

DIGITAL SKILLING

SITUATIONAL ANALYSIS — AUSTRALIA

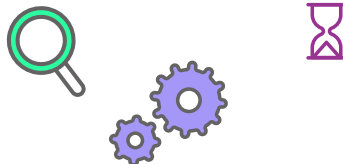
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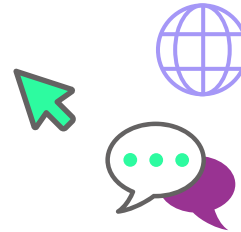
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EXECUTIVE SUMMARY



The report aims to identify outcomes that can shape Australia's digital skilling system at Vocational Education and Training (VET) stakeholder level to engage a range of stakeholders in policy development and to inform later stages of the Microsoft Philanthropy digital skilling project.

GAN Australia and Microsoft Philanthropies recognise that digital transformation must be delivered within an enabling environment shaped by policies and regulations that allow for engagement with and preparedness for emerging technologies that include (but are not limited to) Artificial Intelligence (AI), the Internet of Things (IoT), Blockchain, e-commerce platforms and a range of other technological advancements.

An exploration of the Australian context for digital skills indicates that for many years, Australia has faced a significant challenge in developing, training and sustaining a digitally skilled workforce; in the wake of the COVID-19 pandemic, this challenge has grown extensively.

To investigate how the Australian VET industry can tackle this challenge, this report has first sought to define 'digital skills' as not just an ability to use digital technologies, but instead as a range of capabilities that emerge from the combination of digital technology know-how with the knowledge of their impact and consequences: we term this 'digital competence' to reflect the need for digitally competent workforces to meet industry demand.

The impact of a 'fourth industrial revolution' in Australia as influencing this demand for digital skills but realising this revolutionary change to work and production has been stalled in part by an inability of organisations to rapidly provide training in digital skills to their workers and maintain pace with the impact of digital transformation. Given that all people engaged in the labour market will require some form of digital competency,

digital skills policies, regulations and programs will need to address three key issues – particularly several factors relating to each – which are outlined below.

> **METHODOLOGY**

The report comprises a desktop review of recent Australian literature, a survey about digital skills usage and experience, a small focus group with sector stakeholders around the key issues identified and several follow-up interviews and some case study examples of digital skilling initiatives in the VET sector.

> **THE DIGITAL DIVIDE AND SOCIAL INCLUSION**

A focus on digital skills development must pay particular attention to *the inclusion of* a diverse range of vulnerable groups of Australians – including Aboriginal and Torres Strait Islander peoples, people with disabilities, those living regionally and remotely, those from lower socio-economic backgrounds and other demographic characteristics that highlight vulnerability.

Digital inclusion for excluded groups cannot be achieved by digital strategies alone and must incorporate the much broader policy, infrastructure and training delivery contexts. This report recommends that addressing digital exclusion include broader, non-digital solutions.

> **INNOVATING SKILLS FOR A DIGITAL ECONOMY**

The kinds of occupations emerging to shape the future labour market and workforce contain tasks requiring digital skills but also personal skills of collaborating, communicating, being creative, being flexible and being innovative. These personal skills are also those that workers will package with their digital competencies to transfer between workplaces, industries and sectors as their careers reflect a ‘portfolio’ of experience and knowledge.

Within Australia there is ample support in literature to recommend that equipping apprentices and trainees with the packaged training and work experience that incorporates both technical and personal skills is essential to VET supplying the work-ready graduates that industry will demand.

> **SKILLS DEVELOPMENT AND JOBS AND SKILLS MISMATCH**

Despite the clear need for VET to provide industry with graduates that will be prepared for new work challenges in digitally enabled workplaces, numerous surveys and analyses of VET units of competency reflect a low level of digital competence being offered as part of teaching and learning. This is most problematic where sectors not traditionally impacted by digitalisation are now being exposed to new technologies and must adapt. Overall, there are significant implications for the development of capable Australian workforces

prepared for challenging work scenarios and job descriptions.

The report also recommends the development of basic skills benchmarks across multiple sectors to ensure consistency of digital skills development across the whole Australian labour market and workforce in order to achieve stability in the system as well as support the transferability of digital competencies between workplaces, industries and sectors.

> CONCLUSION

This report has considered the digital skills situation in Australia, examining key issues that create barriers to the development of Australia's digital skills system. It has considered the role of government at national and state levels in Australia and the policy environment created by initiatives of public and private organisations, to identify good examples of collaboration at intergovernmental level, in private industry and through public-private partnerships.

An overall conclusion of this analysis is that stakeholders in the Australian digital skilling system must pay attention to issues that relate to the digital divide – particularly access. The issue of vulnerable groups missing out on access to digital technologies intersects all issues discussed. It will remain difficult to address the digital divide and ensure social inclusion with only a greater emphasis on employment, skills and training services delivered digitally. Appropriate policy responses to skill and prepare Australians for the digital labour market and digitally enabled workplaces must begin at the pre-digital stage and work to develop digital skills that become competencies.



BACKGROUND

The Global Apprenticeship Network (GAN Global) is an international network of companies, employer organisations, associations, and stakeholders headquartered in Switzerland. GAN Global primarily exists in order to promote work-based learning (WBL), quality [apprenticeships](#), and to create job opportunities for youth. This advocacy provides an important voice and input for industry. It also ensures that demand side of the labour force equation can be involved with initiatives that increase the confluence between what the labour force can do, and what is required by employers. Along with the promotion of WBL strategies, GAN Global also recognises and embeds the importance of Sustainable Development Goals. GAN Global has sixteen official country networks whose purpose is to embed the GAN concept in a national context. GAN Australia, hosted by AEN, aims to raise awareness on apprenticeship programs and encourage companies to offer more opportunities to youth within the context of the distinct economic, cultural and institutional needs of Australia.

The GAN Global network is supported by member companies including the Microsoft Corporation which has Board representation in GAN Global. GAN Global has been engaged by Microsoft Philanthropies to support the Microsoft Global Skilling Initiative (GSI). This project is funded by Microsoft and has a focus on digital upskilling with disadvantaged youth.

As part of the GSI, three GAN Networks, in New Zealand, Australia, and Colombia, have been engaged in turn to develop digital skilling situational analyses in their respective countries.

This report is intended to provide GAN Global and Microsoft Philanthropies with a situational overview of both internal and external factors that influence and shape Australia's current digital skilling systems. This includes insight to the challenges faced in how these systems are being shaped and opportunities for innovation to overcome barriers.

The report's aim is to identify outcomes that can shape the digital skilling system at stakeholder level to engage a range of stakeholders in policy development. GAN Global and Microsoft Philanthropies have stated that:

Digital transformation must be delivered within an enabling environment with policies and regulations that allow for engagement with and preparedness for emerging technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), Blockchain, e-commerce platforms, and other technological advancements.

GAN Global and Microsoft Philanthropy recognise that a coordinated effort is required for a digital skills transformation strategy that is responsive to social and economic goals for Australia.

> METHODOLOGY

Information in this report has been collated from multiple sources. A desktop review of recent Australian literature, and of the Australian Government and policy environment has been conducted to provide context and background to issues surrounding digital skills. This also provides a framework for further research, and insights from primary data collected for this project.

A survey of digital skills was conducted, focusing on members of the general public willing to give information about their use of digital technology. Survey participants were able to access a suite of free Microsoft courses on completion of the survey. Appendix 1 gives full information about survey participants, and detailed results. Key results and discussion points are included throughout this report.

A small focus group with sector stakeholders was undertaken, with participants asked for their insights into and examples of each of the key areas of this report. Appendix 2 gives further information about session prompts and answers from participants.

Case studies showcasing ongoing and upcoming areas of innovation in digital skilling are given, as examples of work in the Australian system.

> DEFINING DIGITAL SKILLS

For the purpose of this paper, we have adopted Australian NCVET's definition of digital skills as outlined in Gekara et al.'s (2017) working paper on the topic. These authors defined digital skills as:

A combination of a digital mindset (hardware, software, information, systems, security and innovation), knowledge (theoretical comprehension and understanding), competence (cognitive and practical knowhow) and attitude (value and beliefs) (Gekara et al. 2017p. 6).

This means that possessing digital skills is much more than just having an ability to use digital technologies. Digital skills result from combining an ability to use digital technologies with an understanding of how they create change and add value. This 'understandability' coupled with the concrete technical capabilities to put digital knowledge into action, results in a level of 'digital competence'. Digital competency is what allows an individual to utilise digital technologies in a range of contexts and with a level of critical application that grows with experience.

The impact of a 'fourth industrial revolution' premised on the integration of cybernetic and physical systems in a growing number of real-world activities is already changing many jobs and is predicted to impact many more. It is also fundamentally built on the incorporation of a range of digital technologies into how future skill requirements are

being mapped across all industries.

Ultimately, all people engaged in the labour market will need digital skills, albeit at varying levels, but there are barriers to realising the benefits of a fourth industrial revolution. Three key issues that digital skills policies and programs will need to address to overcome these barriers form the basis of this review: the digital divide and social inclusion; innovating skills for a digital economy; and skills development and jobs and skills mismatch. Below, each of these issue areas is addressed separately.

> DIGITAL SKILLS IN AUSTRALIA: CONTEXT AND OPPORTUNITIES

The Australian Computer Society has reported that Australia had over three quarters of a million (772,000) technology workers in 2019 but that the COVID-19 pandemic will have led to an estimated 35,000 fewer technology workers by the end of December 2020 (ACS 2020).

This is a major challenge to Australia's efforts to cultivate digital skills for future work and industry. An article from *The Australian Financial Review* (Boddy 2021) has reported on findings made by technology company Amazon that Australia will need 6.5 million technology workers in the next four years to 2025 – just to maintain pace with technological change.

This figure represents a major challenge to policymakers and training organisations. Many different approaches can be taken to shaping the digital skills ecosystem and it is important to first define digital skills to map an adequate response to the demands of digital transformation.

In a 2019 Skills Forecasts, Australian Industry Reference Committees (IRCs) ranked a series of 12 generic skill categories, in priority order:

1	Learning agility/information literacy / intellectual autonomy and self-management
2	Communication/Virtual collaboration /Social intelligence
3	Design mindset/Thinking critically / Systems thinking / Problem solving
4	Technology use and applications skills
5	Language, Literacy and Numeracy (LLN) skills
6	Managerial /Leadership skills
7	Customer service / Marketing skills
8	Science, Technology, Engineering, Mathematics (STEM) skills
9	Data analysis skills
10	Financial skills
11	Environmental sustainability skills
12	Entrepreneurial skills

Recently, the Australian Industry and Skills Committee (AISC), an Australian Industry Reference Committee (IRC), identified a range of digital skills in high demand that include automated design, coding and programming, cyber security and understanding and working with automation technologies (see AISC 2021).

The AISC is in the process of establishing an Industry 4.0 IRC to help ensure VET gives students the future-focussed skills they will need, as workplaces become radically transformed by increased automation and digitalisation. A range of factors and trends driving demand for digital skills in Australia have also been identified, including:

- > Access to quality internet
- > Artificial Intelligence and machine learning
- > Automation and robotics
- > Big data and data analytics
- > Changing workplace dynamics
- > Digitisation and ‘Internet of Things’
- > Emerging or changing markets
- > Emerging technology
- > Empowered customers
- > Globalisation and its impact on mobility, migration and international markets
- > More technologically advanced materials and products

The Australian Government’s National Skills Commission (NSC) has developed an Australian Skills Classification that is intended to provide a ‘common language’ for skills by identifying a range of skills linked to occupations. The Classification enables the exploration of how skills in each occupation are connected to others and how skills are transferrable across occupations and industries.

Importantly, the Skills Classification clarifies the overarching trend in digital skills-driven change: that digital skills are or will be needed for all jobs in the Australian labour market with the only variation being the level of skills required; but furthermore, that specialist digital skills beyond this general level of digital competency will be needed for specific jobs.

> TRAINING PACKAGES AND ACCREDITED COURSES

Training Packages “define the skills and knowledge needed by learners to perform a job” (ASQA 2021). In the Australian Vocational Education and Training system, the majority of training delivered to learners is governed by a Training Package. The Information

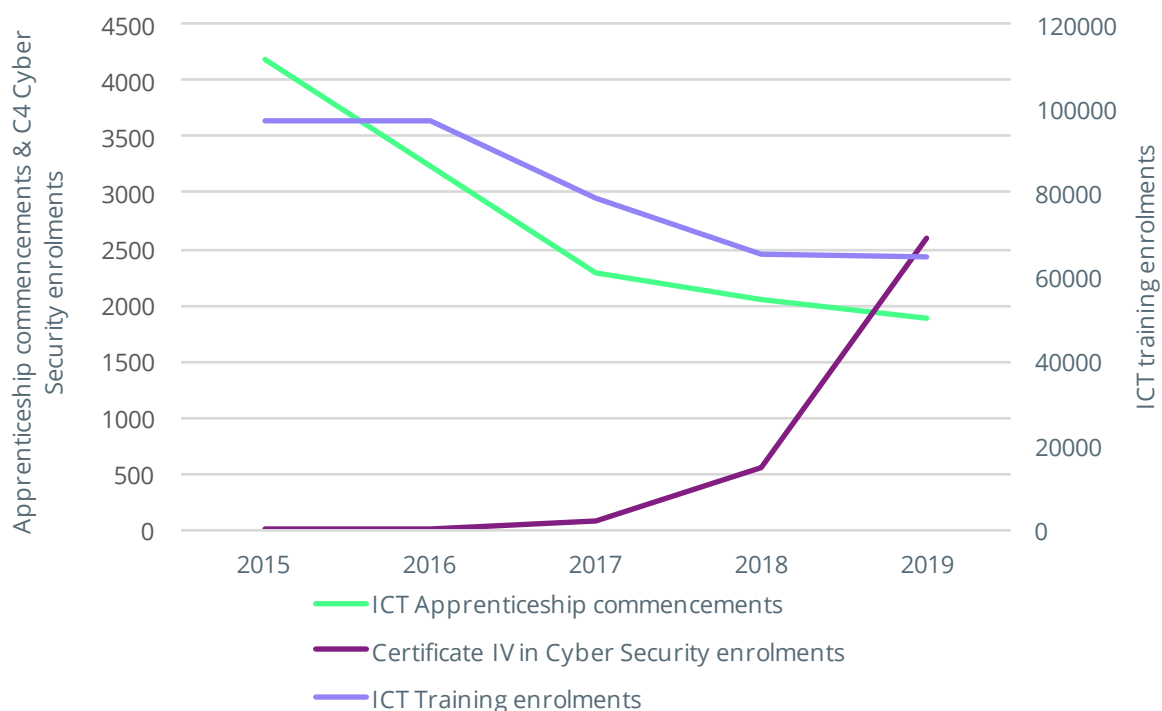
and Communications Technology (ICT) Training Package includes qualifications in both information technology and telecommunications technology.

A number of other Training Packages include units of competency that relate to digital skills. For example, the Foundation Skills (FSK) Training Package has several units around using digital technology in the workplace, as does the Business Services (BSB) Training Package (Training.gov.au 2021). This means that digital and technology skills, both generic and those specific to occupations, are trained outside of the ICT Training Package.

Accredited courses can be developed and released under specific circumstances, where there is a need for qualifications outside of the Training Package arrangement. In 2017, the Certificate IV in Cyber Security (course code 22334VIC) was approved. This qualification was developed and approved due to a need for formal qualifications targeting the occupational outcome of a cyber security analyst, which did not exist within the Training Package (Victorian Department of Education and Training 2017).

The Certificate IV in Cyber Security has been taken up well by providers and learners. There are 23 providers approved to deliver the qualification around Australia (Training.gov.au 2021), and in 2019 there were 2586 learners undertaking the qualification.

Figure 1
ICT Training Package Australian Apprenticeship commencements and training enrolments, and Certificate IV in Cyber Security training enrolments, 2015-2019



Source: VOCSTATS, <http://www.ncver.edu.au/resources/vocstats.html>, 'Total VET students and courses' and 'National Apprentice and Trainee Collection' extracted on 30/03/2021

Figure 1 shows the number of Australian Apprenticeship commencements in the ICT Training Package along with student enrolments in the same Training Package (this includes both Australian Apprentices and non-apprentice students). It also includes enrolment data for the Certificate IV in Cyber Security. Australian Apprenticeships data is from the National Apprentice and Trainee Collection (NCVER 2020a) and enrolment data is from the National VET Provider Collection (NCVER 2020b).

As can be seen in the figure, commencements and overall enrolments in ICT have declined over the past several years. For Australian Apprenticeships, this decline is driven by a large reduction in commencements in the Certificate III in Telecommunications Technology, as the National Broadband Network (NBN) rollout has finished. While a similar pattern is shown for this qualification across ICT Training Package enrolments, other qualifications within the Training Package have also had reductions in enrolments over this time frame which cannot be attributed to the NBN rollout.



CHAPTER 1. //

THE DIGITAL DIVIDE AND SOCIAL INCLUSION



The “Digital Divide” can be understood as the gap that exists between those able to access digital technologies (i.e. the internet, information communication technologies, mobile phones etc.) and those without access for various reasons including geographic isolation, socio-economic status, age, level of education and disability. With digitalisation rapidly transforming an increasing array of activities essential to meaningful participation in society, it is important to reduce the digital divide by ensuring more people without access to digital technologies are provided with opportunities to be included in not only their use but in digital competence-building.

Since 2016, RMIT University and Swinburne University of Technology have produced the Australian Digital Inclusion Index (ADII) and annually prepare a report that measures year-on-year digital social inclusion in Australian society, with reference to three dimensions of digital inclusion – Access, Affordability and Digital Ability. The ADII provides scores based on particular demographic regions and socio-demographic groups and higher scores indicate greater digital inclusion. The 2019 report found that between 2014 and 2019 Australia’s digital social inclusion measure has risen from 54.0 to 61.9 points (7.9 points), with improvements made across all dimensions of digital inclusion (Thomas et al. 2019).

The GAN Australian Digital Skills Survey (Appendix 1) further demonstrates some key issues with social inclusion as described in the ADII. While survey participants were generally well educated and in employment, there were indications of digital exclusion for Aboriginal and Torres Strait Islander participants, and those with a reported disability or medical condition. This exclusion took several forms, in particular an older first age of accessing the internet, and a lack of internet access at home but access on public transport.

> **PROGRESS STALLED**

The COVID-19 pandemic has had a significant impact on the digital divide, resulting in much slower growth in digital inclusion than the gains made in previous years, with just an increase of 1.1 points recorded in 2020. The 2020 report found that although public health-mandated shutdowns of business, schools, offices and community events accelerated the transition of these activities online, this occurred at a time when many Australians continued to face significant barriers to digital participation (Thomas et al. 2020). Digital inclusion is still lacking for many vulnerable groups, including low-income households, Australians aged 65 years and over, and the unemployed. Notably, the ‘employment gap’ – the gap between employed Australians and those not in the labour force – is wider than it was in 2014, whereas the ‘education gap’ – that between individuals with tertiary qualifications and others not completing secondary school – has somewhat narrowed. Australia was making steady progress prior to the outbreak of the COVID-19 pandemic, but progress has stalled since early 2020. This can in part be explained as a result of the negatively reinforcing combination of several forms of digital exclusion.

> CHALLENGES TO DIGITAL INCLUSION: DISADVANTAGE EXPERIENCED BY AUSTRALIA'S FIRST PEOPLES

Vulnerable groups of Australians have experienced exclusion due to access, which is most pronounced in regional or remote areas of the country. In regional and remote areas, major issues remain regarding network access and connectivity and this reality disproportionately affects Aboriginal and Torres Strait Island (ATSI) communities. One of the major Priority Reform areas of the *Closing the Gap* program is the provision of shared access to data and information at a regional level and this priority has been acknowledged as key to achieving the other priority reforms including the ability for ATSI people to share decision-making, build community control over local projects and transform government organisations' accountability to ATSI people (Department of the Prime Minister and Cabinet 2021). The 2020 *Closing the Gap* report identified lagging digital problem-solving skills as a major barrier to regional ATSI communities being able to develop employability to participate in the growth of their regions (National Indigenous Australians Agency 2021).

Aboriginal and Torres Strait Islander (ATSI) people and communities also face significant barriers to digital accessibility. The ATSI information portal *Creative Spirits* has reported that ATSI people – particularly in regional and remote communities – continue to miss out on internet access at an enormous rate. These communities experience low levels of literacy, far higher costs of equipment and maintenance, low technical experience, limited motivation and appreciation of the internet's benefits, significant levels of poverty making affordability a major issue, and problematic levels of poor health that increase unwillingness to use advanced technology (Korff 2020).

> THE ISSUE OF DIGITAL LITERACY

Other dimensions of the digital divide must be addressed before vulnerable groups can be fully enabled through access to digital technologies and online participation. First, access to digital technologies may still not benefit individuals without a suitable level of 'digital literacy'. This concept refers to "the ability to identify and use technology confidently, creatively and critically to effectively meet the demands and challenges of living, learning and working in a digital society" (Coldwell-Neilson 2018). To be digitally literate, Coldwell-Neilson explains, is to have skills and capabilities across a number of domains, including using technology; but beyond this, being able to locate and critically evaluate digital information, communicate and interact in online environments, create as well as consume online content and manage your online identity including maintaining personal security and privacy. A major element of digital literacy is also the digitally literate individual's recognition of skills-transferability between situations, across digital platforms and applications and in different contexts. An individual's 'digital footprint' must also be understood and attention paid to professional and ethical online behaviour as well as demonstrating cultural and social understanding in digital spaces.

The GAN Australia Digital Skills Survey (Appendix 1) included information about use of digital technologies and how participants improve their digital skills. Survey data showed that all participants, including those from disadvantaged groups, had some access to the internet and digital technology. As the survey was conducted online this result is not surprising, and may not be representative of other disadvantaged groups.

Users predominantly developed their digital skills through forms of online education; online courses, videos and self-teaching using the technology were all common. For the survey participants who did have access and who possess basic digital skills, accessing learning online is not a major barrier. For anyone who does not have access to either the internet or to a device to undertake learning on, or who does not have the skills to undertake learning online, there are fewer options for skilling. In addition, several participants agreed to the statement that “I feel threatened when others talk about new and existing digital technologies” and several participants disagreed with or reported being neutral on topics related to positive feelings towards digital technology and skills. Attitudes to technology will further impact on people’s ability to learn new digital skills.

> DATA PRIVACY IN THE DIGITAL ‘NEW NORMAL’

Second, a ‘new normal’, whereby digital connectivity forms the basis for doing many jobs, must be considered for its impact on those already struggling to maintain pace with technological change. Those individuals and groups currently positioned on the negative side of the digital divide will face major barriers, beginning with a basic understanding of, and ability to practice, those elements of digital literacy discussed above. Digital Rights Watch (2020) has warned that vulnerable people may lack access to digital rights and data privacy, in part where they lack digital competencies and in part due to the overreach of governments and corporations accessing and exploiting their data.

Participants in the GAN Australia Digital Skills Survey (Appendix 1) rated “being safe and responsible online” as the most important digital skill. Despite this, only 25% of participants scored themselves 5 out of 5 for their cyber security skills, the lowest of any of the skills categories included. This disconnect between the importance of remaining safe online and participants capacity to do so is worrying. Disadvantaged groups, including those with less familiarity with digital technology, may be more at risk.

Stakeholders interviewed for this project highlighted how in the Australian context, those individuals for whom English is a second language (ESL) will be particularly vulnerable to data-based vulnerability. As identified elsewhere, regional access continues to prevent many individuals from developing digital skills through experience and opportunity and ESL individuals in regional communities will be worst off.

> DISADVANTAGES AMONGST PEOPLE EXPERIENCING DISABILITIES

Third, in relation to access to digital technologies, advocacy organisations have identified the disadvantages experienced by people with disabilities. The prevalence of digital tools and resources in daily life means people with disabilities will fall further behind without diverse accessibility requirements being acknowledged and embedded in digital skilling strategies. Importantly, this means giving due consideration to the role of assistive technologies in providing opportunities for people with disabilities to develop digital competencies. CBM identifies many of the issues discussed above as contributing to barriers to access and outlines what is required to overcome them:

The steps to reduce these gaps for people with disabilities include focusing on raising awareness and enhancing knowledge of ICT accessibility, formulating policies and financial incentives to support universal design in technology and other areas, making assistive technology and ICT available and affordable for people with disabilities, and investing in a barrier-free environment (CBM 2019).

> TRADITIONALLY ADVANTAGED GROUPS FACING DIGITAL DISADVANTAGE

A key demographic that VET sector stakeholders identified as a potential challenge for digital inclusion efforts is older men with long career experience in non-digital roles. With growth in digitalisation, this labour force cohort will be impacted by increased redundancies as traditional industries change and embrace technologies like automation, AI and online service delivery, as well as by the pressure to adapt their skillsets to incorporate digital competencies.

> OVERCOMING THE DIGITAL DIVIDE

All considerations must be given to ensure that greater digital inclusion through training in digital skills protects the privacy of learners. VET plays a significant role in building social inclusion and therefore, has a role in developing digital social inclusion as an extension of helping people to participate more fully in society. Buddelmeyer and Polidano (2016, p. 1) explain that social inclusion “is about being able to fully participate in social and economic life”. In research that they carried out for the National Centre for Vocational Education Research (NCVER), these authors found that education has positive effects on the labour market outcomes of disadvantaged individuals and groups, recommending in particular school-leaver articulation to certificate III (apprenticeship) level to benefit from education that builds social inclusion. Where VET plays a critical role in general social inclusion, VET career pathways can also bridge the gap that continues to divide digitally excluded individuals for more full participation in society. Further NCVER research by Scott-Kemmis, Griffin, and Fowler (2017) has suggested that VET can also foster entrepreneurial skills amongst graduates but that at present this is not something the VET sector is particularly

equipped to achieve. In a digitally enabled future of work, entrepreneurial skills include those that accompany digital literacy, such as adaptability, flexibility and creativity (discussed further in the following section).

Although digital technologies and a push for digital skills will do much to bridge the digital divide, there remains a risk that it does not capture individuals that continue to fear the size of the digital challenges they must overcome. For this and other reasons, these individuals will remain vulnerable to rapid digitally driven change. In such cases, skills development and training will be just one element of helping the people that continue to suffer digital exclusion.

An initial point to begin addressing these separate but often overlapping issues of digital exclusion is with training individuals in baseline digital skills. VET sector stakeholders and providers believe that this can be achieved through formal face-to-face training. They also agree that there is a system-wide issue regarding access to baseline training and that this is likely to be a global issue, where it remains the case that digital access is still denied to many rural and regional communities in most countries.



CHAPTER 2. //

— INNOVATING SKILLS FOR A DIGITAL ECONOMY



The COVID-19 pandemic is frequently acknowledged by Australian organisations as a crisis that has nevertheless created immense opportunity. The Committee for Economic Development of Australia (CEDA) has suggested that digital transformation has benefited many businesses, industries and sectors by encouraging digitally enhanced business model transformations. Notably, the pandemic and accompanying lockdowns and social distancing measures influenced key changes:

- > **Rapid transition of office jobs to working from home (including government departments and major businesses)**
- > **All levels of education moving to online, digital delivery of learning and teaching**
- > **Increased focus on essential products manufactured locally in response to supply chain disruptions**
- > **Emphasis on the important roles of essential workers, particularly health and care workers and teachers**

CEDA has also acknowledged that digitally enabled work (i.e. remote, work-from-home) is not possible for all industry sectors and workplaces and has mostly been successful in industries comprised of high-paid office workers. However, one advantage of remote digital work capabilities is that high-paid professional occupations can be made available in rural and regional communities, where technology permits this kind of work to be done remotely despite businesses remaining located in urban areas (Baxter et al. 2020). This can have larger implications for regions, where greater demand for goods and services urges businesses to increase the availability of digital skills to those regions and for governments to support economic expansion with digital infrastructure improvements.

The CEDA report not only captures the lessons Australia can learn from COVID-19 to rebuild our economy and society, but also takes note of key areas where skills innovation can take place – namely in industries relating to manufacturing, human services and education. Despite decline in manufacturing employment and productivity in recent decades, manufacturing remains a critical sector in Australia’s economy and continues to account for the largest level of spending on Research and Development (R&D) and, as the pandemic has proven, is critical to our prosperity given a need to maintain sovereign capabilities in the production of essential equipment (such as masks, ventilators and respirators).

> OPPORTUNITIES FOR DIGITAL SKILLS GROWTH

Employment in human services, particularly in health and care work, will continue to grow as Australia deals with demographic change throughout the decades ahead and as demonstrated by the national response to COVID-19, the role of health workers including doctors, nurses and ancillary medical personnel, is crucial to overcoming a public health

crisis. Furthermore, the essential role of educators – teachers, lecturers, tutors and other instructors – to ensuring training continues to be delivered to meet labour market demands has been highlighted by the events of the past year.

The greatest impact on these and other occupations and industries is that the scope for digital skills development has broadened significantly. The digital economy's expanse into areas of employment previously not so deeply exposed to it has become clearer and opportunities for its embedding in a range of industries and occupations have been identified. The National Skills Commission (NSC) has reported that the need to adapt and learn new skills and technologies has arisen quickly in the response to COVID-19 across many sectors (NSC 2020), meaning that digital skills will be in demand in occupations and industries far beyond the typically defined areas of Information & Communication Technology (ICT). Emerging occupations are identifiable when existing jobs are combined with emerging skills that mean new jobs can be defined.

> EMERGING OCCUPATIONS DEFINED BY DIGITAL SKILLS

As a result, the NSC has identified and validated 25 emerging occupations within several categories in the Australian labour market – some categories that relate to the areas of employment long impacted by digitalisation and others that are undergoing rapid reconfiguration. NSC's identified broad categories (and its examples of occupations within them) are:

- > Digital deepening (digital marketing and social media specialists, user experience analysts)
- > Data analytics (data analysts, scientists, engineers and architects, pricing analysts)
- > Emerging business practices ('Agile' coaches, developers, engineers, logistics analysts)
- > Regulatory (risk analysts, regulatory affairs specialists, energy auditors, compensation and benefits analysts)
- > Health (respiratory therapists, nurse liaisons, biostatisticians)
- > Sustainability engineering and trades (solar installers, energy efficiency engineers, wind turbine technicians, hazardous materials labourers)
- > Refreshing ANZSCO (fundraisers, researchers, research assistants)

A clear implication of the NSC's process of identifying these broad categories of emerging occupations is that digital competency is not only about possessing technical skills. Instead, it is about deploying these with a range of transferable skills (Payton and Knight 2018). Specifically, it is the generic, non-technical 'soft skills' that will increase in value (Fleming et al. 2019) and these range from communication and organisational skills, to teamwork/

collaboration, time management and problem-solving (Payton & Knight, 2018, p. 6).

The Australian Industry and Skills Commission (AISC) has divided these further by identifying 'skills for collaborating' (communication, cultural and emotional intelligence etc.) as distinct from 'foundational skills' (literacy and numeracy etc.) and skills for learning and adapting (to new technologies, job requirements and work environments) (AISC 2017). PwC (2020) also makes a distinction between 'technical skills' and 'transferrable skills' which broadens the idea that digital skills can be transmitted between different occupations, workplaces and industries when packaged with the kinds of non-technical abilities that workers develop in order to translate digital competencies to new settings along their career trajectories.

> NEW CAREER PATTERNS IN DIGITALLY DRIVEN LABOUR MARKETS

The importance of the kinds of adaptability and competence-building that comes from integrating 'soft' and 'technical' skills into preparing for work is emphasised by a report from the Foundation for Young Australians (prepared by AlphaBeta 2016). This report identified seven unique skills 'clusters' that will underpin 'portfolio careers' in which young people transfer skills across occupations, industries and sectors drawing on their experience and deploying it in new and challenging settings. This highlights the growing need for attention to be given to increasing the focus on skills across all forms of work and occupations – including those stemming from VET pathways – that will require a mixture of soft and specialist digital skills deployed in a range of occupations and workplace settings throughout an individual's career. Treating higher education as a 'safe' pathway for young Australians to develop skills and achieve qualifications in specialist fields will not suitably shape future workforces to meet labour market requirements of flexibility and adaptability. This is also emphasised in the foresight reporting of the AISC where it has suggested "lifelong learning" will be a key focus of digital skills and training. It will involve collaboration and cross-disciplinary learning in education environments that rely extensively on digital platforms to deliver curriculum and engage students (AISC 2017).

More recently, AISC's (2021) national overview of skills has identified 'Adaptability' as the most in-demand skillset of industry, with workers expected to possess traits like understanding and interpreting industry trends, responding to new innovations, demonstrating flexibility and being proficient and willing to learn. The 'top priority' of industry identified in this report also related to 'generic skills', defined as learning agility, information literacy and learning autonomy/self-management – all skills that align closely to adaptability. Overall, industry is responding to technological change by expecting that digitalisation represents a new normal way of doing business and so employees will be expected to participate in digitalisation processes by adapting accordingly and showing flexibility and responsiveness to disruptive forms of change.

> APPLYING THE NEW 'DIGITAL MINDSET' IN THE REAL WORLD

An example of how this new mindset is already being applied is in the retail industry with the response of supermarket chain Woolworths to the disruptive economic circumstances of 2020. It has developed a program to train their store employees in “technical and organisational skills designed to help the company solidify its position in the new digital normal” (Braue 2021). This ‘new normal’ of training retail staff in technical as well as soft skills will influence a massive transformation of retail to e-commerce services, changing the nature of retail skillsets and industries extensively. Partnering with education institutions to deliver this digital training will have flow-on effects that see other retail companies, their supply chains and other industries adopt digital methods, driving a major shift towards digital training requirements and the need for training providers to respond in kind.

The agricultural sector is also seeing digital skills-driven transformation. The Victorian Government has funded a program to boost teaching at agricultural colleges and training providers in Victoria. Training will focus on technical and organisational skills that build a digitally competent workforce able to work with business models that emphasise digital enterprise and marketing (Premier of Victoria 2020).

> TOWARDS AN INNOVATIVE DIGITAL ECONOMY POWERED BY DIGITALLY COMPETENT WORKERS

How will education and training policy frameworks deliver these new skills? What do employers want? A major initiative that many VET stakeholders and providers advocate is industry accredited training. They suggest that training accredited by industry would overcome the lack of cutting-edge digital skills in existing Training Packages, which lack nuance in terms of skills versus qualification and do not provide adequate scope for developing digital skills, instead asking for specific skills (as discussed earlier, also of low sophistication). An additional issue is the length of time it takes, through current approval mechanisms (often 12 months or more), for Training Packages to be updated with new units of competency including those that would deepen the extent of digital skilling. It is hoped by industry that this would also provide scope for a level of transferability across industries, where all industry accredited training would be geared towards meeting existing technological capability standards and ensuring that a high-quality level of digital skilling is delivered by training organisations catering to specific industries and sectors.

Industry stakeholders have discussed the potential of this kind of skillset development within the context of a need for digital technologies to be embedded within training. This is essential to the digital skilling system taking shape, so that learners are engaging with the digital tools that will largely define the occupations they enter into after becoming qualified.

CHAPTER 3. //

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SKILLS DEVELOPMENT AND JOBS AND SKILLS MISMATCH



The impact of the COVID-19 pandemic has been felt right across the Australian economy. Research from The University of Melbourne has reported findings from the Household, Income and Labour Dynamics (HILDA) Survey that show lower-skilled workers are the ones that have been most affected. This means that it is often younger people that have been exposed to adverse employment effects, mainly due to a lack of post-school qualifications and overall low-education attainment (Wilkins 2020). This is a major factor to be considered in the context of digital skills development, particularly given findings that reveal the extent to which digital skills are present in occupations.

> THE STATE OF SKILLS DEVELOPMENT IN THE VET SECTOR

Research published by NCVER has discovered what may amount to serious challenges for VET going forward. Their study (Gekara et al. 2017), analysed 1,708 job advertisements covering 74 occupations/job titles and explored the frequency and nature of references to 'digital skills'.

This study provided key insights with significant implications for general digital skills development in Australia:

- > Only 204 (out of 1,708) vacancies specifically mentioned digital skills and even then, they referred to vague and basic skill application
- > Overall, a very basic level of digital skills is required (i.e. basic computer operations and digital literacy)
- > Employers tend to conceptualise digital skills from a 'tools' perspective and cannot articulate how they would be applied on the job.

Further findings held significant implications for VET:

- > VET contains a significant amount of digital training content across varying units of competence but often they are elective rather than core to qualifications required for the occupations analysed
- > Digital training content in training packages is expressed broadly and generically making limited reference to specific digital tools and systems
- > Training is geared towards skills development on the lower end of the digital skills spectrum (i.e. basic use of computer hardware and software to process data and internet resources)
- > Although digital skills training content is available for all occupations and at all levels, the bulk is geared towards lower-skill occupations with non-supervisory and managerial status

> ONGOING LABOUR MARKET CHALLENGES

Although the above findings are nearly four years old, the challenges that lie ahead remain significant as a 2020 PwC analysis of post-pandemic skills requirements shows. The level of digital skills offered in training have not overly increased, but the demand for employees with crucial enterprise skills, particularly “strategic digital acumen and understanding the implications of data” (PwC 2020) has increased in the wake of COVID-19-driven changes to work. Yet 72% of Australian workers surveyed in PwC’s study reported having not been provided with skills training by their employer in the last 12 months, with 78% of company directors identifying the low availability of key skills as a top threat to business growth (PwC 2020).

With additional implications for VET, DESE (2021) has suggested that Australia’s VET system must be more responsive to skills change to maintain pace with industry demand for skilled apprentices and trainees working towards qualifications that are responsive to digital transformations. VET providers have already fast-tracked new courses to upskill essential workers on the frontline of the pandemic, but this kind of responsiveness must be embedded within the broader VET system for it to service the future needs of industries and workforces.

Industry stakeholders noted the ‘cultural shift’ required to make the digital skilling system more responsive, not just within the VET sector, but across all industries and occupations as well. Whereas ICT recruitment is typically from the tertiary education sector, a significant number of ICT graduates are trained through the VET system and go on to perform in occupations alongside university graduates. Hence, a digital skills cultural mindset will need to recognise that VET pathways and qualifications are in integral part to delivering the skills workforces needed for an innovative economy and society. Positively, there are already examples of how this mindset is beginning to shift through industry programs providing opportunities to young apprentices and trainees.

> CASE STUDY: “RETHINKING THE WAY AUSTRALIAN BUSINESSES TAKE ON THE GLOBAL INDUSTRIAL REVOLUTION”

MEGT and Microsoft Australia



With an average of 20,000 information and communication technology (ICT) jobs being created across Australia each year and Australian universities only producing approximately 5,500 STEM graduates annually, Managing Director of Microsoft Australia, Steven Worrall knew it was time to rethink the way Australian workforces of all sizes develop and build a new robust pipeline of skilled ICT workers to stay afloat in this time of digital transformation. That’s why Microsoft Australia recently joined forces with long-established Group Training Organisation MEGT (Australia) Ltd (MEGT) and leading global training provider Prodigy Learning to launch the Microsoft Traineeship Program.

The first program of its kind in Australia, the Microsoft Traineeship Program combines formal education and on-the-job experience to set trainees up to embark upon a budding ICT career. Upon successful completion of the Program, trainees will receive a nationally accredited qualification, Certificate IV in Information Technology, and some of the latest cloud computing Microsoft certifications as part of the Azure Administrator Certification Track.

> HOW THE PROGRAM WORKS

As a leading national Group Training Organisation, MEGT provides end-to-end traineeship recruitment and programme management services to Microsoft Australia; sourcing, screening and employing trainee candidates. MEGT remains the trainees’ legal employer; paying wages and entitlements, monitoring training and work performance, and providing ongoing mentoring and support.

Trainees are then placed with a Host Employer – either Microsoft Australia directly or a Microsoft partner organisation – where they receive valuable, paid on-the-job experience

as they work towards their nationally accredited qualification. Launching in New South Wales in 2018, the Program has since expanded into South Australia and Victoria and to date has almost 30 partner organisations on board hosting over 50 trainees.

> DELIVERING REAL SKILLS FOR REAL CAREERS

In a time of global industrial revolution and unprecedented technological innovation, the opportunities for Australia's IT industry – and those who wish to be a part of it – are skyrocketing. The demand for talented, knowledgeable and experienced individuals has never been higher; and ensuring our tech workforce is armed with the skills needed to thrive in new growth areas is vital.

While Microsoft Australia recognises that technology has a vital part to play in Australia's evolution, at the heart of the Program is Microsoft Australia's philosophy of people first, technology second. Not only does the MEGT, Prodigy Learning and Microsoft Traineeship Program offer trainees a pathway into a strong future in IT, the Program is also opening doors to those currently underrepresented in the IT and STEM fields; including Indigenous Australians, women, people with disability, those wishing to upskill or pursue a career change, and parents returning to work after an extended period.

Further, while the majority of host organisations currently engaged in the Program are large corporations, over 20% are small-to-medium enterprises that have the opportunity to gain the added productivity a trainee and ICT skills can add to any workplace, while being fully supported by MEGT, Prodigy Learning and Microsoft Australia at every stage throughout the Program.



CHAPTER 4. //

GOVERNMENT AND THE POLICY ENVIRONMENT



In 2019, a major review of Australia's skills and training system, *Strengthening Skills: Expert Review of Australia's Vocational Education and Training System* ('the Joyce Review', Joyce 2019) was undertaken. The Joyce Review recommended that the federal government strengthen quality assurance, faster development of qualification developments, simplified funding and skills matching, improved careers information, clearer secondary school pathways and greater access to participation by Australians at disadvantage.

Overall, the federal government has responded to these recommendations by creating system 'architecture' reforms that position the Australian Skills Quality Authority as the prime national VET regulator, with three additional Federal Government bodies – the National Skills Commission combining federal-state liaison on funding issues; the National Careers Institute improving career information and advice; and Skills Organisations reinforcing industry experience in developing qualifications.

To a significant extent, this 'architecture' provides a framework within which states remain the major jurisdictions where programs for skills and training are delivered as part of the National Partnership on the Skilling Australians Fund. This is a unifying attempt to set skills and training standards at the federal level and provide funding to states and territories to deliver their specific initiatives. Key initiatives at federal and state levels with substantial digital skilling components are noted in Table 1 below.

Table 1
Key Australian federal and state initiatives with digital skilling components

Jurisdiction	Policymaking bodies	Policy initiatives
Federal	Department of Education, Skills and Employment (DESE)	<ul style="list-style-type: none"> Delivering Skills for Today and Tomorrow > Skills reform > Federal-state partnership on training provision > Federal-state partnership on free/low-fee training for jobs in demand
	National Skills Commission and National Careers Institute (within DESE)	<ul style="list-style-type: none"> > Skills research and policy development > Careers information > Provision of information about digital skills courses within the VET sector
	Digital Skills Organisation and Skills Service Organisations (DESE funded)	<ul style="list-style-type: none"> > Integrating industry need into VET sector > Innovating new ways to delivery digital skills training
Australian Capital Territory (ACT)	Skills Canberra	<ul style="list-style-type: none"> > Subsidised Foundational Skills Units of Competency (technical and 'soft' skills)
New South Wales (NSW)	Training Services NSW NSW Institute of Applied Technology	<ul style="list-style-type: none"> > AgSkilled 2.0 (upskilling agricultural workforce) > ICT skills in priority qualifications
Victoria (VIC)	Department of Education and Training Apprenticeships Victoria	<ul style="list-style-type: none"> > Skills for Victoria's Growing Economy (collaboration/innovation in VET)
Queensland	Department of Employment, Small Business and Training	<ul style="list-style-type: none"> > Future Skills Fund (support for high-quality training across public training system, industry)
South Australia	Department for Innovation and Skills	<ul style="list-style-type: none"> > Skilling South Australia (including VET provision of skills for high-tech industries)
Northern Territory	Department of Trade, Business and Innovation	<ul style="list-style-type: none"> > Jobs First COVID-19 recovery strategy (including digital transformation initiatives)
Western Australia	Department of Training and Workforce Development	<ul style="list-style-type: none"> > Strategic Plan 2019-2023 (vision for VET sector development including embedding STEM and digital capabilities)
Tasmania	Skills Tasmania	<ul style="list-style-type: none"> > Energising Tasmania (renewable energy strategy incorporating ICT skills forecasting) <ul style="list-style-type: none"> - North-West Tasmania Job Ready Generation Package (Fed) - Energising Tasmania – energy sector skilled workforce development (Fed)

> POLICY RESPONSES, PROPOSALS AND PRACTICAL EXAMPLES

A major post-COVID-19 challenge for Australia can be found in continuing to address the digital divide while at the same time accounting for the fact that policy responses will need to factor in the 'new normal' of digitalisation. For the foreseeable future this includes the way that 'social distancing' defines how business, work, education and training are conducted safely.

The importance of collaboration to developing digital skills amongst digitally excluded groups is highlighted in both the 2019 and 2020 RMIT/Swinburne reports (Thomas et al. 2020; Thomas et al. 2019). Furthermore, the 2020 report recommends digital inclusion initiatives be taken up in policy responses that are coordinated across multiple sectors and levels of government, aimed particularly at enhancing Digital Ability and Affordability. Although neither of these reports discusses how digital skills can be developed amongst those Australians continuing to find themselves on the wrong side of the digital divide, it is apparent that policy must be focused on the education and training system to deliver these digital skills.

As such, the Australian Government's Digital Transformation Agency is aiming to realise its vision to "deliver better government services through digital capability". The Jobs and Education Data Infrastructure (JEDI) project entails a data science-driven approach to delivering digital government services in the form of analysing a wide range of labour market, skills and education data. JEDI uses these data sources to identify an individual's skills in their current or previous employment that are *transferable* to future occupations. Along with providing information on skill transferability, JEDI also identifies VET courses that can be taken to upskill or reskill before transitioning to new career opportunities requiring higher (or different) qualifications.

Together, these threads of information intertwine to provide a single, comprehensive source of up-to-date information to jobseekers and prospective trainees alike in the Australian Skills Classification. It enables the National Skills Commission to provide information that is timely and accessible and capable of helping individuals and organisations better understand the needs of an economy undergoing rapid change.

The core product of JEDI is the Australian Skills Classification and a tool with which individuals can explore transferability within and between jobs and qualifications with reference to 600 unique skills profiles that have been developed to identify occupations in the Australian labour market.

By using the Skills Match tool (powered by the National Skills Commission), individuals can input their previous and current career information, review the skills that these roles qualify them with and identify what capabilities they possess in their current roles that can be applied in other occupations.

A more recent example of how the government will develop capabilities to deliver employment services is the Australian Government's Department of Education, Skills and Employment (DESE) announcement of plans to develop a New Employment Services Model (NESM) that will integrate payments, training, career support and other services accessed by unemployed Australians in a cloud-based system. DESE aims to develop this digital portal to help job seekers streamline and speed up their participation in the job market and will partner with a number of leading technology companies to develop the product. Beyond providing job-seekers and job-hunters with an integrated digital platform to connect them with employment opportunities, NESM aims to tailor online personalised services to individuals experiencing particular disadvantage, including training, support and counselling (Consultancy.com.au 2021).

Our interpretation of the NESM initiative recognises its relevance given the need for social distancing as Australia continues to recover from the COVID-19 pandemic. Attempts to deliver better government services to Australian job seekers are important and should be encouraged.

However, delivering better government services online will need to address those individuals and groups that currently remain digitally excluded. Initiatives that would help to address the gap have been proposed by the social change charity Good Things Foundation Australia (2021) including the suggestion that funding be provided for community-based training in essential digital skills; community education programs that permit excluded Australians to adopt telehealth and digital health initiatives available to other Australians; and digital media literacy programs targeted at adults with low digital capabilities that will reduce online vulnerability and increase preparation for emergency situations. DESE has also made an Online Employment Services Trial available to jobseekers. Where this service is unsuccessful in matching jobseekers with employment, they will be transferred to a relevant jobactive provider to ensure access to ongoing services.

> POLICY RESPONSE EXAMPLE: NSW INSTITUTE OF APPLIED TECHNOLOGY

In 2020, the NSW Government commissioned Professor Peter Shergold AC and Mr David Gonski AC to review the NSW Vocational Education and Training sector (Gonski AC and Shergold AC 2021). A key recommendation from the report was the establishment of the NSW Institute of Applied Technology (IAT).

In March 2021, the NSW Government announced they are implementing this recommendation. The NSW IAT "will be a new model of tertiary education that will fully integrate the theoretical study of university with the practical training of vocational education" (The Premier 2021).

While the IAT is not specifically focused on digital skills, recommendations for the role of the IAT include an emphasis on emerging occupations and skills, including advanced manufacturing, digital media, and engineering. The NSW media release announcing this initiative also point to emerging industries including 3D printing, robotics and other technology industries. These industries and occupations will necessarily need broad digital competency as well as specific technical digital skills.

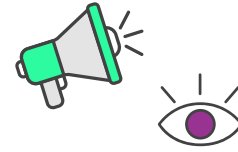
The NSW IAT, as a key policy response of the NSW Government, addresses several key problems with Australia's education and training system similar to those outlined in this report. This includes:

- > **Students will be prepared for the workforce through wrap-around technical and employability skills training**
- > **Students will be able to earn formal qualifications as well as 'badges' for relevant employer-focused learning outside of the Australian Qualifications Framework**
- > **Employers and industry will be included in the design and delivery of skills, including any proprietary training relevant for the employer**
- > **Training development will meet the needs of industry, and won't be constrained by current processes involved in Training Package development**
- > **Students will be able to access income-contingent loans**

It is not yet clear how the NSW IAT will meet all of the demands placed on this model, and whether it will ultimately be successful in its aims. This is, however, an important development in the Australian training landscape that stakeholders should be aware of throughout the development and implementation phases.



CONCLUSION AND SUMMARY OF FINDINGS



While there are many positive aspects to Australia's digital skills landscape, there is also significant room for improvement. There are a number of disadvantaged groups in Australia who are excluded from digital access and who lack digital skills. A clear focus on these groups by governments and other stakeholders is required to remove this divide.

This report recommends that attention be paid to issues relating to the digital divide that may remain difficult to address with only a greater emphasis on digital employment, skills and training services. Some issues of this approach include:

- > The provision of digital services for jobseekers will primarily be accessed by those jobseekers already in possession of digital skills; a major reason for unemployment status amongst a significant portion of jobseekers will be their existing lack of digital skills and taking employment services online will not be capable of addressing this issue.
- > There is reason to suspect that the NBN and other digital infrastructure may fall behind the technological sophistication of networks developed by other nations that Australia will ultimately compete with in a digital global economy. Whereas the completion of the NBN will make significant gains in digital inclusion in Australia, a focus on the digital provision of information may limit the efficacy of such initiatives to service communities that remain digitally excluded.
- > The growth of Australia's urban areas at the expense of its regions has skewed infrastructure development in favour of the cities. This will mean limitations to infrastructure development in the regions as it lags behind urban areas.
- > It is likely that a concentration of the population that is digitally excluded reside in these regional and remote areas not adequately serviced by digital infrastructure.
- > Efforts to make VET more responsive to changing skills demand would be aided by digital literacy being embedded in foundational level training, as well as far greater differentiation in how more advanced digital skills are developed between and within industries. For example, the needs of manufacturing sector skills vary from higher-end IT workers (i.e. programmers/coders, engineers) to medium- and lower-end workers that may only interact with technologies in a "plug and play" sense (i.e. production line workers operating specific machinery). Hence, there is a need for

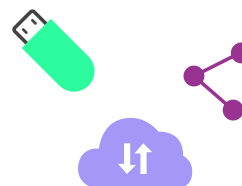
digital skills to be contextualised to specific roles which can be achieved by greater nuance in designing training for digital competency development.

> RECOMMENDATIONS

This Situational Analysis has highlighted some areas of improvement across the Australian digital skills landscape. There are some recommendations and actions that flow from these areas of improvement. Key recommendations from this report are:

- 1.** Social inclusion should be a consideration of all stakeholders working across initiatives to expand and enhance access to digital technology, and for those delivering skills training. Evaluation of programs and rollout of technology should specifically reference the effects on disadvantaged groups.
- 2.** Governments and other stakeholders need to come together to ensure access to the internet and to affordable digital technology for disadvantaged groups. Without this access, individuals face a multitude of participation issues not limited to the availability of government services.
- 3.** Foundation-level digital skills training must be delivered in accessible formats for those without basic digital skills; online training is only appropriate once a baseline of skills have been developed. Governments and stakeholders should ensure access to digital skills training, particularly for disadvantaged groups.
- 4.** When moving services online, governments and other stakeholders must ensure access for every Australian covered by the service. For those unable to access services online, in-person or other methods of access must be provided. In the case of unemployed Australians, it is important to ensure these foundation digital skills are developed so they are able to actively engage with employment which, in the majority, includes the use of a variety of digital skills including in some cases specific technical skills for the role.
- 5.** Digital skills training can exist within both formal qualifications and non-accredited training. The needs of industry and employers should be considered when training is developed, and outcomes for learners should be considered throughout the development and delivery of training.
- 6.** Government digital skilling policy should create an ecosystem in which training providers can implement new models of qualification and accreditation. If designed within a framework established by government, initiatives of training providers can become more responsive to industry needs and flows of information between industry, training providers, trainees and accreditation bodies can be made more effective.

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APPENDIX 1. //

SURVEY RESULTS FROM GAN AUSTRALIA DIGITAL SKILLS SURVEY

GAN Australian undertook an online survey of digital skills and digital technology use. The survey was shared across social media platforms and in e-newsletters by GAN Australian and AATIS. Organisations in the Australian Apprenticeships and related sectors were also asked to share the survey.

> PARTICIPANTS

Sixty-nine participants undertook the survey. 45% of participants were female, 54% male, and 1% preferred not to answer. 22% of participants were aged 16 to 24, and the remaining 78% were aged 25 years and above.

4% of participants identified as Aboriginal or Torres Strait Islander; 14% reported a medical condition or disability; 17% speak a language other than English at home; and 36% were not born in Australia.

> EMPLOYMENT, EDUCATION AND TRAINING

Participants were asked for their employment status, current education and training status, and the highest level of education or training they had completed.

Table 1 shows the breakdown of employment status of participants; Table 2 shows the current education and training status of participants; Table 3 shows the highest education level achieved by participants.

The majority of participants are employed full-time (54%), with close to a third of participants employed in other methods of paid employment. Many of the participants are currently engaged with (45%) or have completed a higher education qualification (69%).

Table 1. Employment status of participants (%)

Employment status	Percent of participants
Casual	10%
Employed Part-Time	12%
Employed Full-Time	54%
Seeking Employment	6%
Not in Employment	9%
Retired	1%
Self-Employed	7%
Unpaid Carer	1%

Table 2. Current education and training status of participants (%)

Employment status	Percent of participants
Higher Education Student (University)	45%
Not Studying	43%
Secondary School Student	4%
Tertiary Student (TAFE/VET)	7%

Table 3. Highest education level of participants (%)

Employment status	Percent of participants
Less than High School	1%
High School	19%
Professional Certificates	10%
Bachelor Degree	49%
Masters	17%
PhD	3%

> INTERNET USE

Participants were asked how old they were when they first used the internet. The average age reported by all participants was 16.6 years, with a range from 3 to 56 years of age.

There was a significant effect of reported age group on the first age participants report using the internet ($t(67) = 2.59, p = .012$). Those in the younger age group (16 to 24 years) reported first accessing the internet at an average age of 10.5 years (SD = 7.1), compared to the average age of 18.3 years for the older group (SD = 10.9; 25 years and above).

This difference is likely due to access to the internet, which in terms of general access is relatively recent. In late 1998, only 20% of households in Australia had internet access, so many of the older age group of participants in this report would have grown up without this.

> VULNERABLE GROUPS

Survey participants who identified as Aboriginal or Torres Strait Islander were likely to report an older age of first using the internet compared with those who didn't identify as such. Results are shown in Table 4. Due to a small sample of those identifying as Aboriginal or Torres Strait Islander, these results should be interpreted with caution.

Table 4. Reported first age of internet use, for participants identifying as ATSI or with a disability

	Reported	Not reported	Statistics
Aboriginal or Torres Strait Islander	m = 32.2, SD = 11.7	m = 14.3, SD = 8.5	t(64) = -5.57, p < .001
Disability or medical condition	m = 28.0, SD = 14.6	m = 14.6, SD = 8.6	t(67) = -4.07, p < .001

Survey participants who reported a disability or condition that would affect their access to digital technology reported an older first age for internet access compared with those without a reported disability. Results are shown in Table 4. Due to a small sample of those reporting a disability or medical condition, these results should be interpreted with caution.

This result is consistent with research demonstrating the disproportionate access issues faced by Aboriginal and Torres Strait Islander people, and those with a disability, as discussed in the main report. There were no significant differences in the mean age of first accessing the internet between those who speak English at home versus those who don't, or those born in Australia versus overseas. This is possibly due to the high levels of education that survey participants report; those who have not completed such education may face additional barriers.

> ACCESS TO INTERNET

The majority of survey participants (91.3%) reported that they use the internet in their home, and all participants in the survey reported accessing the internet in at least one location. Many also use the internet in their workplace (59.4%), on public transport (43.5%), in cafes (36.2%) and at school (20.3%). For those participants who did not report using the internet in these locations, we do not know whether this is due to them not going to the location (e.g. using public transport) or whether they are doing this but without using the internet.

There are some significant differences between groups of participants in relation to where they are accessing the internet. Table 6 shows the differences between groups where there is a statistically significant difference reported.

Table 5. Differences between groups for internet access use locations, for Aboriginal and Torres Strait Islander participants and those reporting a disability

Location	Group	Group member	Not member	Statistics
Home	Aboriginal or Torres Strait Islander	44.4%	98.2%	$\chi^2(1) = 27.2, p < .001$
	Disability or medical condition	50.0%	98.3%	$\chi^2(1) = 25.1, p < .001$
Workplace	Disability or medical condition	90.0%	54.2%	$\chi^2(1) = 4.54, p = .03$
Public transport	Aboriginal or Torres Strait Islander	77.8%	38.6%	$\chi^2(1) = 4.84, p = .03$
	Disability or medical condition	80.0%	37.3%	$\chi^2(1) = 6.35, p = .01$

While all participants in the survey did report using the internet in one or more locations, there were some differences in access patterns reported by Aboriginal and Torres Strait Islander people, and those with a reported disability. Both groups were less likely to access the internet at home compared with other participants but were more likely to access the internet on public transport. Participants with a disability were also more likely to report using the internet in their workplace.

Determining why these patterns are emerging is a potential question for future research. Access issues for these groups due to infrastructure difficulties and costs may mean that they are more less likely to have internet access at home. In this line, it may be that free internet on public transport enables people without access at home to use the internet. However, it may be that participants from these groups are more likely to catch public transport for other reasons, such as the cost of private transport.

People with a reported disability were more likely to report using internet in their workplace than other participants. This may be due to the types of work that these participants are doing. Some disabilities preclude people from working in industries where the internet isn't used; they may therefore be more likely to work in industries using the internet, for example in office environments. This is another topic for further research, particularly given the lack of reliable data available on the education and employment arrangements of Australians with a disability or medical condition.

> DEVICE USAGE

Survey participants were asked for information about what types of digital devices they use, and how long they have used them for. They were also asked what types of activities they have undertaken on different types of devices, and how they would rate their skills in undertaking those activities.

All participants reported using either a desktop (97%) or laptop (99%) computer. Of these, most participants reported that they have used these devices for more than 5 years (83% for desktop, 81% for laptop). All participants reported using a smartphone, with 75% of participants having used one for more than 5 years.

Some digital devices were used by fewer participants: 22% reported not using a tablet, 6% not using a camera, 12% not using a scanner, and 16% not using a smart TV. These are less common digital devices, and those which can be considered an addition to the core devices of a computer and smartphone.

Looking at the types of activities that participants use different devices for, it is clear that education and employment related activities such as word processing, spreadsheet and database work, and emails are undertaken using a computer (either desktop or laptop). Activities more likely to be conducted for personal entertainment, such as messaging, social media and other entertainment were more likely to be undertaken on a smartphone.

There were some exceptions to this: for those participants who undertake gaming, they are most likely to do so on a computer. Creating or editing videos or photos, and creating or editing online content were each spread across device types, but also had higher rates of non-participation (17% of participants don't create or edit videos or photos; 25% don't create or edit online content).

Browsing the internet was also spread across device types; it is likely that participants are using multiple devices for this purpose, and are doing so for personal use, and in education and employment where relevant.

> WILLINGNESS TO USE DIGITAL TECHNOLOGY

Survey participants were asked several attitudinal questions about their perceptions of technology use. While the majority of participants reported positive attitudes to technology, as shown in Table 7, the question regarding being threatened by technology had 22% of participants report they agree or strongly agree.

An area of future research could consider what types of technologies Australians feel threatened by. It is possible that this is reflective of messaging around 'robots stealing jobs' and an uncertain future of technology. The other items in this survey reflect actions

and behaviours that the participant can actively engage with, such as using devices and developing skills. The question around feeling threatened is related to what other people are saying about technology, which is outside of personal control.

Research into differences between vulnerable groups should also be undertaken with reference to these attitudes. The current survey has insufficient data to be able to understand differences between groups.

Table 6. Attitudes to digital technology

	Disagree or strongly disagree	Neutral	Agree or strongly agree
I enjoy using digital devices	0%	7%	93%
I feel confident using digital devices	1%	9%	90%
I am willing to learn new digital skills	0%	1%	99%
I feel threatened when others talk about new and existing digital technologies	68%	10%	22%
I think it is important to learn new digital skills	1%	4%	95%

> DIGITAL SKILLS ABILITY AND IMPORTANCE

Survey participants were asked to rate their skill level across a range of digital activities, and were asked to rank important digital skills. Table 8 and Table 9 show the results of these items.

As we can see from the data, survey participants rated their overall digital skills as either 4 or 5 out of 5. Despite this, there were key skills where many participants rated themselves at the lower end, including cyber security and learning a new device or software.

Interestingly, being safe and responsible online was the top ranked skill by participants for importance. There is a disconnect between the types of skills being rated as important and the types of skills that participants rate their skills for.

Table 7. Self-assessed digital skills levels

	1-3	4	5
Web / Internet Search	7%	25%	68%
Word Processing	10%	43%	45%
Typing	13%	39%	46%
Spreadsheet / Database	32%	36%	29%
Learning to use a New Device or Software	27%	32%	41%
Cyber Security	49%	26%	25%
Overall Digital Skills	18%	41%	41%

Table 8. Ranking of digital skills importance

Rank	Skill
1	Being safe and responsible online
2	Communicating
3	Creating
4	Handling and editing information
5	Using and updating devices
6	Transacting personal and financial information

> DIGITAL SKILLS TRAINING

Participants were asked for information about whether they had undertaken any digital training courses, how they learn new skills, and how often they found training for the digital skills they wanted to access.

Over half of participants reported having looked for or taken a digital skills training course (57%) in the past year. Despite this, participants report difficulties in finding training courses that meet their needs. Only 22% of participants agreed they could find training most of the time, 25% could find training often, 45% sometimes, and 9% rarely.

When accessing training, 55% of participants reported that they go online or to the internet for further digital skills training. Other common methods of training include from a colleague (25%), a training course (25%), a friend (23%), or being self-taught (47%).

Participants in this survey needed baseline digital skills to be able to participate, and it is clear from these results that they would also need these skills to be able to engage in further training. For someone who cannot access the internet or does not have the skills to self-teach, the two main methods for skills development are removed. If the individual

is not working and does not have access to training courses, this removes two of the other main methods.

For those Australians who do not have friends who are able to teach them, either due to social isolation, language barriers, access to devices and the internet, or because their friends also do not have the skills (e.g. for those older Australians), there are limited ways to be able to develop digital skills.

> CONCLUSION

Results from the GAN Digital Skills survey reflect previous research and discussion about access issues for some groups of disadvantaged Australians, while highlighting some areas for further research. While survey participants generally had high education levels and were working, there were still difficulties faced by participants in access digital technologies. This is particularly true for Aboriginal and Torres Strait Islander participants, and those reporting a disability or medical condition.

To complete the survey participants necessarily had access to a digital device and the internet. They needed good English language skills to understand the survey questions and give answers. They also needed strong enough digital technology skills to navigate to and through the survey.

Further research, undertaken with participants who do not have these accesses and skills, would enhance our understanding of the experience of Australians who are facing entry-level barriers to participating in the digital landscape. A key focus should be validating the experiences of these groups and understanding the complex issues they face with regards to access, skills, and skills development.

A key concern evident within this survey is the lack of capacity for someone with access issues and without baseline digital skills to be able to access skills development. Organisations within Australia, including at Government level, need to consider the best ways to ensure access for everyone, and how to then adequately train individuals in the basic skills so they are able to access further training online.



APPENDIX 2. //

KEY RESULTS FROM STAKEHOLDER FOCUS GROUP

A focus group session was undertaken with sector stakeholders. Participants sit on the GAN Australia steering committee and represent a range of stakeholders from across Australian Apprenticeships. This includes employers, support organisations, researchers, government, and peak industry bodies.

Members of the GAN Steering Committee were presented with a draft executive summary of this report, outlining the key areas of research. Members of the research team gave a brief summary of the literature within each of these areas. Participants therefore had a prior understanding of the research, and of previous work, before they were prompted for feedback.

For each of the key focus areas, participants were first requested to answer an online question which formed a live word cloud, or responded to a poll. They were then prompted to discuss answers and to add new items during the discussion (for the word cloud items). This allowed for participants to note new items in the online word cloud while others were talking, which could then be discussed as a group. Participants were also able to add answers to the word cloud without others knowing who had raised the issue.

The three questions posed to participants were:

1. What is missing from the current digital skills context in Australia? (word cloud)
2. Which of the following groups do you consider to be most vulnerable when it comes to digital skilling in Australia? (poll)
3. Which digital skilling issues related specifically to vulnerable groups? (word cloud)

Results from the word clouds, poll and discussions are given below.

> CURRENT DIGITAL SKILLS CONTEXT

Participants reported that access issues were an important issue across Australian digital

skills. Three areas of access were further discussed: access to internet and technology; access to quality training for employers and employees; and access for disadvantaged groups.

It was recognised that without access to internet and digital technology, there is limited capability for anyone to develop their skills. Australian infrastructure was discussed as a barrier: a lack of fast internet was considered a major problem facing all Australians, but particularly those in regional and remote areas. The prohibitive cost of technology was also seen as an access issue.

Access to high-quality training was seen as a barrier for those looking to develop basic level digital skills, as well as for those enhancing their skills. There are issues for employers and industry in accessing skills specifically related to their work, and in finding trainers of a high quality to deliver the skills training needed.

This is particularly relevant when it comes to emerging technology and the related skills that industry needs within their specific context. Generic skills development may be suitable for many employees, but those working with new, complex or specific technology need higher level and more specific skills development. It was considered that industry should be driving content development.

A further issue with access to quality skills training is the perception that Australian Vocational Education and Training (VET) qualifications are not valued. This is potentially a reflection of the issues within the training system as mentioned above, however may also be related to overall perceptions of VET as being less prestigious and less useful compared with higher education qualifications.

Australian Apprenticeships were discussed by participants as a method to overcome many of these issues. Combining on- and off-the-job training, Australian Apprenticeships in technology and digital rich occupations would allow employers and their apprentices to develop the relevant digital skills for the industry. While the quality of the off-the-job training may still be a concern, a significant portion of the apprentice's skills development would occur under the supervision of industry leaders in the workplace.

A further access issue discussed by participants, which will be further developed below, was around access by specific groups.

> VULNERABLE GROUPS

Many Australians are vulnerable to exclusion from digital technology and skills development, for a myriad of reasons. This vulnerability can be compounded when the individual faced multiple different disadvantages.

> Who is most vulnerable?

Half of participants who answered the poll question around most vulnerable groups recognised people from a low socioeconomic background most vulnerable. Aboriginal and Torres Strait Islander people, older Australians, and people with a disability were also noted as particularly vulnerable.

Discussion by participants noted that, for the majority of these groups, their vulnerability was related to circumstances beyond their control. These issues include those raised previously regarding infrastructure, cost issues, and a lack of access to digital skills training.

For older Australians an additional issue occurs due to their lack of development of skills through both education and everyday use of technology. Young Australians are taught basic digital skills during their schooling, and are able to enhance these skills through their work or further study. For those who have not been introduced to technology at a younger age, and are no longer working or studying, the development of basic digital skills is a significant challenge.

A similar issue occurs for adult migrants who do not have basic digital skills when they arrive in Australia, and for workers who do not use digital skills or technology in their jobs. For this latter group, this can become a significant issue when forced to change roles. An example of this has occurred in Australia with the closure of the car manufacturing industry, and subsequent need to upskill and reskill workers who never developed digital skills.

> Which digital skills issues related specifically to these groups?

The final area of discussion, around issues specifically related to vulnerable groups, recapped many of the themes mentioned above. These were predominantly around access for many groups, regular exposure to digital technology and skills, and costs.

Some additional issues related to more general groups of Australians were also discussed. Language, and across Australian online content English, is a barrier to many people. This affects migrants and Aboriginal and Torres Strait Islander people who do not speak English as their first language, as well as people with poor language and literacy skills.

Regular exposure to digital technology and skills is another barrier, particularly given the fast pace of technology change. This affects people who are unable to engage with technology for periods of time, including those in jail or with other barriers, and individuals who are unable to access technology due to cost or other access issues.

Fear of technology, particularly for those who do not have basic digital skills, was the final barrier discussed by participants. While many access issues can be overcome, individuals

need to be willing to engage with technology and digital skills if they wish to develop skills. For those who are fearful of technology changes and therefore are reluctant to participate, further exclusions are likely to occur.



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