills, linked to open widely shared standards and definitions that cover the whole economy, enable global exchange, and support alignment across higher education and vocational training systems. The platform will help the learning and working population to monitor and evidence the development of their own skill profiles and enable them to be more active participants in the skilled labour market. The ability of employers to fill skill gaps will also be greatly enhanced and simplified by easily discovering and verifying individuals who possess the requisite skills (defined by the descriptors).

Investments in collaborative skill development

In addition to architectural changes, immediate actions are required to drive industry and higher education collaboration focused on the skills needed in Australia's future workforce. These can be incentivised by policy initiatives to sharpen the focus on high-quality innovation and build critical mass in new types of provision. Investing more in micro-credentials to support upskilling and reskilling; expanding and enriching WIL; and investing in a cadetship program to give people rich employment experience while they undertake relevant studies. Such measures will ensure the higher education sector develops and delivers courses and skills needed and endorsed by industry, while targeting the cohorts of learners who can benefit most from these changes.

This policy agenda aims to support higher levels of skilled employment, increased productivity, and sustained economic growth and help to achieve lower levels of unemployment. However, it will be important to monitor progress and evaluate the impact of these initiatives, in order to refine and adjust policy settings, promote transparency and learning between sectors and jurisdictions, and consider expansion of certain measures like micro-credentials and cadetships if they achieve the expected outcomes. It's important to note that these initiatives are not static, and to remain relevant, they will require ongoing investment to monitor, supplement and refine as necessary.

High-level architectural actions

Action 1. Develop an open access national skills taxonomy

According to the OECD, skills have become the global currency of 21st century economies.[37] This view is shared by Deloitte Access Economics who state, "ultimately skills, rather than occupations or qualifications, form the job currency of the future."[38] The nature of work is changing rapidly, with growing demand for higher-level technical skills (especially digital) and important general capabilities or human skills, such as problem solving, teamwork and communication skills.

This shift in skills is the result of a number of factors including; changing demographics in the population, the increasing use of technology (including automation), the internet of things, big data and artificial intelligence, and international trade and markets.[39] The COVID-19 pandemic has also triggered significant changes in the demand for skills in certain sectors of the economy. The rapid speed of change is dramatically impacting individuals, businesses and government. The challenge facing many countries, including Australia, is to ensure that people acquire the right skills, and that economies and societies make good use of those skills.[40]

Consultations with industry confirm the claim that Australia is facing skills shortages, skills mismatches, and skills imbalances across the workforce. These challenges are highlighted in several industry reports and the Government's Skills Priority List released by the National Skills Commissioner.[41] Industry needs a ready workforce capable of participating at the right skills levels, in the right jobs and with the capacity to adapt and reskill. According to the Ai Group, although more individuals are upskilling, 75 per cent of employers are still reporting skills shortages in the workforce.[42]

Higher education providers play a critical role in supporting industry to meet current and emerging workforce needs and to help people gain sustainable employment. However, employment outcomes for graduates have been declining and an increasing percentage of graduates in full-time employment report that they are not fully utilising their skills and education.[43] There is a pressing need for closer collaboration between higher education providers and industry to better align the skills and capabilities being developed by the education sector with the changing requirements of industry.

To achieve this, all stakeholders including higher education providers, industry and government, need access to reliable and clearly defined skill descriptors, regular skills forecasting and robust skills datasets. This should be

37. The Organisation for Economic Cooperation and Development. (2016), Skills Matter: Further Results from the Survey of Adult Skills.
38. Deloitte Access Economics. (2019), The Path to Prosperity: Why the future of work is human.
39. The Australian Industry Group (2019), 2020-21 Federal Budget Submission.
40. The Organisation for Economic Cooperation and Development. (2016), Skills Matter: Further Results from the Survey of Adult Skills.
41. National Skills Commission. (2021), Skills Priority List.
42. The Australian Industry Group. (2020), 2020-21 Federal Budget Submission.
43. The Australia Institute. (2019), The Future of Work for Australian Graduates: The Changing Landscape of University-Employment Transitions in Australia.

done through an open access skills taxonomy. This should ensure individuals, industry and higher education providers are working with common definitions and participating in a shared, open system regarding skill needs and development, designed to enable collaboration, shared investment, and continued improvement in response to evidence and societal demand. A skills-based approach to identifying and assessing skills in demand is needed rather than a focus primarily on formal qualifications. Access to a comprehensive, cross-sector skills infrastructure would assist higher education providers to work with industry to create courses and teach skills which are in demand, making it easier for individuals to gain the necessary skills employers need.

The move to an open access skills taxonomy to support greater skills matching and recruitment, identification of labour market skills shortages, and education and training opportunities has occurred in the United States and United Kingdom. In the United States, O*Net (sponsored by the US Department of Labor) and LinkedIn have established machine-readable skills datasets. While the O*Net dataset is open access, the LinkedIn skills taxonomy is only accessible to LinkedIn members. However, it is wide ranging and contains over 35,000 skills aligned to training and education opportunities and supports over 250,000 businesses to make skill-based hiring decisions from amongst LinkedIn's 575 million members.

In Australia, the National Skills Commission has developed the Australian Skills Classification. The Classification offers a common language of skills, enabling stakeholders to identify and articulate skills using a universal taxonomy. The classification system was developed using a mix of machine learning and human judgement and drew on different data sources, including O*Net and the Australian Employability Skills Framework. It has been further refined through employer surveys, Australian job advertisement data, and education and training course documentation.

The comprehensiveness of this system indicates that the Australian Skills Classification should be used as the foundation for skills language, for identification of where further investments are required, and for ways in which we can more effectively meet future skills needs.

Action

1. National Skills Taxonomy

Accelerate the development and use of the Australian Skills Classification as an open access national skills taxonomy. This will create a common skills language for industry, higher education and VET to collaborate on education program development, and more effectively meet workforce needs.

Steps:

- Australian Skills Classification to be expanded to cover all occupations in the labour market relevant to VET and higher education.
- Scope out and undertake additional work needed for government, industry and educators to build a proxy list of rich skill descriptors to underpin the unified credentials platform (see Action 3 below).
- Determine if the Australian Skills Classification, which is already matched to occupations, can be used as a proxy for rich skill descriptors to underpin the credentials platform. This will involve government and the higher education and VET sectors working together with industry to inform a more comprehensive Australian Skills Classification.

- Industry to work with government and educators to use the rich skill descriptors to co-develop required new courses and corresponding digital badges.
- Industry to use rich skill descriptors to assist in recruiting and developing talent and workforce capabilities.
- Wherever possible, skill descriptors should be mapped to open standards.
- Government, industry, higher education, and VET work together in the governance of this process to drive better outcomes for students and industry. This will ensure that it meets their respective needs, for example in the implementation of Actions 2 and 3 below.

Action 2. Expedite reform of the Australian Qualifications Framework reform

The AQF is the national policy for regulated qualifications in Australia. It describes learning outcomes for qualifications in the senior secondary, VET and higher education sectors, ranging from the senior secondary certificate to the doctoral degree. Education and training providers use the AQF when developing their qualifications to ensure their learning programs match the broad learning outcomes determined for each qualification type.

The 2019 Review of the AQF, led by Professor Peter Noonan, found that the AQF in its current form "requires substantial revision to make it a relevant and useful framework".[44] This would allow Australia's education and training sectors to respond effectively to national priorities and changing skill demands, while also supporting the design of more industry-relevant qualifications.

The review proposed several reforms to the AQF that could support collaboration between higher education providers and industry. These include modernising the definitions of qualification learning outcomes and general capabilities, improving recognition of industry-focused credential types, and making it easier for students to transition between the tertiary education sectors and work.

The review proposed a new AQF architecture that emphasises qualification types, rather than the levels of qualifications that dominate the current framework. It also proposed updated, contemporary definitions of knowledge, skills, and application, which are the three dimensions used to define qualification types. These new definitions would be framed in terms of 'action' by the learner to focus on the application of what is learned: the information, capabilities, and context to act in order to create valuable, relevant and useful outcomes.

This new system would be facilitated by a reduction of the number of capability levels in the AQF for knowledge, skills, and application, more clearly defining and differentiating what students obtain through different qualifications. Another proposal was to allow more flexibility in the construction of qualifications within the same type, so that any qualification could emphasise and achieve a higher standard of application, skill, or knowledge.

These reforms to the qualifications architecture allow education providers across all sectors to respond effectively to industry needs and act as part of a holistic system geared towards the continuous development of skills and capabilities.

44. Noonan, P., et al. (2019), Review of the Australian Qualifications Framework, p. 12.

"These reforms to the qualifications architecture allow education providers across all sectors to respond effectively to industry needs and act as part of a holistic system geared towards the continuous development of skills and capabilities."

The review also suggested adding contemporary general capabilities into the components that make up qualification types. General capabilities are qualities that a person exhibits in their general behaviour and attitude to work and life, often gained through informal or non-formal learning experiences, but also through a formal learning environment. General capabilities are recognised by employers as desirable in the workplace and are particularly valued because they are transferable from one role to another. In frameworks ranging from the Australian Curriculum to the OECD Education 2030, general capabilities are increasingly recognised as being critical for an individual's long-term success and prosperity.

The AQF currently lists general capabilities, known as generic learning outcomes, as fundamental skills, people skills, thinking skills and personal skills. The AQF Review found that this list is not an appropriate summary of the general capabilities that learners need to succeed in future jobs and contribute to civic life. The review recommended updating the list of general capabilities in the AQF to include capabilities such as digital literacy and ethical decision making, and to ensure they are taught in the context of a qualification's core content.

The importance of updating general capabilities, and in particular 'human-centred' skills to meet current and future workforce needs is reflected in a number of recent reports. According to Deloitte Access Economics and LinkedIn, there is increasing demand for soft skills like creativity, collaboration, persuasion, and emotional intelligence. Industry surveys conducted by Ai Group also confirms employer demand for soft skills has increased substantially across most occupational groupings. It is predicted that human-skill occupations will account for two-thirds of all jobs in Australia by 2030. It is also acknowledged that determining how to teach, measure and reliably assess these human skills is difficult and poses challenges for the current education system. A range of current research and development efforts is addressing these questions across the tertiary education sector.

The review acknowledged the growing need to improve recognition of micro-credentials, so that learners can be confident that the skills they gain are recognisable and portable. Many stakeholders see micro-credentials as an effective education and training tool that improves access to lifelong learning, given they take less time to complete than a traditional qualification, cost less, and can support learners to gain specific work-focused skillsets. However, the inclusion of micro-credentials as a component of Australia's tertiary environment requires clarity and consistency about what is considered a micro-credential.

There are many types of micro-credentials and other short courses to choose from in Australia. Learners are often overwhelmed as they attempt to navigate, compare, and gain recognition of these smaller credentials from employers or other providers. Discussions on how to improve recognition of micro-credentials are often stalled by the risk that increasing their regulation may have a negative impact on education and training providers' ability to rapidly respond to new and emerging skills needs. The AQF Review recommended improving recognition of micro-credentials through the creation of guidelines in the AQF's Qualifications and Pathways Policy, so that students have clarity on how they can gain credit for what they learn towards formal qualifications in the AQF. A separate recommendation was to design principles for institutions that wish to align

short-form credentials to the AQF, which would show the credential's complexity and provide more information on outcomes. The review cites these measures as the best way to strike a balance between quality assurance and the need to ensure micro-credentials remain a speed-to-market offering.

The Qualifications Pathways Policy provides guidance on best practice in credit arrangements and establishing agreements between providers – both within and across sectors. The AQF review recommended revising the policy to better reflect the range of pathways across the tertiary sector and placing greater emphasis on RPL. This would better support lifelong learning as students undertake and seek assessment for more and diverse learning experiences. It also recommended establishing an optional AQF credit point system for use by both sectors to support credit transfer and show the learning equivalence in both VET and higher education. This credit point system could be integrated with the unified credentials platform and extended to cover micro-credentials to better embed a flexible, forward-looking tertiary system.

On 9 December 2019, a joint media release by the then Minister for Education, the Hon Dan Tehan MP, and the then Minister for Employment, Skills, Small and Family Business, Senator the Hon Michaelia Cash, announced that the Australian Government had accepted all higher education recommendations and the aims of all VET recommendations, contingent on further discussions with State and Territory governments.

Implementing the proposed AQF reforms through agreement across Australian jurisdictions and industry sectors would provide a framework in which the definition, funding, and credit-bearing value of micro-credentials and innovative, and the industry-focused forms of work-based learning experience could be integrated into a comprehensive, open and transparent framework. This would enable students and workers in Australia to access a growing range of learning opportunities, while building their specific experiences into a cumulative framework that enabled them to gain credit and recognition for their growing skills – wherever they gained them and wherever they apply them.

All Australian governments should expedite the work to update the AQF as a foundation of a tertiary education system aligned to the future needs of lifelong learners, and a fundamental driver of tertiary policy and collaboration in Australia's education and training system.

"All Australian governments should expedite the work to update the AQF as a foundation of a tertiary education system aligned to the future needs of lifelong learners, and a fundamental driver of tertiary policy and collaboration in Australia's education and training system."

Action

2. Implement AQF Reform

To assist in the design of qualifications that will meet the needs of industry, expedite reform of the Australian Qualifications Framework (AQF), in order to facilitate better collaboration between higher education providers, VET providers and industry and to also enable the alignment of micro-credentials to the AQF.

Steps:

- The Commonwealth, State and Territory Governments should prioritise AQF reforms (as proposed by the Noonan Review), focusing on general capabilities, the AQF architecture, credit pathways, and principles for institutions that wish to align micro-credentials to qualification types and credit pathways.
- Governments to validate the position of the undergraduate certificate in the AQF and to end the uncertainty for providers and students caused by the sunsetting provisions currently attached to this qualification.
- Government, industry, higher education, and VET, all to be involved in the governance of this reform in a way that is complementary to Actions 1 and 3.

Action 3. Build a unified credentials platform

Advancements in digital technology are driving changes in the higher education system. Credential engines are becoming more common, digital badges are establishing forms of credential currency, and skills libraries are changing the way higher education providers work with industry. These advancements mean that the higher education sector can now join industry and individuals in a more agile online environment.

A unified credentials platform is a single place for individuals to access information on their lifelong learning history, linked to their employment possibilities and future learning options. The platform is informed by skills needs and employment data. It would be used by higher education providers and industry to develop the skills required in the workforce of the future, and to market opportunities aligned to skills needs. A unified credentials platform aligned to a common, open skills taxonomy would be a powerful and beneficial tool for learners, education providers and employers to navigate the ever-changing skills landscape, which will increasingly be driven by rapid changes in digital technology and innovation in the modern workplace.

Online learning has allowed students to have more choice of course offerings. This is likely to increase as micro-credentials become more commonplace, and as lifelong learning requires individuals to interact more frequently with the tertiary education system. A credentials platform could reduce fragmentation of information for prospective students and help them to navigate towards high-quality education options that meet their needs. In addition to learning experiences offered by higher education and VET providers, the platform could include professional, and industry developed accreditations, and act as a bridge to encourage their recognition towards a formal qualification, where appropriate. By linking to new credentials that will help learners to build a digital portfolio of their skills and capabilities that progresses their careers, a credentials platform could also increase worker engagement with lifelong learning.

These skills could be expressed in a learner profile to help students store and display their achievements, as well as share them with prospective employers and learning institutions to verify. Designed correctly, a learner profile could provide a much better and more useful representation of a learner's achievements and capabilities than a curriculum vitae. For providers and employers, standardised formats could make comparisons quicker and less subject to bias, as well as support more efficient and inclusive admissions or hiring processes.
The platform could also support Australian providers to find new markets overseas and provide additional pathways to attract international students to Australia once borders reopen.

Internationally, these types of platforms not only capture learning experiences and qualifications, they also link to career guidance materials, labour market data, employment opportunities, and skills information. Integrating this information is a key step in driving an efficient lifelong skills development system. Existing international platforms help students from as young as 16 make education and career decisions; the same platform then helps those further into their career make decisions about reskilling or upskilling. Figure 10 highlights an example of such a platform, MySkillsFuture, which has been developed in Singapore for its citizens.

Case Study

MySkillsFuture (Singapore)

MySkillsFuture is a comprehensive, one-stop portal that enables Singaporeans to make informed learning and career choices to pursue their skills and career development throughout their lifetime. The online portal connects learners with industry insights, education and training opportunities, employment resources and job opportunities. Additionally, the platform supports employers to search for talent, upskill staff, manage job postings, and stay informed of industry and skill trends.

Figure 10. The Singaporean Government's unified MySkillsFuture Platform

Source: MySkillsFuture

For government, the data generated by the platform could improve policy-making and funding decisions to help all Australians find fulfilling and high-skilled work.

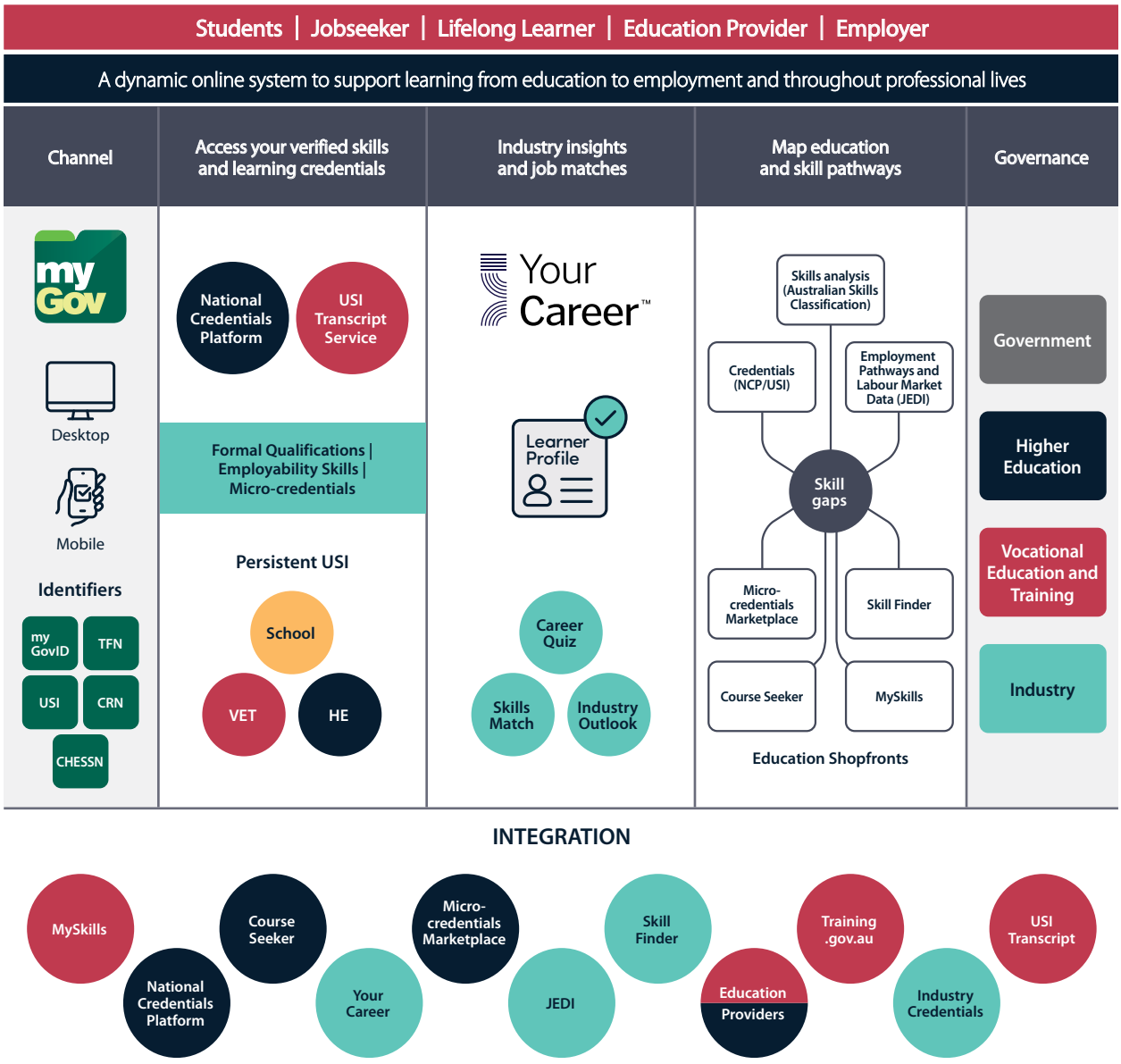
Many of the components of the proposed platform are now under active development or are operating as standalone websites:

- The National Skills Commission is developing the Australian Skills Classification, a comprehensive and universal taxonomy for occupational skills, and Jobs and Education Data Infrastructure (JEDI), which provides labour market information, workforce changes, and emerging skills needs.
- The National Careers Institute has launched the Your Career website to provide up-to-date, accurate careers information and support.
- The Department of Education, Skills and Employment (DESE) is working with the higher education sector to develop a National Credentials Platform (NCP), leveraging the sector's My eQuals platform to compile students' complete tertiary learning journey and achievements in a secure and trustworthy online environment. This will be an interactive digital tool allowing university students and graduates to access, analyse and share their verified learning credentials. It will support engagement in lifelong learning by making it easier for individuals to build a recognised and verified profile of their skills and qualifications.
- DESE is currently funding the development of the Micro-credentials Marketplace. The Marketplace will be a nationally consistent platform for students to compare micro-credentials against higher education provider offerings and credit point values. The Marketplace will also show arrangements for recognition of courses across higher education providers, which will support student decision-making and help students understand how they can stack micro-credentials and shorter-form credentials to contribute to a qualification or larger skill set. Cross-recognition of micro-credentials will help providers compare their offerings and encourage further development of education programs.
- Skill Finder is a centralised marketplace connecting the Australian workforce to new learning opportunities. Funded by the Department of Industry, Science, Energy and Resources, it connects learners to thousands of free online courses, particularly in digital skills, offered by leading tech companies.
- Other job search and credential search websites, like Jobactive and Course Seeker.

This action seeks to highlight the importance of these efforts and stresses the need for a national, cross-jurisdictional, and cross-sectoral approach to developing a unified credentials platform, with the experience and outcomes of learners at its centre. Figure 11 shows how the current suite of initiatives and systems could be integrated into a unified platform.

"For government, the data generated by the platform could improve policy-making and funding decisions to help all Australians find fulfilling and high-skilled work."

Figure 11. An integrated system for education, skills and employment



Source: Department of Education, Skills and Employment

This review recommends establishing a working group comprising Government, industry, and the tertiary sector to be involved in the definition, implementation, and governance of the platform, in a manner that complements the development of a national skills taxonomy, and reform of the AQF. The success of the platform will be driven by its ability to combine these initiatives seamlessly and create an engaging and useful service for all stakeholders. Therefore, a commitment to open standards is vital to enable interoperability between the constituent parts of the platform, but also facilitates connections with a broader ecosystem of services, including non-government platforms. This approach will create the most flexibility and value for users to support their learning from education to employment and throughout their professional lives.

Action

3. Unified Credentials Platform

Build a unified credentials platform to:

- Provide clear evidence of current and emerging skill shortages,
- Provide information, advice, and guidance to individuals to make informed learning decisions, and
- Provide clear links to quality credentials of all types and a bridge to existing labour market opportunities.

Steps:

- Government to articulate a vision for a platform that connects education, employment, and industry information to the user (job seeker, student, lifelong learner etc.), and develop a roadmap to unify and build on existing initiatives, which create a seamless experience for users of all types. The roadmap must identify priority investments and a clear timeline for deliverables.
- Government, industry, and the higher education and VET sectors to be involved in the definition, implementation, and governance of the platform in a way that is also complementary to Actions 1 and 2. As part of the governance, an expert working group must be established to oversee the ongoing development of the platform.
- Ensure the platform is based on global open standards and effectively interoperates with government and non-government platforms across Australia and, where possible, globally.
- Higher education providers to participate in co-design and user testing of the platform, integrate it into their offerings, and promote it to students and alumni.

Immediate investments in collaborative skill development

Action 4. Scale up industry-focused micro-credentials

As discussed earlier in this report, 70 per cent of Australian employers surveyed by the WEF last year were seeking to reskill workers in less than six months. Of these employers, more than 50 per cent preferred to reskill workers in less than 3 months, with around 25 per cent seeking to reskill workers in less than 1 month. In another survey by Ai Group, industry identified universities as the provider type least likely to be used to deliver micro-credentials and short courses.

Given the higher education sector's key role in providing education programs that support the ongoing skills needs of industry sectors across Australia, and the reputation of Australian universities for delivering quality learning experiences, there is an opportunity and an imperative to ensure greater collaboration between higher education providers and industry in providing learning and teaching for lifelong learners.

Micro-credentials offer an important opportunity to focus effort and investment on valuable skills and capabilities, while linking them into a shared ecosystem of capabilities, with a common, underpinning infrastructure based on rich skill descriptors and labour market data that encourages access, learner progression, quality, verification, and interoperability. The use of rich skill descriptors is key to providing a common language for industry and higher education providers to develop content that will deliver the workforce of the future.

The case studies below provide some examples where higher education providers have begun to develop more targeted, shorter, and industry-focused course offerings. It is time to ramp up these efforts with a continued focus on ensuring industry relevance. This could take many forms, from industry contributing to skills definition, course design, instruction, and even to endorsement. The key issue is ensuring that micro-credentials produce immediate value for learners: without this, the benefits of the format will be lost. A second consideration is ensuring that provider offerings are capable of being assessed for academic credit and can be stacked towards full qualifications. This will require providers to take a macroscopic view when designing micro-credentials, and work with other providers to improve inter-provider recognition. A system where learners are locked in to one provider will not be sustainable in the long-term.

"The use of rich skill descriptors is key to providing a common language for industry and higher education providers to develop content that will deliver the workforce of the future."

Case Studies

Micro-credentials and Short Courses

Charles Darwin University

Charles Darwin University has begun an initiative to accredit work-based learning towards a micro-credential. Using a portfolio assessment method, students would undertake, evidence, and reflect on certain workplace tasks. These would then be accredited against pre-defined units of competency to award a micro-credential. A complementary online tool to capture experience and learning is also being developed to improve the recognition of prior learning process.

Murdoch University – Digital Futures Academy

Murdoch University launched the Digital Futures Academy in 2020 with Cisco as a foundation partner. The academy offers industry focused micro-credentials and short courses that explore the impact of digital technology across disciplines as diverse as law technology, Fintech, gaming, and computational and systems medicine. With initial course offerings in automation, AI, robotics and blockchain, each run with and endorsed by Cisco, the academy aims to position Perth as a leading digital hub.

RMIT University – FutureSkills

RMIT University offers FutureSkills short courses via RMIT Online, with many focusing on digital technology and work-ready skillsets. More than 80 courses are currently offered, which are co-designed and delivered with industry partners such as Accenture, Salesforce, and NAB. Some short courses can be combined into 12-week 'bundles' that offer a cohesive learning experience for learners to develop a new skillset. Each course completion is signified with an RMIT digital badge.

University of Technology Sydney – Telstra

University of Technology Sydney has partnered with Telstra to deliver enterprise micro-credentials for Telstra employees and improve the ICT capabilities of its workforce. The partnership begun with three programs in data analysis, artificial intelligence and machine learning that are each 8-weeks in duration. Delivery of the micro-credentials are helping early career academics to develop their teaching capabilities and links with industry. Telstra intends to train 2,000 employees through the program over the next three years.

Internationally, governments are beginning to experiment with funding and accreditation of micro-credentials. In the United Kingdom, the Department for Education has recently announced competitive funding for providers to develop innovative employer-focused higher education short courses of 300-400 hours duration at the higher technical and degree levels.[45] New Zealand began accrediting micro-credentials in courses of between 50 and 400 hours in 2018.[46]

45. Department for Education. (2021), Higher education short course trial: Challenge Competition.

46. New Zealand Qualifications Authority. (2018), Micro-credentials.

As part of its response to COVID-19, the Government made a push on shorter qualification types with the idea of providing a quick and flexible way for people to reskill or upskill in preparation for Australia's economic recovery. This placed a new emphasis on the existing six-month qualification at the postgraduate level, the graduate certificate, and introduced a corresponding qualification at the undergraduate level, the undergraduate certificate. The sector responded quickly to the initiative: in 2020, there were 55 institutions offering around 400 courses. This was a strong start by higher education providers and demonstrated the sector's capacity to innovate in the way courses are offered.

This momentum should not be lost. However, some changes are required to deliver courses that are flexible and of the right duration and deliver the skills most in demand by industry. This in an opportunity for the Government to kick-start the mass adoption of industry-focused micro-credentials in higher education.

The review recommends improving the conceptual framework and funding arrangements for micro-credentials. As part of a workshop on the future of shorter qualifications types held as part of the review, participants from the higher education sector nominated three priorities.

1. Develop clear information, guidelines, and definitions.
2. Target offerings to in-demand or soon-to-be in-demand skills and competencies.
3. Improve student support, incentive structures and funding arrangements.

Government can alter the funding for micro-credentials, including the undergraduate and postgraduate certificate to respond to the needs of industry and our economy. The first step is for Government to clearly define the term micro-credential. This review has used the definition proposed by the AQF Review, developed by Professor Beverley Oliver:

> "A micro-credential is a certification of assessed learning that is additional, alternative, complementary to or a component part of a formal qualification."[47]

To ensure quality and an appropriate learning outcome for the individual, the review recommends that Government fund micro-credentials that meet the following criteria:

- Courses must be assessable for credit by a registered higher education provider and providers should define pathways to further study.
- Industry must play an active part in course design, delivery, and endorsement in one or more of the following ways:
  - Skills definition
  - Course design, including work experience, as appropriate
  - Teaching, mentoring and workplace assessment, as appropriate
  - Course endorsement.
- Courses must deliver clearly defined learning outcomes with immediate value to the learner and industry. This may include units from across fields of education and/or across AQF levels, and may also include new content.

47. Noonan, P., et al. (2019), Review of the Australian Qualifications Framework, p. 56.

- Providers should issue digital badges based on rich skill descriptors that define skills learned.
- A micro-credential should involve about 3 to 6 months of learning (or 0.25-0.5 equivalent full-time student load).
- Courses should deliver valuable student employability outcomes, equivalent to those of an average higher education student.

To ensure these credentials provide good public value, the Government should fund these credentials using a competitive innovation fund separate to the Commonwealth Grant Scheme. This will ensure funding is allocated to enterprising providers willing to develop micro-credentials in areas of national priority, while limiting the risks of unintended consequences for Australia's system of higher education qualifications. The Government should link investment in micro-credentials to the Australian Skills Commission's Skills Priority List and the National Manufacturing Priorities, as well as areas of emerging technologies or skills, such as Industry 4.0, which may not yet be accounted for by the list.

Not all micro-credentials need to be funded by government; the higher education sector should continue to design and deliver content that responds to the needs of learners and industry. The conditions above would not apply to a non-funded micro-credential, though it would be best practice to incorporate rich skill descriptors, as outlined in Action 1.

Although the review recommends that undergraduate and graduate certificates should continue to play an important role in the higher education system and be funded on that basis, funding micro-credentials is necessary as an additional step in the context of an emerging, transparent and integrated architecture for skills and capabilities. This would underpin lifelong learning by the wider community, as well as giving the sector the capability to respond effectively to the needs of industry and learners as the system moves towards an open, tertiary and cross-sector approach to investment in skills and capabilities.

Developing micro-credentials which are also well suited to online delivery could open new sources of overseas revenue to Australian providers by encouraging international students to participate in Australian learning pathways and enrol in a full Australian qualification, whether online or on campus, once international travel to Australia resumes.

In the future, as the framework for and delivery of micro-credentials matures, the government should consider funding even shorter micro-credentials to provide greater responsiveness and flexibility in meeting skills needs. For example, a micro-credential duration of 0.125 EFTSL corresponds to the typical duration of a university unit.

To complement development of micro-credentials, the higher education sector needs to invest more actively in digital badging. Digital badges provide a validated, online graphical representation of an achievement, which is accomplished by undertaking criteria-based learning activities.[48]

Several initiatives have emerged in the education and industry sectors, including:

- DeakinCo provides university-certified Workplace Credentials which validate specific skills through an independent assessment of demonstrated practice by applicants.
- VeriSkills measures skills (called human capability outcomes) that students gain upon completion of their course.

48. Perkins, J., et al. (2021), Digital badges: Pinning down employer challenges, p. 24.

Badges are important not only for the learner to use as a form of credential currency, but also for industry to quickly recognise competencies in a credential. Investment in digital badging will support machine-readable credential platforms to assess future employment or education pathways for students and assist in designing content to meet the needs of the workforce.

"For industry, the digital badge provides the skill information they need to assess and verify an individual's work readiness."

There is value in providing a form of recognition for micro-credentials, particularly if issued by regulated higher education providers. It is a signal of the value of learning and skill development. For a student, the digital badge would not only provide a certificate of achievement, but also key information on the skillset they have gained, using rich skill descriptors that are industry-recognised and co-developed. For industry, the digital badge provides the skill information they need to assess and verify an individual's work-readiness.

Action

4. Industry Focused Micro-credentials

Higher education providers and industry work together to build a stronger culture of partnership in the development and delivery of industry-focused micro-credentials. Accelerate progress by investing in a fund which targets areas of national priority, skill shortages or emerging skills.

Steps:

- Higher education providers, industry professional bodies and other industry representative groups to work together to build responsive, industry-focused micro-credentials that offer rapid skilling into defined workplace roles, with corresponding digital badges (aligned to global open standards), as described in Action 1.
- Government to establish a fund to accelerate progress for micro-credentials (0.25 EFTSL) that deliver skills in demand with industry, are assessable for credit, and incorporate rich skill descriptors, as described in Action 1.
  - A micro-credential is defined as "a certification of assessed learning that is additional, alternative, complementary to or a component part of a formal qualification."[49]
  - As the framework for, and delivery of, micro-credentials matures, the Government shoulder consider inclusion of even shorter micro-credentials, such as 0.125 EFTSL, to provide greater responsiveness and flexibility in meeting skills needs.
  - Participating students should receive access to the Higher Education Loan Program.
  - Government continue to fund undergraduate and graduate certificates, provided they meet the criteria outlined above.

49. This review has used the definition of micro-credentials developed by Emeritus Professor Beverly Oliver. Noonan, P., et al. (2019), Review of the Australian Qualifications Framework, p. 56.

Action 5. Roll out a flexible higher education cadetship program

Over the longer-term, higher education graduates experience greater success in the workforce compared to those without degree qualifications, including higher rates of employment and higher average incomes over their working lifetime.[50] With increasing demand for critical, abstract, and human-led inquiry, the knowledge acquired through university degrees will continue to be crucial to the future economy.

However, in the short-term employment outcomes of higher education graduates have been declining since the GFC of 2008. This decline in employment outcomes for graduates has been attributed to general labour market conditions, including more recently the economic downturn caused by the COVID-19 pandemic.[51] In 2020, the proportion of those with undergraduate qualifications working full-time after graduating was only 68.7 per cent, the second lowest level in over 20 years.[52] Graduates are not only experiencing poorer short-term employment outcomes; the evidence also indicates that they are increasingly experiencing underemployment and underutilisation of their skills and education.[53] Further evidence indicates the major cause of the deterioration in employment conditions for young people is an increase in labour market competition faced by the young as a result of a slower rate of employment growth and continuing strong participation growth.[54] Increased labour market competition highlights the importance of the learning experience to aid the transition into professional-level employment, and that the set of skills and capabilities needed for workers to adapt and thrive under today's labour market conditions goes beyond the traditionally defined outcomes of graduate knowledge.

Graduates can no longer rely solely on their qualifications to gain employment or succeed in the labour market. Even before the COVID-19 pandemic, evidence indicated employers' strong preferences for relevant work experience and skills when making recruitment decisions. According to the Ai Group, the most important factor for employers when making hiring decisions for graduates was relevant work experience, perhaps reflecting the increase in job seekers relative to available jobs since the GFC.[55] Qualifications remained important, but their relative importance in hiring decisions was declining.[56] In response to employer expectations of relevant work experience, young people are looking for opportunities to increase their employability, skills and knowledge by participating in extra-curricular activities, work experience and volunteering.[57]

To improve student employment outcomes and better meet industry skill needs, several countries have adopted employer-based LIW models aimed at fostering greater university and industry collaboration. These models include the United Kingdom's (UK) degree apprenticeship and sandwich models, the United States' and Canada's cooperative model, and Germany's dual study model. For all these models, a significant proportion of the learning program occurs in the workplace.

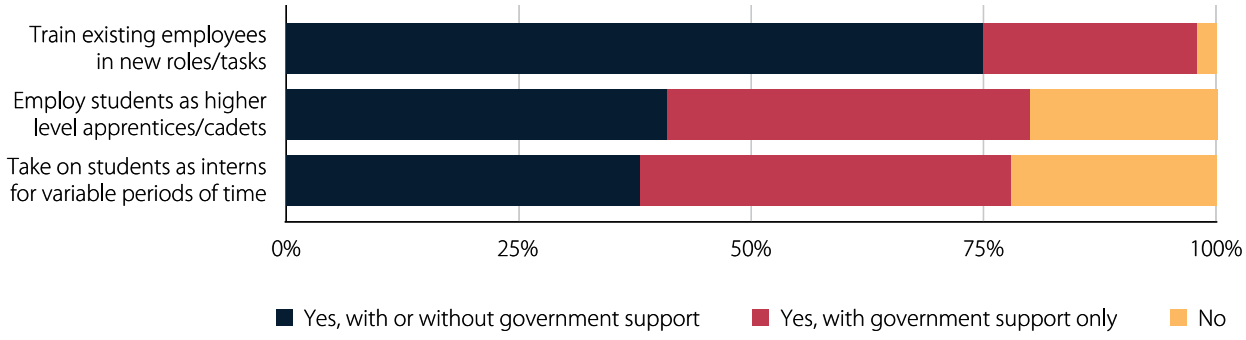
50. The Australia Institute. (2019), The Future of Work for Australian Graduates.
51. Walsh, L., et al. (2021), Life, Disrupted: Young People, Education and Employment Before and After COVID-19.
52. Quality Indicators for Learning and Teaching. (2020), Graduate Outcomes Survey National Report.
53. The Australia Institute. (2019), The Future of Work for Australian Graduates.
54. Borland, J., et al. (2021), Is it 'dog days' for the young in the Australian labour market?
55. The Australian Industry Group (2018), Survey Report: Skilling a National Imperative.
56. The Australian Industry Group (2018), Survey Report: Skilling a National Imperative.
57. Walsh, L., et al. (2021), Life, Disrupted: Young People, Education and Employment Before and After COVID-19.

The UK's degree apprenticeship model, introduced in 2015, enables students to attain a full bachelor or masters degree while doing an apprenticeship in the relevant industry. The UK degree apprenticeships are co-funded by industry and government through an 'apprenticeship levy' placed on all UK employers with annual payroll more than £3 million (approximately A$5.6 million). The levy collected by the Government can be used by employers to pay for the degree apprenticeship training costs. Degree apprentices spend around 80 per cent of their time in the workplace and the remainder in academic study at higher education institutions. In 2018-19, approximately 14,000 students commenced a degree apprenticeship – over double the number of students from the previous year. Degree apprenticeships accounted for around 2 per cent of all higher education commencements and around 3.5 per cent of all apprenticeships. Evidence indicates 84 per cent of UK businesses offering degree apprenticeships intend to continue offering them in the future due to access to higher-level skills and the ability to upskill existing staff.

Another important feature of the international models is higher education and industry collaboration in co-designing the learning program. Evidence indicates students participating in these learning programs obtain better employment rates and higher salaries in the short term compared to students who are not involved. Industry benefits by having access to a pool of employees educated and trained in programs that directly relate to their work, providing an effective matching of skills (see Appendix 1).

In Australia, industry is now showing an increased interest in investing in young people to build the workforce skills they need. Figure 12 shows the results of a recent survey by Ai Group found that approximately 75 per cent of employers are willing to take on university and TAFE students as higher apprentices, cadets or interns with or without government support.[58]

Figure 12. Australian employers' willingness to offer higher-level apprenticeships or cadetships, as well as other forms of work-related training.



Source: Ai Group

58. The Australian Industry Group. (2021), Skills Urgency, p. 21.

Supported by the experience of successful work-based models overseas, evidence here shows a clear opportunity to build on the appetite of Australian employers to take on higher apprentices, cadets, and interns to establish a national higher education cadetship model in Australia. Australia needs more young people leaving our school system to navigate and transition successfully into higher skilled occupations and pathways. Simply expanding the number of enrolled undergraduate students would not achieve this. Additional funding is needed to incentivise providers and industry partners to develop such programs. Under the cadetship model, a student would be employed by industry (either ongoing or on a fixed contract based on the length of the cadetship) while studying to achieve their qualification. Study would be made up of time in the classroom and learning on the job.

Case Studies

Advanced Apprenticeship

Flinders University – Diploma of Digital Technologies

The Diploma of Digital Technologies, developed in collaboration between Flinders University and BAE Systems Australia, has been designed to bring Industry 4.0 and advanced manufacturing to the Hunter Class frigates in South Australia's new digital shipyard. During the 10-month course, students develop future-focused skills in innovation and industry 4.0, cybersecurity, digital design, design for manufacture, cyber-physical systems, robotics, and automation. Building on a strong research collaboration, BAE Systems and Flinders University engaged in a journey to co-design the curriculum to enable the translation of skills into practices and pathways for students. The program is designed as a 'degree apprenticeship' with pathways into information technology and engineering programs. It also now includes a pathway from an Undergraduate Certificate in Industry 4.0 into the Diploma. The Diploma of Digital Technologies has been recognised nationally for its significant advance in teaching, winning the prestigious 'Training and Mentorship Program of the Year' in 2020 at the Defence Connect Australian Defence Industry Awards.

RMIT University - Advanced Diploma of Community Sector Management

RMIT's Workforce Innovation and Development Institute has developed a higher apprenticeship initiative offering an Advanced Diploma of Community Sector Management. Through this initiative, higher apprentices are hand-picked by their employers for their leadership potential, to learn while undertaking on-the-job training and help them cement their leadership skills. Since the initial pilot in 2019-20 comprising 25 participants, the initiative has scaled for up to 1,000 students in 2021. The success of the model has been attributed to a range of factors, including a clear industry objective to credential and upskill existing workers into mid-level leadership and management positions. Other factors included: industry support for the development of the credential and its alignment to the workforce development objectives sought; a co-design approach; ongoing review, customisation, and alignment of the curriculum; assessments to determine the capabilities of the learner; and specific support for on-job learning and training being undertaken by full-time workers (not students or trainees on placements), and specific support for workplace supervisors.

Swinburne University of Technology - Associate Degree of Applied Technologies - Advanced Manufacturing (Higher Apprenticeship)

Swinburne University's Associate Degree of Applied Technologies – Advanced Manufacturing has been co-developed with Siemens and the Australian Industry Group. The associate degree builds students' skills and knowledge in Industry 4.0 technologies related to advanced manufacturing, such as artificial intelligence, robotics, and cloud computing. Students are also given opportunities to develop other skills vital for success in the workforce, including project management and collaboration. The holistic training program equips graduates to be job-ready and is specifically designed to meet the future requirements of Australia's advanced manufacturing sector. As part of the program, students get hands-on work experience with Siemens and other companies that places them in an ideal situation to gain employment upon completion of their studies. This course extends the apprentice model beyond traditional trade-based occupations and demonstrates the virtue of higher education courses adopting elements from vocational education – especially industry co-design. The vocational focus also creates a more efficient nexus between higher education and industry, which is particularly important in technology-related areas where speed of adoption is crucial.

Case Studies

Internship and Co-op

Central Queensland University - Bachelor of Engineering (Honours) and Diploma of Professional Practice (Co-op Engineering)

Central Queensland University's Bachelor of Engineering (Honours) and Diploma of Professional Practice (Co-op Engineering) is a demonstration of best practice in university-industry collaboration across five regional locations that supports education and training in civil, civil and humanitarian, electrical, mechanical, mechatronic, and resource systems engineering. Both courses feature 48 weeks of paid work placement, as well as project-based learning. This allows students to develop the professional skills required to work as an engineer and graduate with one year of industry experience.

Federation University - Bachelor of Information Technology (Professional Practice)

Federation University's Bachelor of Information Technology (Professional Practice) offers an 'earn as you learn' internship with IBM, where students are embedded in real projects with real teams, learning the critical soft skills of client interface and securing meaningful experience. This innovative degree is now one of the most prestigious IT degrees in Australia and is recognised as national best practice by the Australian Computer Society, the authority responsible for the accreditation of professional ICT education programs in Australia.

The review proposes the development of two broad types of higher education cadetships for Australia. The first is short cadetships, which would be aimed at individuals nearing the end of their studies and seeking to gain relevant work experience before completion. It could also target mid-career individuals seeking to switch careers and assist with the financial challenges of transitioning to a different occupation. The second type is a longer-term cadetship aimed at individuals who might seek to undertake work-based learning for the duration of their qualification, in much the same way as a traditional apprenticeship. The features of the two types of cadetship are outlined below.

"The vocational focus also creates a more efficient nexus between higher education and industry, which is particularly important in technology-related areas where speed of adoption is crucial."

Short cadetships

The first broad type envisaged is short cadetships of one year or less. Learning would be based on micro-credentials or higher education certificates, rather than a longer-length qualification.

There could be three types:

1. 'Transition to work cadetships' for school, VET, or higher education leavers, as well as those not in education, employment or training (NEETs).
2. 'Career-change cadetships', providing reskilling for mature aged workers who wish to change their occupation in a way that can be achieved in a year or less through a combination of work experience and a short-course or micro-credential.
3. 'Sandwich-course cadetships', where an employer offers an employment contract for a year to a student who is part way through a degree.

Longer cadetships

Longer cadetships would involve an employment contract in which the employee also studies for a diploma, associate degree or degree. These cadetships would offer a highly vocational pathway that may not have previously been available.

These longer cadetships could be of two types:

1. Co-designed cadetships between a higher education provider and one or more industry partners, resulting in a cadetship program that could focus on a particular industry or occupation, most likely in an area of strong employment growth or significant skill shortages.
2. A cadetship program offered by a higher education provider which is available for employer-sponsored students who want to combine their employment with learning. Candidates would apply to the program and their employer would also offer to provide on-the-job skill development that complements the formal learning program.

In both cases, design and delivery of cadetships may involve collaboration with the VET sector. This collaboration could lead to the creation of integrated qualifications that draw on course content from both sectors. This will enhance pathways between the sector and to further study. For instance, students enrolled in a diploma in the VET sector will be granted access into to a degree in the higher education sector. It will also prepare learners to be effective in the workforce as they have been exposed to skills required in both sectors.

The recently announced, Commonwealth-funded digital cadetships in the VET sector are an early example of an opportunity for higher education and vocational education to collaborate in such an initiative.

Subject to an application process for higher education providers (with industry partners), these cadetships will utilise allocated Commonwealth supported places to encourage a roll-out of cadetships by providers by reducing funding costs. Additional funding should be made available to such programs to cover additional costs that may be incurred by employers or intermediaries, which need to be met to make the cadetships possible.

Action

5. Cadetships

Roll-out a flexible higher education cadetship program combining an employment contract and a learning program, including short 'transition to work' and 'career-change' cadetships (with micro-credentials) and 'sandwich course' cadetships (as part of a degree), along with longer, multi-year cadetships (with diplomas, associate degrees, or degrees). Provide Commonwealth supported places and additional funding to support industry involvement and establish a reference group to help review and advise on best practice in employment arrangements, curriculum, and assessment.

Steps:

- Higher education providers and industry to partner in the development of cadetship models that suit different student cohorts, especially equity groups. Higher education providers should preferably work with multiple employers in individual cadetship programs. Collaboration with VET providers should also be encouraged.
- Government to establish and implement a cadetship program with Commonwealth supported places and additional funding to support industry involvement and, where helpful, intermediaries to bring the partners together. Establish a reference group to review and advise on best practice, including the importance of working through the appropriate employment and industrial arrangements.
  - Program to include short cadetships (with micro-credentials) and longer, multi-year cadetships (with diplomas, associate degrees, or degrees).
- Funding for cadetships should be prioritised in areas where there are gaps for in-demand skills or fields in emerging technology.
- Industry to use cadetships as a LIW model of higher education to improve the job-readiness of graduates and support skills needs.

Action 6. Enhance engagement with industry in shaping learning outcomes and work-integrated learning

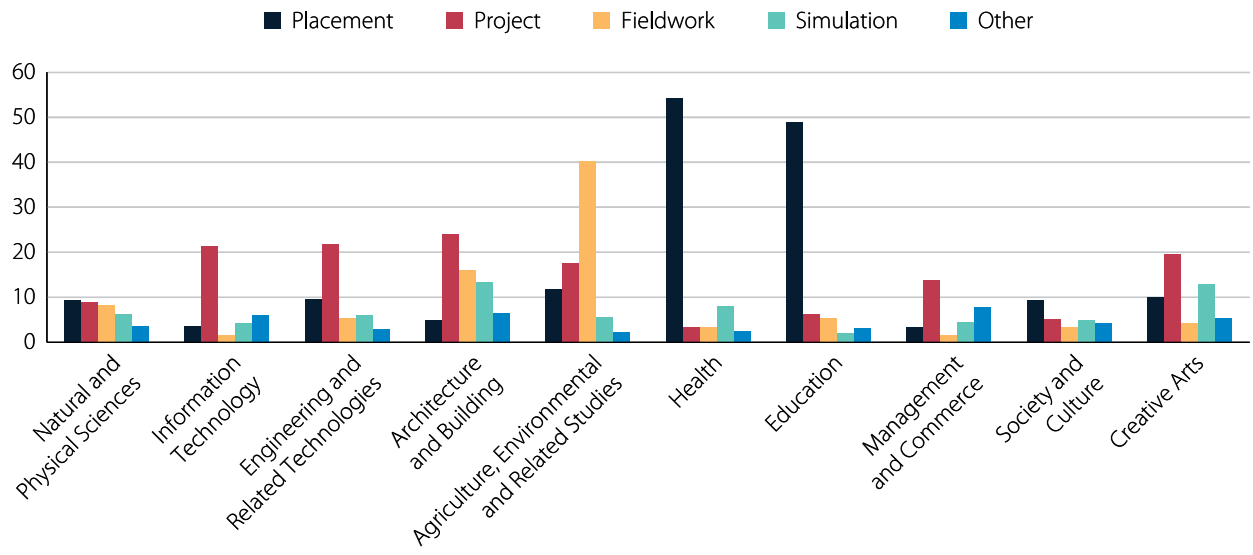
For some time, higher education providers have been making efforts to improve the work-readiness of their graduates. Professional accreditation of courses has been a long-standing way of aligning some courses to workplace outcomes. This has been enhanced through the engagement of industry in course design, curriculum, and pedagogy, as well as adjunct appointments, mentoring and other mechanisms.

Higher education providers have been making greater efforts in recent years to include WIL to support students gain industry-relevant experience during their studies. For many occupational disciplines, such as nursing, teaching, and engineering, various forms of WIL are embedded within the degree and are critical to transitioning graduates from education to employment.

It is difficult to quantify the scale and nature of some of these efforts, particularly course design and teaching. Regarding WIL, in 2019 Universities Australia released a snapshot of activities across Australian universities with the following findings (see Figure 13).[59]

- In 2017, 451,263 students had a WIL experience, which was around one third of university students enrolled.
- Of that total number of students who undertook a WIL experience, 104,140 had more than one WIL experience during the year. This made a total of 555,403 WIL activities in 2017.
- The most common type of WIL was a placement, accounting for 43 per cent of the total activity in 2017.
- Although a work placement was the most common type of WIL activity, universities are moving beyond this to offer more opportunities, such as projects (23 per cent), simulations (13 per cent), and fieldwork (9.7 per cent).

Figure 13. WIL participation rate by type by fields of education



Source: Universities Australia

59. Universities Australia. (2019), Work-Integrated Learning in Universities.

Case Studies

Curriculum, Pedagogy and Work-Integrated Learning

Central Queensland University (CQU) - Bachelor of Echocardiography

The Bachelor of Echocardiography at CQU enables students to apply their cardiac physiology and echocardiographic studies under the direct supervision of a qualified cardiac sonographer or delegate. Students must also submit a clinical case logbook every two weeks for evaluation by the clinical supervisor or qualified medical practitioner to ensure key practical skills are developing.

Edith Cowan University (ECU) and Perth Theatre Trust

The ECU Western Australian Academy of Performing Arts (WAAPA) has a partnership with The Perth Theatre Trust to enable students to perform and study in high-profile performance venues in Perth, such as the His Majesty's Theatre. This opportunity is available for students in the Bachelor of Arts (Acting) / Bachelor of Arts (Music Theatre), and Bachelor of Performing Arts (Production Specialisation) degrees. The Perth Theatre Trust also supports its members to contribute to student learning at WAAPA by studying a Certificate IV in Training and Assessment.

Federation University – Regional Innovation Centres

Federation University's Regional Innovation Centres provide industry-led, immersive WIL and assist students in the transition to high-value employment. The model consists of four centres: the Business Centre of Excellence, the Ararat Jobs and Technology Precinct, the Gippsland Hi-Tech Precinct, and the Regional Incubator for Social and Economic Research. The Business Centre of Excellence received funding for a Watson Internet of Things facility at Federation's Ballarat SMB campus in January 2021. Co-funding for up to 11 research postgraduate students has also been provided and each student will benefit from a paid internship with IBM.

La Trobe University – Industry Placement Minor

La Trobe University has also focused on reforming curriculum by expanding opportunities for students to combine work, study, and ongoing skill development. The Industry Placement Minor, offered university-wide across 29 courses in various disciplines, is aimed at allowing students to apply the theoretical learnings and acquired skills from their course to a professional work setting. More than just a single placement experience, the Minor contains four new professional placement subjects to the value of 60 credit points, which can be undertaken over two or more semesters and may involve as many as two organisations. Through this Minor, students gain valuable work experience, build their professional networks, and develop important job-seeking skills as they are encouraged to self-source placements.

Monash University – Education Agenda

Through its Education Agenda, Monash is reforming its curriculum, pedagogy, and assessment to include greater industry involvement. This agenda includes drawing on the university's alumni to ensure its course offerings and their curricula align to future industry and professional requirements. To help facilitate industry engagement, Monash has also established Industry Advisory Broads to advice on course content, as well as the Monash Industry Council of Advisers, which comprises Chairs and CEOs of national and international corporations, to lead its industry engagement strategy.

University of Canberra – Professional Practice Core Units

The University of Canberra (UC) has been undertaking revisions to its bachelor degree programs over recent years, embedding Professional Practice Core units to improve course coherence, student outcomes and satisfaction. The Professional Practice Core, implemented in 85 per cent of bachelor courses in 2021, consists of four authentic WIL units covering professional orientation, practice, and evaluation. The embedding of these units into the curriculum, enables students to integrate theoretical learnings with real-world practical experiences (from internships to industry competitions), equips them with transferable employability skills, and creates new employment paths. The delivery of these units is overseen by UC advisory groups and courses with professional accreditation requirements have adapted units to suit.

University of Sydney – Industry and Community Project Units

The University of Sydney has partnered with many corporate, community and government organisations to collaborate on real-world projects thorough its Industry and Community Project Units. These units complement traditional placements in professionally oriented undergraduate programs to ensure all undergraduate students at the university can engage with industry in their program of study. More than 4000 students participate annually. Through the units, students work in multi-disciplinary teams to solve real-world issues posed by industry partners, including Cochlear, Wandiyali Environa Wildlife Sanctuary, and NSW Treasury.

University of Tasmania – Associate Degree: Equipment Design and Technology

This associate degree is a good example of shorter-form, demand-led offerings meeting an industry need. Co-designed with industry, it includes real work projects and applied learning, including experience of product development lifecycles, pitching ideas, and understanding costs. Rapid technological developments have led to a shift away from manual labour towards interconnectivity, automation, robotics, and the real-time data in the field of equipment design. Students get hands-on experience and see their designs come to life with cutting-edge equipment, such as 3D scanners and printers, laser cutters, and virtual-augmented reality technology. The course is offered in the North-West region of Tasmania, which has long been a centre for traditional manufacturing. The course is based in the university's Original Equipment Manufacturer facility, which is co-located with industry at the Tasmanian Minerals, Manufacturing and Energy Council facilities.

University of Technology Sydney (UTS) - Shopfront

UTS's Shopfront demonstrates industry engagement with the not-for-profit sector. The shopfront is the longest running cross-faculty community engagement program in Australia, having successfully completed more than 1200 projects with more than 800 community organisations. These projects provide expertise for organisations that otherwise would not be able to afford these services. In 2020, UTS students assisted Meals on Wheels to streamline its business processes as part of the Executive Master of Business Administration capstone subject. Additionally, students who majored in events in the Bachelor of Management were tasked to create an event with social impact in collaboration with the Event Creation Lab.

Victoria University – VU Block Model

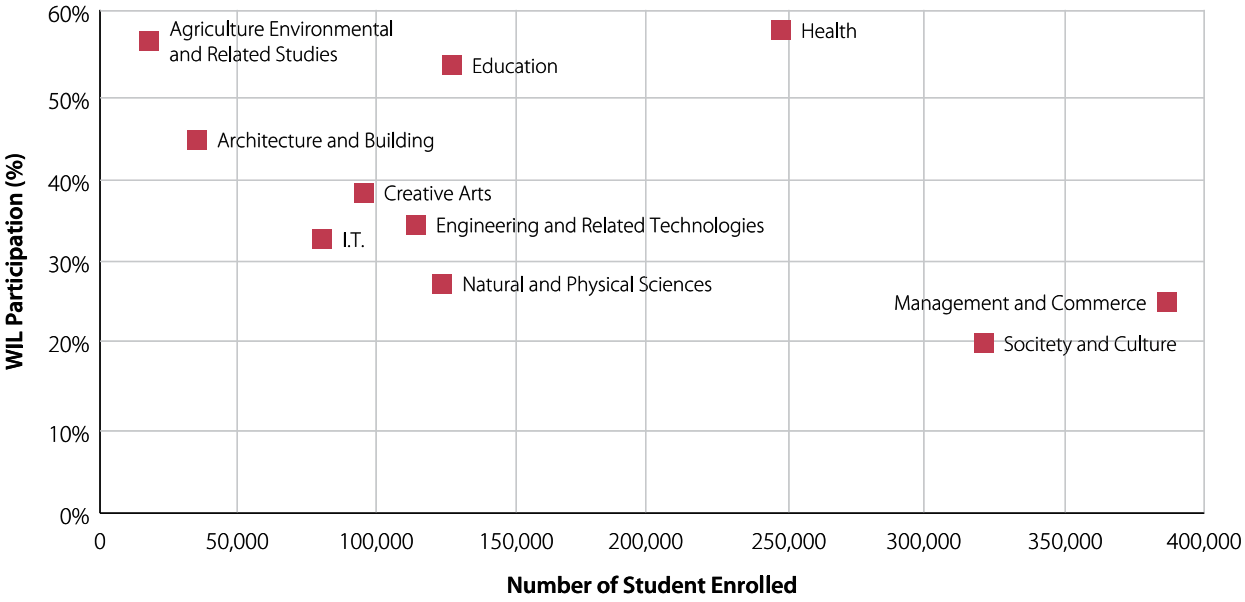
In 2018, Victoria University introduced the VU Block Model, providing greater flexibility for students to design their own learning journey by combining study with practicums and employment, while accommodating their other commitments. Moving away from the traditional four subjects over a semester term, the VU Block Model reformed the curriculum to allow students to attend classes at times that suit them and to complete one subject at a time. This curriculum change enables students to learn in smaller class groups and attend three-hour high-engagement, high-application activities relevant to real world workplace challenges while building networks and professional communication skills. Industry partners of Victoria University also benefit from this model. Those who submit real-life workplace challenges are provided with solutions from students and have access to a customisable model for upskilling or reskilling of their own workforce staff. This model has improved retention, success, and employment outcomes for students from all backgrounds. For instance, in 2018 pass rates for first-year students increased from 74 per cent to 87 per cent.

The extent of university-industry collaboration in teaching and learning is encouraging. This collaboration was also reported by stakeholder input to the review, which showed interest and significant efforts from both higher education providers and industry to drive improvements that will create better outcomes for students. However, there are still significant gains to be made, especially in generalist degrees and non-vocational pathways. During consultations for this review, higher education providers acknowledged difficulties in securing enough placements from industry, particularly for students in regional or remote areas with limited industry opportunities. In some fields, higher education providers are also charged by industry to host WIL students. Some noted that the structure of Australia's economy, with small and medium enterprises comprising 99.8 per cent of all enterprises and 68 per cent of employment in the private sector, made the situation more challenging than in other countries.[60] Nonetheless, several providers indicated they are offering work experience placements to all their students and encouraged the review to consider mandatory WIL for every student in higher education.

60. The Organisation for Economic Cooperation and Development. (2020), Financing SMEs and Entrepreneurs 2020.

Figure 14 below shows university student participation in WIL by field of education.[61] The lowest participation in WIL is in some of the fields of education where the most students are enrolled: society and culture, and management and commerce. Even in the fields with the most WIL, participation is only slightly higher than one in two students.

Figure 14. Rate of university student participation in WIL in 2017 by field of education



Source: PwC

Raising participation in WIL will require both higher education providers and industry to work together to provide high-quality placements for students, as well as learning support. Hosting WIL students and ensuring meaningful learning experiences will impose some additional costs on industry; however, this also provides industry with a job-ready student equipped to take on the challenges of the workforce.

It should be added that there are also a significant number of university-industry partnerships in teaching and learning that also involve industry-university collaboration in research, development, and innovation. There can be significant synergies between industry partnerships in teaching and learning, and industry partnerships in research and innovation.

61. Bridge, J., et al. (2021), Scaling up work integrated learning in higher education.

Case Studies

Partnerships in Teaching, Learning, Research and Innovation

Macquarie University - Macquarie Park Innovation District

Macquarie University has established an innovation district that combines its hospital and more than 350 large international and smaller Australian-based businesses to establish a nexus between research commercialisation, innovation, and learning. The innovation district contributes to research and innovation at the University while also providing WIL opportunities for Macquarie's students. More than 75 per cent of the institutions hosted at the innovation district provide placements for students, which Macquarie is expanding through new partnership development roles at the University.

Queensland University of Technology (QUT) – Start-up Law Clinic

QUT's Start-up Law Clinic is a collaboration with local government to deliver legal research and assistance to start-ups located at the Brisbane Business Hub. Students undertake client interviews and produce advice for businesses as part of a WIL program, while also receiving guidance from industry experts. Connections made through the clinic have helped students find paid internships or transition to employment.

University of Adelaide – Industry Engagement Priority areas

In 2019, the university established five Industry Engagement Priority (IEPs) areas to connect the university to industry while working on societal and technological challenges in five areas. These areas are: Agrifood and Wine; Creativity and Culture; Defence, Cyber and Space; Energy Mining and Resources; and Health and Medical Industries. Through the IEPs, the university can listen to industry needs, provide suitable learning experiences, as well as identify collaborative research opportunities.

University of Melbourne – Innovation Practice Program

The Innovation Practice Program is administered by the University's Faculty of Engineering and Information Technology. Through the program, masters degree students in Engineering, Biomedicine, Business, and IT are matched with an industry mentor and spend 12 weeks in teams developing a response to a challenge or opportunity posed by the mentor's organisation. In addition to the student stream, the program provides industry mentors with workshops and classes to gain experience in coaching and leadership to guide innovative projects. To date, the program has partnered with more than 120 organisations on 275 projects, leading to further collaborations and research engagement.

University of Queensland (UQ) – The Innovation Bridge

The Innovation Bridge is a partnership between UQ and the Australian Defence Force. Master of Business Administration students undertake a semester-long project to solve defence problems through accelerating the adoption of new technologies and tapping into university research and development. The program has adopted a start-up approach to connect different groups –researchers, entrepreneurs, and the intelligence community – which allows them to consider problems from multiple perspectives.

Victoria University (VU) – Western Bulldogs Partnership

Victoria University has a long-standing partnership with the Western Bulldogs Football Club, including a shared campus at VU Whitten Oval. Partnership activities span player educational support, WIL opportunities for VU students, vocational education in remedial massage, research collaboration and community activities. The joint funding of sport science practitioners and researchers has strengthened that collaboration, contributing to the supervision of honours and PhD students undertaking applied research in sport science, data analytics, strength and conditioning, and psychology.

Our review's consultations with industry have shown a strong willingness to collaborate with the higher education sector on graduate job-readiness. This collaboration should extend to improving industry input and accreditation for courses, rethinking what is possible for evaluating the learning outcomes students attain from WIL for credit against course requirements, and involving industry in the assessment process, where possible. All the major industry peak bodies, Universities Australia, and the Australian Collaborative Education Network (ACEN) came together in 2015 to develop a national strategy on WIL. More recently, ACEN has published guides of online WIL placements and projects targeting practitioners, industry/community, and students.[62] This work should continue with renewed energy to see Australia emerge from the COVID-19 pandemic with a future-focused outlook.

"Our review's consultations with industry have shown a strong willingness to collaborate with the higher education sector on graduate job readiness."

62. Australian Collaborative Education Network. (2020), Guides for Online WIL Placements and Projects.

National Work-Integrated Learning Strategy 2015

In 2015, Universities Australia, the Australian Chamber of Commerce and Industry (ACCI), the Australian Industry Group (Ai Group), the Business Council of Australia (BCA) and the Australian Collaborative Education Network (ACEN) joined together to develop the National Work-Integrated Learning Strategy with the aim of enhancing "the productive capacity of Australia's workforce, improve graduate job prospects, and meet the skills needs of employers".[63]

The strategy proposed action in eight areas:

1. Provide national leadership to expand WIL
2. Clarify government policy and regulatory settings to enable and support growth in WIL
3. Build support among students, universities, employers across all sectors and governments to increase participation in WIL
4. Ensure the investment in WIL is well targeted and enables sustainable, high-quality experiences, stakeholder participation and growth
5. Develop university resources, processes, and systems to grow WIL and engage business and community partners
6. Build capacity for more employers to participate in WIL
7. Address equity and access issues to enable students to participate in WIL
8. Increase WIL opportunities for international students and for domestic students to study offshore.

The Government's NPILF offers a method to put some of these ideas into practice and contribute to better outcomes across the sector.[64] Universities are currently designing their NPILF strategies and will begin implementation in 2022. Government has committed to report on NPILF case studies to show what can be achieved and to encourage further collaboration across the sector. The Australian Government also committed to reviewing the NPILF in 2024. During this transition period, consideration should be given to how to learn from innovations across the sector, and to ensure successes can continue and be scaled up.

In 2021, the Government introduced an industry employer engagement standard in the Australian University and University College categories of the redesigned Higher Education Standards Framework (Threshold Standards) 2021. The standard for Australian Universities is to demonstrate:

> "…engagement with employers, industry, and the professions in areas in which it offers courses of study. This engagement may include, but is not limited to, curriculum development, professional engagement, work-integrated learning, and research partnerships…."[65]

63. Universities Australia., et al. (2015), National Strategy on Work-Integrated Learning in University Education.
64. Additional information on the NPILF and other Government programs to support industry collaboration is contained in the report's appendices.
65. Commonwealth of Australia. (2021), Higher Education Standards Framework (Threshold Standards) 2021.

In future years, the Government should consider whether these changes to the Higher Education Standards Framework (Threshold Standards) 2021 are having the desired impact, and either amend the standards or strengthen policies through associated efforts, such as NPILF or funding agreements.

Action

6. Learning Outcomes and Work-Integrated Learning

Continue to enhance higher education's engagement with industry in the shaping of learning outcomes and enrich and expand WIL offerings through the NPILF and the National Strategy on Work-Integrated Learning.

Steps:

Work-Integrated Learning (WIL)

- Higher education providers and industry should continue to work together to improve WIL to ensure students leave study as work-ready as possible. A key priority in improving student outcomes is to continue to work on embedding WIL in the curriculum and in the assessment of all study programs.
- Universities Australia and ACEN to continue to work with the ACCI, Ai Group, and the BCA in championing the National Strategy on Work Integrated Learning, and to consider providing oversight for the feasibility and potential development of a digital marketplace for WIL placements and projects proposed below.
- Higher education providers and industry to work together to streamline the process for higher education providers to access WIL placements and projects, and test the feasibility of establishing a digital marketplace for WIL placements and projects.
- Higher education providers and professional bodies to work together to establish a guidance framework for WIL placements that makes it easier for small and medium enterprises to (1) participate in hosting learners, (2) ensure students' activities provide quality learning outcomes, and (3) participate in assessment where appropriate.
- Industry and higher education providers to design work experiences that meet the needs of the workplace and the curriculum. Provide more opportunities for WIL through placements, projects (including remotely, where appropriate) and industry mentoring of learners – especially in areas like business, arts and social sciences, maths, and science, where WIL has been less prevalent.

"Through the NPILF, higher education providers should continue to aim for best practice and find new and better ways to work with industry to shape learning outcomes that enhance the relevant skills and capabilities of their students."

Enhancing higher education's engagement with industry in the shaping of learning outcomes

- Through the NPILF, higher education providers should continue to aim for best practice and find new and better ways to work with industry to shape learning outcomes that enhance the relevant skills and capabilities of their students.
- Government should:
  - Review any impediments that may exist in the Higher Education Standards and their implementation that affect the ability of higher education providers to be effective and agile in meeting changing industry needs.
  - Based on NPILF reporting of each higher education provider, continuously promote best practice to improve WIL on an ongoing basis.

Action 7. Invest in better cross-sectoral partnerships

Closer collaboration and partnerships between industry and education providers is crucial. They help our education system to support job-ready students in seeking pathways towards employment, and those wishing to pursue lifelong learning through tertiary education. They also enable education providers to co-develop innovative programs and learning experiences that are industry-informed and relevant, as well as encourage students to engage in lifelong learning by improving credit pathways and policies. Collaboration and partnerships allow industry to be at the forefront of skilling Australia's future workforce, co-designing course content and WIL experiences to reflect industry needs and meet skill shortages, and to tailor upskilling programs for their own workforce.

Greater consideration should be directed to how we can foster cross-sectoral partnerships on a larger scale, with a greater focus on the outcomes and capabilities that create long-term shared benefits. A future tertiary system must enable individuals to gain the best combination of education, training and work experience, supporting their successful transition from education into work and lifelong learning. Part of the solution relies on individual providers to implement best practice in credit policies and RPL, while also making long-term investments in partnership development and collaboration with other providers, particularly across sectors. The higher education and VET sectors have different strengths, and integrated qualifications should be explored in developing the right mix of skills that learners might require for a particular role. As noted in the AQF Review, there is also scope to improve transitions and credit recognition for secondary students progressing to related studies in higher education.

A growing number of jurisdictions and tertiary institutions are now seeking and building effective ways to support the successful transition of school leavers into highly skilled pathways and tertiary education enrolments, moving beyond the traditional focus on selection rank in Year 12 and the narrowly defined full-time vocational pathways. This shift towards a more comprehensive and holistic approach to pathways from secondary schooling to tertiary education and skills, while working with the contemporary realities of the youth labour market and pandemic-induced disruptions to work and learning, was reflected in the recommendations of the Shergold Review of Senior Secondary Pathways into Work, Further Education and Training.[66]

66. Shergold, P., et al. (2020), Looking to The Future: Report Of The Review Of Senior Secondary Pathways Into Work, Further Education And Training.

NSW Institute of Applied Technology

Following a review of its VET system by David Gonski and Peter Shergold, the New South Wales Government has accepted a recommendation to establish an Institute of Applied Technology (IAT).

The IAT will offer both theoretical and practical skills and integrate learning between stackable VET and higher education qualifications, with a focus on student career aspirations and industry skills requirements. A student might commence with a Certificate IV in year 1 and follow pathways to a Bachelor in Applied Technology in year 3. Complementary digitally badged micro-credentials and employer-focused learning programs will also be offered.

The IAT will be established through colleges focusing on specific industries of current and emerging importance to NSW. The review identified advanced manufacturing, digital media and care industries as potential areas. The government has announced an IAT for Construction will open in 2023. Collaboration between VET and higher education providers and industry will be central to each college.

The IAT's courses will focus on professional, trade, managerial, and entrepreneurial skills to produce 'T-shaped graduates' or those with a deep practical specialisation and a breadth of employability skills. Work-based learning will be embedded each year, with students given access to industry mentors and trainers.

Consistent with the review's other recommendations, the Government should focus on stimulating innovation and enhance engagement between higher education providers, VET providers, schools, and industry. As the above reform directions are worked through and implemented between Australian jurisdictions, an innovation fund for teaching and learning should be introduced to energise and empower the higher education sector to work in new ways with schools, not-for-profit partners, vocational education, and industry. The innovation fund would have wide-ranging purposes including assisting the sector to pursue innovations in course co-design and co-delivery, credit practices and policy, and models in work-based learning. As Australia emerges from the pandemic, projects and partnerships supported by the fund should contribute transparently to the stock of working examples and shared capability to build effective, industry-relevant pathways for a wider range of young Australians.

"Consistent with the review's other recommendations, the Government should focus on stimulating innovation and enhance engagement between higher education providers, vocational education providers, schools, and industry."

As all sectors benefit from working together, stronger pathways and partnerships between vocational education, higher education and industry should be encouraged.

Case Studies

Higher Education, VET and Schools Cross-sectoral Collaboration

Central Queensland University (CQU) – Start Uni Now

Start Uni Now (SUN) provides students in Year 10, 11 and 12 with an authentic university experience by completing first year university units while still at high school, and provides direct entry to university. The program is delivered to schools across all Australian states and offers pathways for high school students looking to extend or challenge themselves during their senior schooling. The program complements existing partnership agreements which CQU has in place with industry and/or high schools to enable opportunities for additional co-curricular experiences for students during their studies, such as career conversations, mentoring and work experiences. The SUN program ensures students are entering university study prepared and confident for the next step of their career journey.

Charles Darwin University – Block Credits

Charles Darwin University has designed block credits to recognise a combination of work, study and skills development. Rather than specified credit that maps unit components for recognition and typically requires multiple VET units to translate into a higher education unit, block credit applies the maximum credit possible for the AQF they have shown competence in. This structure allows for acknowledgement of life-long learning and life-wide capabilities built into a VET qualification.

Federation University – Grampians Region Health Work Readiness Program

Collaboration between Federation University's TAFE and higher education departments, as well as the largest health providers in Western Victoria (Grampians Regional Health, Wimmera Health and Ballarat Health Services) has led to the delivery of an education program which meets the skill needs of regional health authorities and provides enhanced pathways to students between the higher education and VET sector.

This program allows school students in their final years of secondary education to study a Certificate II qualification to be delivered in their school through the university's VET in Schools program. These qualifications are tailored to the specific requirements of the health employers and framed as traineeships, ensuring that most of the training is delivered through the employers. The VET qualifications are linked to the delivery of specialised Continuing Professional Practice modules and to the Bachelor of Nursing degree. Students can manage and track their progress in the program through an online portal, which is also available to potential employers to contact students regarding employment opportunities.

La Trobe University – Cyber Security Partnership

La Trobe University's partnership for cyber security professions skills and employment has been developed in collaboration with Cisco, Quantum Victoria, Wiley, Practera, GHD, War on Wasted Talent, and Optus to enhance Australia's cyber security capability. The project is designed to create career-ready professionals through industry placements and work experience programs. In 2021, the project will engage more than 80,000 high school students in cyber security education, as well as upskill current professionals through micro-credentialed learning.

NUW Alliance – Aerotropolis Multiversity

In 2021, four universities (University of Newcastle, University of New South Wales, University of Wollongong, and University of Western Sydney) launched the cross-sector Aerotropolis Multiversity in partnership with TAFE NSW, industry, and government. The Multiversity spans education, training and research and focuses on developing an industry-centric, highly skilled, job-ready workforce to meet current and future skills demands. Its courses will incorporate WIL, the integration of VET and HE, and developing pathways between the secondary and tertiary sectors across multiple fields of study. The Multiversity began by rolling out eight undergraduate certificates and is now developing new ways of training diverse cohorts, from school leavers to career returners, in areas such as Industry 4.0, cyber skills, IT, construction management, advanced manufacturing, sustainability, engineering and science.

University of Queensland – UQ Skills

The University of Queensland Skills (UQ Skills), a registered training organisation within the University of Queensland, collaborates with more than 84 industry and government organisations to upskill and reskill the broader community. Through its partnerships with a vast range of partners closely linked to Government initiatives and local organisations, UQ Skills delivers programs providing pathways between school, VET and higher education. One pathway provided by UQ Skills is targeted towards Year 11 and 12 students who have not completed school to undertake tertiary study. Students who wish to undertake the Bachelor of Veterinary Technology, are able to enrol on the UQ Skills Diploma of Agribusiness. Following successful completion of the Diploma, the resulting increased ATAR result enables students to enrol in the UQ Bachelor of Equine Science and then progress onto the Bachelor of Veterinary Technology. This pathway has become extremely popular and successful, with over 50 per cent of graduates enrolling in further study through the bachelor degree at UQ.

University of Technology Sydney (UTS) – Diploma of Engineering Case Study

UTS and TAFE NSW are currently collaborating to develop a new course offering and pathway for students studying engineering. In 2021, students enrolled in a Diploma of Engineering (Technical) at TAFE NSW, have the opportunity to undertake an additional subject offered by UTS. The subject provides students with the opportunity to further develop their mathematical skills and to engage with a series of additional activities at UTS, which will help gain an insight into the benefits of further study at a university. On successful completion of their Diploma, students will receive entry to the Bachelor of Engineering degree at UTS with 24 credit points in recognition of their prior learning.

University of the Sunshine Coast (USC) – Sunshine Coast Health Institute

The Sunshine Coast Health Institute is a multi-organisation project between the Sunshine Coast Hospital and Health Service, USC, TAFE Queensland and Griffith University. The Institute connects training and research between the organisations, facilitating continuous improvement and innovation in the delivery of care. By co-locating the latest technologies at the Sunshine Coast University Hospital campus, the institute promotes collaboration between the partnering organisations on the most significant challenges in health.

Victoria University (VU) – Paramedics

Victoria University, Victoria University Polytechnic, and Ambulance Victoria are collaborating to develop a new delivery model in a national skill shortage area (specifically the ambulance and paramedic industry), providing pathways between the higher education and vocational education sectors. Although, the Bachelor of Paramedicine offered by higher education providers is typically a three-year qualification (including 360 hours of supervised clinical placements), VU is exploring how to integrate the vocational education qualifications; Certificate III in Non-Emergency Patient Transport (20 week duration) and the Diploma of Paramedical Science (1 year duration), as well as offering a substitute/alternative to the first year of the Bachelor program. Enhanced cross-sectoral collaboration through co-location, shared spaces and collaborative staff teams allows for greater integration and application of practical skills with theoretical learnings. Students are also able to choose from multiple entry and exit points to suit their lifestyle and for different job roles, exposing them to the work environment earlier in their studies than is usual practice in the bachelors degree.

Action

7. Cross-Sectoral Partnerships

Build stronger cross-sectoral partnerships of higher education and industry, in collaboration with VET and/or schools, including the introduction of a cross-sectoral teaching and learning innovation fund to drive immediate progress in areas of partnerships and pathways.

Steps:

- Higher education providers to review their credit practices and policies against best practice, including RPL, and pursue partnership projects with industry, VET providers and schools to improve outcomes for learners. The projects could include jointly designed learning programs and work experience, as well as improved pathways and credit arrangements.
- Higher education providers to include content from the VET sector where industry advises it would be beneficial.
- Higher education providers to work with tertiary admissions agencies to enhance the study pathways available to students as they work towards a future career. This may involve accrediting learning from secondary studies or school towards the course requirements of a tertiary qualification.
- Government to establish an innovation fund to drive collaboration and enhance pathways and partnerships between higher education providers, industry, and the VET and school sectors. Examples of possible areas of investment, and of precedents, include:
  - Programs for secondary school students in Years 10-12, which provide industry experience and credit into higher education programs, such as Central Queensland University's Start Uni Now program.
  - A consortium of providers and industry, such as the NUW Alliance's Multiversity in New South Wales as part of the Aerotropolis project, collaborating for example on integrated work-ready certifications across sectors. Another example is the New South Wales Institutes of Applied Technology, focusing on areas such as advanced manufacturing, digital media, and care industries.
  - Industry/regional cross-sectoral collaborations, such as Federation University's Grampians Region Health and Work Readiness Program, which helps meet the skill needs of regional health authorities with supported pathways from senior secondary school onwards through VET and higher education.

Longer-term reform directions for higher education providers

1. Move towards a more integrated tertiary sector and seamless pathways from school

Explore with urgency a move towards a more integrated tertiary sector. The proposed short-term steps of expediting AQF reforms, developing a unified credentials platform and fostering partnerships through the innovation fund should be accompanied by longer-term steps to align the vocational and higher education sectors' funding and regulatory models. This will require significant reforms at Commonwealth, State and Territory levels, but these are necessary to rectify the distortions in learner experience and behaviour that are produced by current policy settings. A related issue is ensuring that the tertiary system places equal emphasis on academic and vocational learning to give students the right skills needed to succeed in their careers. Seamless pathways from schools into the tertiary education sector, along with relevant opportunities for paid work experience and work-based learning, should also be a priority. The progression from secondary to the tertiary sector should be understood as further development of the knowledge and capabilities developed by school students in their secondary studies.

2. Review incentives for individuals and industry to invest in human capital development – especially for industry-higher education collaboration

The benefits of education are spread between individuals, industry, the economy and Australian society. Long-term consideration must determine whether appropriate incentives are in place for students, employers, and higher education providers to undertake socially optimal levels of investment in human capital development. One idea put forward during the review, worthy of consideration, was that of a lifetime learning accounts.

During the review, some stakeholders suggested the implementation of financial incentives for industry would ensure greater collaboration between the sectors. Such financial incentives are in place in Canada, which introduced a tax credit for industry investments in WIL. Others suggested schemes include the industry training levy operating in the UK, which is used to fund the UK apprenticeship system, including degree apprenticeships. However, the evidence on the need for industry incentives to produce greater collaboration in Australia is mixed.

Employers engage in WIL for a variety of reasons, such as accessing new ideas and practice, or even to 'give back' to an industry or profession.[67] Thus, industry are motivated by a range of reasons that are not purely financial. However, education or training that has embedded transferable skills and produces clear benefits for the broader economy and society (i.e. beyond the learner or employer), will warrant stronger consideration in the allocation of public funding. It was beyond the scope of this review to evaluate and construct actions for these longer-term reforms. However, given the importance of human capital development for the economy and society, this review recommends further work on these proposals, as well as the incentive structures for corporate, fringe benefits, and personal tax, tertiary education funding models and loan systems, and the Youth Allowance and Jobseeker systems. Getting the right settings will be critical in helping workers strengthen their skills, find productive employment, and drive long-term increases in living standards.

"Employers engage in WIL for a variety of reasons, such as accessing new ideas and practice, or even to 'give back' to an industry or profession."

3. Expand on successful initiatives

Implementation of the review's actions will create further incentives for collaboration between higher education providers and industry (for example, in the form of higher rates of WIL or industry-relevant micro-credentials and cadetships). Funding student places and some level of financial support to industry that recognises the costs incurred in providing WIL placements or cadetships are examples of financial incentives that will help promote collaboration. If these initiatives achieve positive returns on investment, the expansion of funding should be considered.

4. Extension and possible expansion of the National Priority Industry Linkage Fund

The NPILF Review will examine how to redirect NPILF funding to reward successful strategies. It should also consider the progress of new actions that may be undertaken as a result of this review and any adjustments or expansions that may be needed. The Government should also consider providing additional funding to NPILF in 2025 when funding becomes performance-based, so that incentives do not rely solely on redistributing funding between providers.

67. PhillipsKPA. (2014), Engaging Employers in Work Integrated Learning: Current State and Future Priorities, p. 41.

Glossary

Term	Definition
ABS	Australian Bureau of Statistics.
ACCI	Australian Chamber of Commerce and Industry.
ACEN	Australian Collaborative Education Network.
AQF	Australian Qualifications Framework.
BCA	Business Council of Australia.
Cadetship	A program which combines formal study with practical work experience.
Credential	Documentary evidence of an individual's qualification or competence in a particular educational, academic, or occupational field.
Credentials Platform	A secure digital environment that brings together a learner's full range of tertiary qualifications and achievements with the ability to compile and share them with potential employers.
Credit	The value assigned for the recognition of equivalence in content and learning outcomes between different types of learning and/or qualifications. Credit reduces the amount of learning required to achieve a qualification and may be through credit transfer, articulation, recognition of prior learning or advanced standing.
Credential engine	A platform which provides a centralised registry of up-to-date information about all credentials and a common description language to enable credentials to be compared
Digital badges	Verifiable online indicators (title or icon) associated with an individual that recognises their completion or achievement in attaining a skill.
Higher education providers	A body that is established or recognised by the Commonwealth or a State or Territory government to issue qualifications in the higher education sector. It may be a university, or a self-accrediting institution or non-self-accrediting institution.

Term	Definition
IAT	Institute of Applied Technology.
Learning-Integrated Work (LIW)	Learning-Integrated Work engages an employee in a formal educational program while employed to develop their skills.
Lifelong learning	Learning activities that are undertaken throughout life to acquire knowledge and skills within personal, social and/or employment-related contexts.
LSAY	Longitudinal Surveys of Australian Youth.
Micro-credential	A micro-credential is a certification of assessed learning that is additional, alternative, complementary to, or a component part of a formal qualification.
NPILF	National Priority Industry Linkage Fund.
OECD	Organisation for Economic Co-operation and Development.
Open standards	A format or protocol that is made available for anyone to access, use or share without constraints. These standards are maintained and developed through collaboration.
Pathways	Arrangements to support students to move freely between different learning experiences with full or partial recognition for the learning outcomes they already have, which might come from formal, informal, or non-formal learning.
Qualification	A formal certification issued by a relevant approved body to recognise that a person has achieved the intended learning outcomes or competencies.
Reskill	The process of learning new skills with the purpose of the individual having the ability to move to a new role.
Rich skill descriptors	Machine readable, searchable data that include the context behind a skill, providing a common definition for a particular skill.
Sandwich courses	A course which integrates an industry work placement in between periods of study.

Term	Definition
Skills	The abilities required to act, acquired through deliberate, systematic, and sustained effort.
Skills library	A database of descriptive statements on required skills and knowledge needed to undertake certain jobs. These statements are designed to improve transparency on job requirements for industry, providers, and policy makers using a shared skills-based language.
SUN	Central Queensland University's Start University Now program.
TAFE	Technical and Further Education.
Tertiary education	Higher education and vocational education and training.
Threshold standards	These comprise of Part A: Standards for Higher Education (the minimum acceptable requirements for the provision of higher education in or from Australia by higher education providers registered under the TEQSA Act) and Part B: Criteria for Higher Education Providers (enables categorisation of different types of higher education providers according to certain characteristics; and whether a provider is responsible for self-accreditation of a course(s) of study it delivers).
UA	Universities Australia
Upskill	The acquisition of new skills through training or study which build upon an individual's existing skills.
VET	Vocational education and training.
Work-Integrated Learning (WIL)	Any arrangement where students undertake learning in a workplace outside of their higher education provider as a part of their course of study.
Workforce capabilities	Qualities that a person exhibits that contribute to an efficient, effective, and productive workplace. These can include technical knowledge gained through a formal learning environment, as well as human capabilities.
WEF	World Economic Forum

Appendices

Appendix 1: International Work-Based Learning Models

United Kingdom

Degree Apprenticeships

In 2015, the UK introduced the degree apprenticeship program, which allows students to attain a full bachelor degree (level 6) or masters degree (level 7) while undertaking an apprenticeship in the relevant industry.

There are currently around 87 universities that deliver degree apprenticeships in the UK, including Russell Group universities. Around 70 companies of varying sizes employ degree apprentices, including large international companies such as Rolls Royce, GlaxoSmithKline, and Goldman Sachs, as well as public sector organisations such as the National Health Service and the Government Economics Service.

In 2021, there are 72 level 6- and 24 level 7-approved degree apprenticeship programs. Health and science (29 per cent), engineering and manufacturing (27 per cent), and construction (16 per cent) account for most of the approved degree apprenticeships. However, the most popular degree apprenticeships are in business, administration, and law, which accounted for 48 per cent of the commencing degree apprenticeship students in 2018-19.

Degree apprentices must be aged 16 or over and they can be new or current employees. They spend around 80 per cent of their time in the workplace and the remainder in off-the-job study at higher education institutes. Students do not pay any tuition fees to participate in the program; they receive a wage for workplace training. Companies are required to pay at least the apprentice minimum wage, which is £3.90 (A$7.23) per hour. Work may be completed on a day-to-day basis or in blocks of time, depending on the program and the requirements of the employer. Degree apprenticeships generally take between 3 to 6 years to complete, depending on the course level.

Degree apprenticeships are developed by employers, universities and professional bodies working in partnership. The quality of the degree apprenticeships is regulated by the Institute for Apprenticeships and Technical Education (IATE). IATE establishes and approves the industry-specific professional quality standards, which a particular degree apprenticeship program must meet in addition to the standard academic quality criteria of higher education. This ensures the course content, learning outcomes and competencies, performance assessment, quality assurance and recognition procedures for each degree apprenticeship program are based on a combination of academic and professional standards.

While the intent of the degree apprenticeships is to target young people entering the labour market, a significant proportion of degree apprenticeships are undertaken by adults aged over 25 and those who are already employed.

However, degree apprenticeships still make up only a small proportion of England's students: 2 per cent of higher education commencements and 3.5 per cent of all apprenticeships for 2018-19.

Sandwich Courses

The 'sandwich' model adds periods of work experience into a traditional course. A 'thick' sandwich is where students undertake work experience (a placement year) in between the second and third years of an undergraduate program, making it a four-year program. A 'thin' sandwich is where, instead of a one-year placement, students undertake two or more shorter work placements.

Currently, a small number of higher education institutions in the UK provide most of the sandwich placements. The majority of these are either a college of advanced technology or a polytechnic. In the late 1980s, around 20 per cent of all higher education students participated in sandwich courses, whereas the latest available data (2012-13) indicates that this rate has dropped to approximately 10 per cent.

Typically, universities partner with local and international companies to provide students with work experience. Students are usually assessed by the company throughout the placement, which may or may not be credited towards the final degree result. Most of the sandwich programs are available in business and STEM fields but select universities offer placements in arts.

Students either get a tuition fee waiver or a significant reduction (around 20 per cent) in their tuition fees during their placement year. This may be deferred through the UK Government's income contingent loan. In part, the fees cover the costs of visits from university placement supervisors. Students are not legally entitled to receive payment from companies during their placement. However, most companies do pay their placement students, which is usually between £10,000 and £17,000 (approximately A$18,500 and A$31,500) a year.

Sandwich students are entitled to a cheaper loan from the government for the cost of living during a sandwich placement. The loan is based on students' circumstances rather than their income and will vary based on whether if they are living with their parents or away from home.

Research conducted by the Work Based and Placement Learning Association showed that students in sandwich degrees were more likely to achieve a better grade in their degree than non-placement students. This is potentially due to the 'increased confidence, motivation and professionalism' engendered by the placement.[68] A study by Aston Business School concludes that placement years boost students' personal development and their teamwork skills.[69] Additionally, the UK government's research shows the average salaries of students who have completed sandwich placements are 8 per cent higher than those that did not within six months of graduating.[70]

68. Duignan, J. (2003), Placement and adding value to the academic performance of undergraduates: reconfiguring the architecture- an empirical investigation, p. 335-350.

69. Jones, C., et al. (2017), Do work placements improve final-year academic performance or do high-calibre students choose to do work placements?, p. 976-992.

70. Department for Business, Innovation & Skills. (2021), A review of business-university collaboration: the Wilson review.

Germany

Dual Study

The practice-oriented vocational training system, or dual system, was introduced in Germany in the 1970s. The model, which combines on-the-job learning at companies and school-based learning at vocational colleges, is a significant component of the German tertiary education sector. Every year more than half of senior secondary school students start a dual study training program in one of the 325 training occupations.[71]

The model has been adopted in the higher education sector, which applies the same principle of practice-oriented learning. At the higher education level, approximately two thirds of all dual study is delivered through Universities of Applied Sciences (UASs). UASs are vocationally focused and specialise in applied science or applied art, such as engineering, technology or business.

The higher education dual system has become increasingly popular since the late 1990s. More than 100,000 young people are now studying in over 1500 dual study programs offered by UASs or other types of higher education providers.

A differentiator of this model is that the student is required to pass a university entrance examination and gain an employment contract with a partner company. The dual study program is generally available at the bachelor degree level, although it is also available at the masters degree level.

There are several variations of the dual study model, including a training-integrated program which includes an integrated vocational diploma with the higher education degree, and a career-integrated program designed for people who are employed and are looking for further opportunities to gain professional qualifications.

The workplace training component generally accounts for approximately half of the learning program. It may be undertaken in blocks, where students switch between school and employment on a longer timeframe. Alternatively, students may also switch between the classroom and workplace multiple times a week.

The program is co-funded between state governments and participating industries: state governments fund the full costs associated with academic training and the company pays the students a wage for the workplace segment of their study. Students earn a fixed salary throughout their dual studies, based on their experience and the industry.

A survey of companies involved in dual study programs showed that most participating employers were satisfied (59.6 per cent) or very satisfied (37.5 per cent) with the quality of the program.[72] Employers rated the quality of dual study programs better (51 per cent) or clearly better (23 per cent) than conventional bachelor degrees. A 2019 study confirmed that graduates of dual study programs have a more predictable and stable transition to employment than graduates of conventional bachelor degrees.[73]

71. Ertl, H. (2020), Dual study programmes in Germany: blurring the boundaries between higher education and vocational training, p. 79-95.

72. Goeser, J., et al. (2011), AusbildungPlus Betriebsumfrage.

73. Krone, S. (2019). Duales Studium aus der Perspektive der Studierenden, p. 462–478.

Canada and the United States

Co-operative Education

Co-operative education combines classroom-based learning with practical work experience relevant to the course. Generally, the time spent at work placement is at least 25 per cent to 30 per cent of the total course.

In the US, it's estimated several hundred institutions offer formal co-op programs, although most only have limited options available. In Canada, almost all colleges and universities offer a co-op option for their academic programs, with over 80,000 students currently undertaking one.

These programs are split between parallel and alternating models. In the parallel co-op model, students frequently switch between the classroom and the workplace, typically multiple times a week. In contrast, the alternating co-op model has students switching between full-time employment (often paid) and full-time study on a longer timeframe, typically term to term.

Industry and universities co-design the learning program. Co-op employers usually pay a wage based on the student's program and level of experience. As a result, co-op students are often a low-cost option for the companies.

Co-ops tend to be most prevalent in technical fields, but have recently expanded to other programs, including the humanities. While they are primarily available to diploma and undergraduate students, some institutions have introduced co-op programs at the postgraduate level. In certain program areas such as engineering, co-op experience may be credited towards professional certifications.

Co-op students pay tuition fees when they are enrolled in traditional academic semesters. In Canada, this is subsidised by the government. Usually, co-op students also pay a one-time program fee for each work term, which gives them full-time student status. This fee is used to cover job search training and career counselling, and access to co-op jobs. Given that co-op work terms are mostly paid, this fee is much lower than the wages.

Several studies show that co-op students are more successful at finding a job and earn a higher salary after graduation.[74] Graduates from co-op programs are more likely to be employed (97.6 per cent) and in permanent positions (91.1 per cent) than graduates from non-co-op programs (96.6 per cent and 77.9 per cent respectively).[75]

Paid co-op placements can be an economically feasible avenue for students of all backgrounds to gain valuable work experience. This is important for low socio-economic status students and older students who might otherwise find it difficult to support themselves and their family without the co-op salary.

University co-op graduates were also found to be less likely to be overqualified for their job.[76] This means the skills gained from co-op programs are being effectively used and that co-op programs are more efficient in meeting labour market needs.

74. Somers, G. (1995), The post-graduate pecuniary benefits of co-op participation: A review of the literature, p. 25-41.

75. Downey, J., et al. (2002), Co-operative Education Greater Benefits Greater Costs.

76. Frenette, M. (2004), The overqualified Canadian graduate: The role of the academic program in the incidence, persistence, and economic returns to overqualification, p. 29-45.

Appendix 2: Digital Platforms

In recent years, several countries have set up digital platforms that provide students and workers with a record of the skills and qualifications they have attained. These platforms aim to standardise access to education records, making it easier for students to compile and present their credentials, and for employers to verify prior learning. The platforms are often linked to skills and labour market information that assists individuals with career choice.

Governments often collaborate with the education and not-for-profit sectors in developing and maintaining these platforms, while some have been created solely by the not-for-profit sector.

Singapore's Government launched the MySkillsFuture portal in 2017. It is a one-stop portal that enables students of all ages and workers to make informed learning and career choices, enabling them to pursue their skills and career development. It provides a wide range of information, including industry, job and occupation insights, available courses, tips and advice in career planning and development, and job vacancies. MySkillsFuture is available as a mobile app and individuals can create a personalised account for their learning and career plans, which can follow them throughout their life.

Employers can use MySkillsFuture to identify suitable programs and resources to upskill their employees. Similarly, training providers can use the portal to reach out to a wider audience for their programs and enhance their knowledge on labour market trends to deliver customised and quality training.

In the Netherlands, a collaborative organisation of over 100 education institutions, known as the National Research and Education Network, recently launched a pilot platform that creates, and issues digital badges called Edubadges.

An Edubadge is a secure, electronically issued digital certification of skill and/or competence awarded by a verified issuing organisation, such as a university. Students use Edubadges to communicate the skills and knowledge they have demonstrated in regular accredited study programs, as well as non-traditional training, such as short courses, micro-credentials, internships, or community service projects. Each Edubadge is linked to an institution-wide identity, which continues to maintain the badge's validity after a learner has graduated. Edubadges cannot be reproduced or edited, making it easier to verify authenticity of a learner's credentials.

In the United States, Credential Engine is a not-for-profit organisation that provides a centralised registry of up-to-date information about all US credentials and a common description language to enable credentials to be compared. Credential Engine started in 2016 and currently houses nearly 20,000 credentials and competency frameworks from more than 450 providers. Credentials include traditional degrees, certifications, licenses, and apprenticeships.

Appendix 3: Australian Government initiatives to support collaboration between higher education providers and industry

This review was undertaken following several reforms in recent years to strengthen partnerships between higher education teaching and research and industry.

National Priority Industry Linkage Fund

The National Priorities Industry Linkage Fund (NPILF) was established as part of the Government's Job-ready Graduates Package. It prioritises three areas: expanding opportunities for WIL, building greater STEM capability in the workforce, and increasing the development of industry partnerships and collaborations.

The NPILF aims to bring about system-wide improvements by requiring universities to identify new and additional initiatives to achieving better outcomes in these areas, establish clear targets, and evaluate progress. It has a broad focus, covering a range of industry engagement practices and student cohorts from undergraduate to masters and doctoral degrees. Universities can focus on any action that will support the NPILF targets, including the delivery of new course offerings or learning models and the associated investments in redesigning curricula, work-based learning, and assessment processes.

Universities are currently developing implementation plans to support commencement of a pilot program, which will run for three years from 2022 to 2024. The pilot will require universities to identify and report against targets and case studies in each of the three priority areas, using a combination of government and institutional data, in conjunction with other information sources and evaluation methodologies. From 2025, a performance funding component will be progressively implemented, informed by the outcomes of the pilot.

Advanced Apprenticeships

The Government is supporting a range of small-scale pilots testing advanced apprenticeship-style courses that allow existing employees to combine work and study to gain new skills for themselves and their workplaces. These models provide a pathway into higher education through sub-bachelor qualifications, often for students who have not been able to access traditional post-school pathways to higher education.

These pilots include the recently completed Diploma of Digital Technologies (Naval Shipbuilding) pilot, conducted at Flinders University, and the current Digital Technologies (Industry 4.0) trial, being conducted at six universities across the country, targeting small and medium enterprises in key manufacturing 'pipeline' industries. Under the Industry 4.0 trial, participants can study an undergraduate certificate, diploma, or associate degree with a full or part-time study load.

In 2021, the Government also introduced the Women in STEM Cadetship and Advanced Apprenticeship program to assist women employees looking to upskill in STEM fields or move into a STEM career. This program has capacity to support around 600 women across 37 approved courses in fields such as engineering, data science, cybersecurity, and agribusiness. Potential employer partners have been identified across a range of sectors, including IT, energy, manufacturing, education, telecommunications, and agriculture.

In addition, as part of BHP's Future of Work Program, the Government is partnering with BHP to develop a program of advanced apprenticeship-style courses, based on the skills required for the future of work in the regional communities in which BHP operates. The first intake of learners is planned for the 2022 academic year.

University Research Commercialisation Scheme

As part of the 2020-21 Budget, the Government announced funding to scope how Australia can better commercialise university research outputs to build sovereign capability, economic productivity, and solutions to national challenges.

An expert panel of industry and university leaders, chaired by Jeff Connolly, CEO of Siemens Australia, has been appointed to look at a new university research commercialisation scheme.

In February 2021, a university research commercialisation consultation paper was released, which received over 170 submissions from researchers, universities, industry, and government agencies. The submissions reinforced support for a new scheme focusing on national priorities, which would provide funding at different stages to progress ideas and technologies. Many submissions also advocated for new ways to incentivise and increase collaboration between universities and industry.

Based on consultation feedback, the research commercialisation effort is exploring options to:

- Adjust existing university policy.
- Invest in new priority-focused schemes.
- Strengthen industry incentives to pull university research through to commercialisation.
- Build new collaboration and workforce capabilities.

Appendix 4: Consultations

A Reference Group was established at the beginning of the review to advise on issues for consideration and provide feedback as the review progressed. This group comprised Tom Bentley, Jeff Borland, Adam Boyton, Linda Kristjanson, Megan Lilly, Peter Noonan, Jennifer Westacott/Mike Pope.

A workshop on improving transitions from education to skilled employment for Australia's youth was held on 7 June 2021. Participants included members of the Reference Group, together with subject matter experts from higher education and industry.

A workshop on the future of shorter-form credentials was held on 15 June 2021. All providers that participated in the 2020-21 higher education certificates initiative were invited to attend.

The review also received written submissions against the terms of reference from:

- Bond University
- Central Queensland University
- Charles Darwin University
- Deakin University
- Edith Cowan University
- Engineers Australia (Bernadette Foley)
- Federation University
- Flinders University
- Griffith University
- La Trobe University
- Macquarie University
- Monash University
- Murdoch University
- NUW Alliance
- Queensland University of Technology
- RMIT University
- Swinburne University of Technology
- Tina Faulk
- Universities Australia
- University of Adelaide
- University of Canberra
- University of Melbourne
- University of New South Wales
- University of Newcastle
- University of Queensland
- University of Southern Queensland

- University of Sydney
- University of Tasmania
- University of Technology Sydney
- University of the Sunshine Coast
- Group of Eight
- Victoria University
- Western Sydney University
- Australian Council of Professions

Consultation on the review's findings was undertaken with the organisations listed below and individuals, and through several roundtables with experts and practitioners, including:

- Ai Group
- Australian Catholic University
- Australian Chamber of Commerce and Industry
- Australian Government Department of Education, Skills and Employment
- Australian Government Department of Industry, Science, Energy and Resources
- Australian Government Department of the Treasury
- Australian Skills Commission
- Australian Technology Network of Universities
- Business Council of Australia
- Dual-sector universities roundtable
- Employers' roundtable
- Group of Eight
- Independent Higher Education Australia
- Industry roundtable
- Innovative Research Universities
- National Careers Institute
- Peter Coaldrake (TEQSA)
- Peter Shergold
- Regional Universities Network
- Terence Hogarth and Derek Bosworth (University of Warwick)
- Unaligned universities roundtable
- Universities Australia
- University of Tasmania
- Victoria University

Bibliography

AlphaBeta (2019), 'Future Skills', *AlphaBeta*, p. 5.

Australian Bureau of Statistics. (2017), 'Work-Related Training and Adult Learning', *Commonwealth of Australia*, accessed 11 October 2021.

Australian Bureau of Statistics (2021), 'Business Conditions and Sentiments', *Commonwealth of Australia*, accessed 11 October 2021.

Australian Collaborative Education Network. (2020), 'Guides for Online WIL Placements and Projects', *Australian Collaborative Education Network*, accessed 11 October 2021.

Bartlett H., Bean, M., Dawkins, P., Klomp, N., Kristjanson, L. & Maddocks, S. (2019), 'Reforming Post-Secondary Education in Australia: Perspective from Australia's Dual Sector Universities', Melbourne, Victoria.

Bean, M., Dawkins, P., Klomp, N., Maddocks, S., Quester, P., & Smith, A. (2020), 'Dual-Sector Paper in Response to VET Funding Reform Discussions: Proposals from Australia's Dual Sector Universities'.

Billett, S. (2015), 'Integrating practice-based experiences into higher education', *Springer*, p. 1-26.

Bogna, F. (2016), 'Articulation between VET and Higher Education qualifications: enhanced pathways and professional outcomes', *National Vocational Education and Training Research Conference*, p. 2-16.

Borland, J. & Coelli, M. (2021), 'It is 'dog days' for the Young in the Australian Labour Market?', *The Australian Economic Review*, p. 45-70.

Bridge, J., & Twaddle, J. (2021), 'Scaling up work integrated learning in higher education', *PwC*, accessed 13 October 2021.

Commonwealth of Australia. (2021), 'Higher Education Standards Framework (Threshold Standards) 2021', *Federal Register of Legislation*, accessed 11 October 2021.

Dawkins, P., Hurley, P. & Noonan, P. (2019), 'Rethinking and Revitalising Tertiary Education', *Mitchell Institute for Health and Education Policy*, Victoria University.

Dawkins, P., Hurley, P., & Lloyd, D. (2020), 'Averting an Escalating labour Market Crisis for Young People: A Proposed National Job Cadet Program', *Mitchell Institute for Education and Health Policy*, Victoria University, p. 9.

de Fontenay, C., Lampe, B., Nugent, J. and Jomini, P. (2020), 'Climbing the jobs ladder slower: Young people in a weak labour market', *Productivity Commission Staff Working Paper*, p. 24.

Deloitte Access Economics. (2019), 'The Path to Prosperity: Why the future of work is human', *Deloitte*, accessed 11 October 2021.

DeMark, S., Kozyrev, J. (2021), 'Enabling pathways to opportunity through a skills-based architecture', *The Journal of Competency-Based Education*, 6(1), p. 3.

Department for Business, Innovation & Skills. (2021), 'A review of business-university collaboration: the Wilson review', *Government of the United Kingdom*, accessed 11 October 2021.

Department for Education. (2021), 'Higher education short course trial: Challenge Competition', *Office for Students*, accessed on 11 October 2021.

Downey, J. Kalbfleisch, J. & Truman, R. (2002), 'Co-operative Education Greater Benefits Greater Costs', *University of Waterloo*.

Duignan, J. (2003), 'Placement and adding value to the academic performance of undergraduates: reconfiguring the architecture-an empirical investigation', *Journal of Vocational Educationand Training*, 55(3), p. 335-350.

Ertl, H. (2020), 'Dual study programmes in Germany: blurring the boundaries between higher education and vocational training', *Oxford Review of Education*, 46(1), p. 79-95.

Frenette, M. (2004), 'The overqualified Canadian graduate: The role of the academic program in the incidence, persistence, and economic returns to overqualification', *Economics of Education Review*, 23, p. 29-45.

Goeser, J., & Isenmann, M. (2011), 'AusbildungPlus Betriebsumfrage', Bonn: BIBB.

Hurley, P., Coelli, M., Ta, B., Knight, E., & Hildebrandt, M. (2021), 'Industry experiences and their role in education to work transitions', Department of Education, Skills and Employment, p. 4-30, (forthcoming).

IMS Global Learning Consortium (2021), 'OpenBadges: Frequently Asked Questions & Glossary', *IMS Global Learning Consortium*, accessed 11 October 2021.

Jones, C. M., Green, J. P., & Higson, H. E. (2017), 'Do work placements improve final-year academic performance or do high-calibre students choose to do work placements?', *Studies in Higher Education*, 42(6), p. 976-992.

Krone, S. (2019). Duales Studium aus der Perspektive der Studierenden. In B. Hemkes, K. Wilbers, & H. Heister (Eds.), Durchlässigkeit zwischen beruflicher und hochschulischer Bildung, p. 462–478, Bonn: BIBB.

Mitchell Institute (2021), 'Industry experiences and their role in education to work transitions', (unpublished).

Modini, M., Joyce, S., Mykletun, A., Christensen, H., Bryant, R., A., Mitchell, P., B., & Harvey, S., B. (2016), 'The mental health benefits of employment: Results of a systematic meta-review', *Australasian Psychiatry*, 24(4).

National Skills Commission (2021), 'Industry Employment Outlook', Commonwealth of Australia, p. 1.

National Skills Commission (2021), 'Skills Priority List', *Commonwealth of Australia*, accessed 11 October 2021.

New Zealand Qualifications Authority. (2018), 'Micro-credentials', *New Zealand Qualifications Authority*, accessed on 11 October 2021.

Noonan, P., Blagaich, A., Kift, S., Lilly, M., Loble, L., More, E., & Persson, M., (2019), 'Review of the Australian Qualifications Framework', *Australian Qualifications Framework*, p. 12-56.

Open Skills Network. (2021), 'Rich Skill Descriptors | Open Skills Network', *Western Governors University*, accessed 13 October 2021.

Perkins, J. and Pryor, M. (2021), 'Digital badges: Pinning down employer challenges', *Journal of Teaching and Learning for Graduate Employability*, 12(1), p. 24.

PhillipsKPA. (2014), 'Engaging Employers in Work Integrated Learning: Current State and Future Priorities', *PhillipsKPA*, p. 41.

Productivity Commission (2020), 'PC Productivity Insights', *Commonwealth of Australia*, accessed on 11 October 2021.

Productivity Commission (2020), 'Why did young people's incomes decline?', *Commonwealth of Australia*, p. 1.

Quality Indicators for Learning and Teaching. (2020), 'Graduate Outcomes Survey National Report', *Commonwealth of Australia*, accessed 11 October 2021.

Schoon, I., & Mann, A. (2020), 'School-to-work transitions during coronavirus: Lessons from the 2008 Global Financial Crisis', *OECD Education and Skills Today*, accessed 11 October 2021.

Shergold, P., Calma, T., Russo, S., Walton, P., Westacott, J., Zoellner, D., & O'Reilly, P. (2020), 'Looking to The Future: Report Of The Review Of Senior Secondary Pathways Into Work, Further Education And Training', *Department of Education Skills and Employment*, accessed 15 October 2021.

Somers, G. (1995), 'The post-graduate pecuniary benefits of co-op participation: A review of the literature', *Journal of Cooperative Education*, 31, p. 25-41.

The Australia Institute. (2019), 'The Future of Work for Australian Graduates: The Changing Landscape of University-Employment Transitions in Australia', *The Australia Institute*, Canberra.

The Australian Industry Group (2018), 'Survey Report: Skilling a National Imperative', *The Australian Industry Group*, accessed 11 October 2021.

The Australian Industry Group (2020), '2020-21 Federal Budget Submission', *The Australian Industry Group*, accessed 11 October 2021.

The Australian Industry Group (2021), 'Skills Urgency', *The Australian Industry Group*, p. 22.

The Organisation for Economic Cooperation and Development. (2020), 'Financing SMEs and Entrepreneurs 2020', *OECD Skills Studies*, accessed 11 October 2021.

The Organisation for Economic Cooperation and Development. (2016), 'Skills Matter: Further Results from the Survey of Adult Skills', *OECD Skills Studies*, accessed 11 October 2021.

Universities Australia, Australian Chamber of Commerce and Industry, Australian Industry Group, Business Council of Australia & Australian Collaborative Education Network. (2015), 'National Strategy on Work-Integrated Learning in University Education', *Australian Collaborative Education Network*, accessed 11 October 2021.

Universities Australia. (2019), 'Work-Integrated Learning in Universities', *Universities Australia*, accessed 11 October 2021.

University of Tasmania (2015), 'Developing Pathways from Vocational to Higher Education Courses: Challenges Faced', *Australian Association for Research in Education Conference*, p. 1-10.

Walsh, L., Gleeson, J., Magyar, B., & Cordoba, B., G. (2021), 'Life, Disrupted: Young People, Education and Employment Before and After COVID-19', *Monash University*, Melbourne.

World Economic Forum (2020), 'Future of Jobs 2020', *World Economic Forum*, p. 38-70.

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