DSO Digital Skills Development Model

Building a Skilled Workforce for the Digital Age
Digital Skills Organisation April 2023

DSO DIGITAL SKILLS ORGANISATION

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Executive Summary

This report is a compendium of four papers that discusses the growing demand for digital skills in Australia and the challenges in the National Training System to provide people with those skills. It proposes the Digital Skills Development Model (DSDM), which is a skills-based approach that focuses on real-world tasks and problems, producing job-ready workers more rapidly than traditional qualification-based systems.

Paper One sets the context by exploring the demand for digital skills in the Australian workforce, the ability of the National Training System (NTS) to meet this demand, and the challenges faced by registered training organisations (RTOs). This includes providing quality training that produces graduates with the skills required by industry.

Paper Two describes the theoretical foundations of the DSDM, including Output-based Human Capital Theory (Becker, 1964; Rosen, 1977) and the Dreyfus Model of Skill Acquisition (Dreyfus & Dreyfus, 1980). This report presents the components of the DSDM, such as skills taxonomies, skill standards, and the pathways model as a supplementary alternative to the current NTS. Finally, the report concludes with a detailed discussion on the important role of Networks of Digital Excellence (NoDE) to enable the implementation of the DSDM at scale.

Paper Three delves into the challenges faced by the Australian Vocational Education and Training (VET) sector and how the DSDM can boost this sector to increase the volume of graduates with practical, job-ready digital skills that will meet industry requirements.

Paper Four explores how policy and reforms can support the VET sector's transition to a future state that meets the digital economy's expanding skill demands.

Overall, this compendium of papers highlights the need for a skills-based approach to digital skills development and the importance of collaboration between employers, learners, and training providers to close the digital skills gap in the Australian workforce.

DIGITAL SKILLS ORGANISATION

Key Points

✔ Demand for digital skills in the Australian workforce is rapidly increasing.

✔ The National Training System is not keeping up with this demand, which if not addressed will result in a significant digital skills gap.

✔ DSDM is a skills-based approach that aims to develop adaptable, modifiable skills that meet the current and future needs of the digital workforce.

✔ DSDM is based on Output-Based Human Capital Theory and the Dreyfus Model of Skill Acquisition.

✔ Skills taxonomies, skill standards, and the pathways model are components of the DSDM.

✔ NoDE allow for a local network of training and education providers as well as employers to apply the DSDM in a planned way, supporting digital skills development at scale.

✔ The VET sector faces challenges in providing learners with practical, job-ready digital skills, which the DSDM can help address.

Paper One:

The Demand for and Supply of Digital Skills: Challenges to Overcome

As digital technologies continue to transform the nature of work, the demand for people with digital skills will rapidly increase. However, the ability of the National Training System to supply people with those skills is not keeping up with this demand, and if not addressed will result in a significant digital skills gap. This section aims to address this gap by proposing a Digital Skills Development Model (DSDM), but first, it is necessary to examine the context in which the model is being designed.

This section aims to provide a comprehensive overview of the current and future demand for digital skills in the Australian workforce. It posits that digital literacy and fluency have evolved from desirable skills to essential ones, necessary for all workers to effectively perform their job roles. The resulting increase in demand for digital and technology professionals across diverse sectors underscores the criticality of developing digital skills among the workforce.

In addition, this section analyses the efficacy of the National Training System in meeting the escalating demand for digital skills. It highlights the significant challenges encountered by registered training organisations (RTOs) in delivering quality training to bridge the digital skills gap. Furthermore, it examines how to increase employer involvement in designing and delivering training to address the impediments faced by RTOs.

By contextualising the need for a Digital Skills Development Model, this section aims to provide important insights into the current state of digital skills development in Australia and the crucial role of digital skills development in enhancing the workforce's capacity to succeed in the digital age.

Key Points

✔ All workers will require digital skills of some form, with digital literacy and fluency identified as "assumed knowledge" for any job role.

✔ It is estimated that 653,000 new workers will be required by 2030 (Deloitte Access Economics, 2021; National Skills Commission, 2021).

✔ There will continue to be a gap between the demand for people with digital skills and the supply unless the National Training System has the required capability and capacity.

✔ It is unlikely that higher education will bridge the supply gap, as it lags behind VET in enrolment numbers.

✔ Traditional training models that include units of competence/ higher level qualifications are not keeping up with the demand for digital workers and learners may find it necessary to look for alternatives.

✔ Employer satisfaction with nationally recognised VET has declined over the last decade.

✔ Registered training organisations face significant barriers, such as a lack of funding to invest in the latest technologies; shortage of qualified trainers and assessors who possess the necessary skills and experience; as well as difficulties with keeping up with the rapid pace of technological change and incorporating relevant skills into training programs.

✔ It will be crucial that employers be involved in planning and delivering training to ensure their business needs are met and that the training system is transparent.

Digital Skills

Digital skills are defined by Gekara et al. as

A combination of a digital mindset (hardware, software, information, systems, security, and innovation), knowledge (theoretical comprehension and understanding), competence (cognitive and practical know-how) and attitude (value and beliefs)

(Gekara et al., 2017, p. 6)

They are the skills required to use digital technologies effectively for communicating, for accessing and managing information as well as for operating within a digital environment in our everyday lives and work. They may also include more technical and expert skills such as those required for data analytics, cyber-security, and software development.

This distinction allows for the hierarchical organisation of digital skills into three layers (SkillsIQ, 2022):

Digital literacy skills is the ability to search and navigate, create, communicate and collaborate, think critically, analyse information, and remain safe in a digital world using a variety of digital technologies. Digital literacy skills exist on a continuum with varying levels of proficiency depending on the workplace (or societal) context (DESE, 2020).

Digital fluency skills build on and are broader than digital literacy. It is the ability to select and use the appropriate digital tools and technologies to achieve desired outcomes by having the skills to navigate across digital technologies.

Digital professional skills are higher-level digital skills required by creators and by expert consumers of digital products and services. These are skills used by professionals such as software developers, cyber-security analysts, data analysts, DevOps engineers, and cloud security specialists.

The Importance of Digital Skills

Digital skills are essential to productivity, innovation, and competitiveness in all parts of the economy. They are also important for Australia's national competitiveness.

Research shows that many workplaces digitalised to meet the demands of operating virtually during the COVID-19 pandemic. This is especially true in the white-collar, health, education, government, and retail sectors. Since more and more employers and industries are using digital technologies to initiate or to complete tasks across job roles, a higher level of digital skills are now required. According to Australian Industry Group studies, the demand for digital skills in the sector is broad and deep, covering everything from fundamental digital skills to specialised technical skills (Australian Industry Group, 2022).

The Demand for Digital Skills in Australia

"At a fundamental level, all workers will also need the skills to interact with digital technology — whether it is maintaining records in caring professions, taking orders in hospitality, or operating equipment in a processing plant."

Productivity Commission, 2017

Given the extensiveness of digital transformation across Australian workplaces, employers expect some level of digital skills from all their employees. In 2022, on behalf of DSO, Nous conducted an analysis of the Australian workforce digital skills needs, that uses the metric "digital intensity[1]" to demonstrate the degree to which digital skills are incorporated into various job roles within the Australian workforce.

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1   *According to Nous,* **digital intensity** *is defined as the proportion of all skill mentions for a certain occupation that is related to digital skills. Digital Intensity: (Digital Skills mentions / All Skills Mentions) *100%*

This is demonstrated in the table below.

Table 1: *Australian Workforce Digital Intensity*

Workforce Share	Digital Intensity	Description
9%	>20%	Information and Communication Technology (ICT) or digital professionals such as software developers who require high-level professional skills.
25%	10-20 %	Professionals who must have at least one technical professional digital skill to do their job.
15%	5–<10%	Professionals who may use high-level digital fluency skills to perform their job.
46%	1–<5 %	Workers who require digital fluency to perform their job, and some may require at least one technical or professional skill.
5%	<1%	Requires digital literacy to perform their job.

Source: *Nous Analysis, Lightcast™, 2022 (Formerly Burning Class) and ABS*

According to Nous' analysis shown in Table 1, at least 95% of the workforce is in some way impacted by digital transformation. It also shows that in addition to the professional and technical digital skills required for job roles with higher levels of digital intensity, all employees must possess a certain level of digital literacy and fluency to perform their duties.

All Workers Require Digital Skills

Australian companies reported demand for monitoring and controlling the use of technology as the fifth most in-demand skill in the Australian workforce (World Economic Forum, 2021). This finding is similar to that of the Australian Industry Reference Committee's 2019 Industry Skill Forecasts, which ranked digital skills as fourth (of the twelve generic skill categories) across industries (National Skills Commission, 2021; citing SkillsIQ, 2022).

The National Skills Commission found that "skills associated with engaging in the digital economy will continue to grow and be used 15 percent more of the time within an average person's job in the next five years" (National Skills Commission, 2022, p. 23).

In 2022, on behalf of DSO, NOUS and Accenture forecast that 82% of the Australian workforce would be classified as **digital workers** requiring at least one technical/professional digital skill by 2026.

The Increasing Need for Digital and Technology Professionals

According to a similar report written by the Tech Council Australia (TCA) and Accenture (2022), Australia will need 1.2 million ICT/digital professionals by the year 2030. This is an increase of 650,000 positions over the current workforce of 860,000. This forecast identifies the need for businesses to keep up with technological advancement which in turn will develop a robust digital workforce. To meet rising economic demand, it is anticipated that Australia must develop an additional 60,000 digital professionals each year, after accounting for retirements and recently immigrated professionals (Technology Council of Australia & Accenture, 2022).

Additionally, a predictive analysis of digital skills in the workforce done by Nous in 2022, showed that the number of high-digital-intensity jobs (jobs that use digital technologies more than 20% of the time) has grown quickly over the past five years, and it is expected that this growth will continue over the next five years as well.

Table 2: *In-Demand Digital Jobs*

Occupation	Digital Intensity	Historic Growth 2016 – 2021 (000s)	Forecast Growth 2021 – 2026 (000s)
Analysts & Programmers	59%	63.3	58.4
Information and organisation professionals	31%	57.8	52.1
Architects, Designers, Planners, and Surveyors	28%	26.7	31.7
Database and System Admin & ICT security	61%	35.1	31.4
ICT Managers	28%	17.6	19.0

Source: *Nous Analysis, Lightcast™, 2022 (Formerly Burning Class) and ABS*

As the literature reviewed in this chapter suggests, there is an urgent need to develop the digital skills of Australian workers. This need may be summarised as follows:

- *Digital Literacy and Fluency will be "assumed knowledge" for any job role across any sector.*

- *Digital Professional skills in technology jobs across technology and non-technology sectors is estimated to require 653,000 new workers by 2030 (Technology Council of Australia & Accenture, 2022).*

Changing Skills for Work

Following on from the Nous analysis the skills needed for jobs are changing and increasingly involving some type of digital skill.

For example, **Figure 1** shows there has been a significant uplift in the demand for people with data analytic skills since 2015. Data analytics is an example of a digital skill that is in high demand and is now needed in many roles. It is therefore considered plausible that digital skills will become more common and integrated into job roles, thus becoming less specialised over time.

Figure 1: *Growth in Relative Demand 2015-2021 Key Digital Skills*
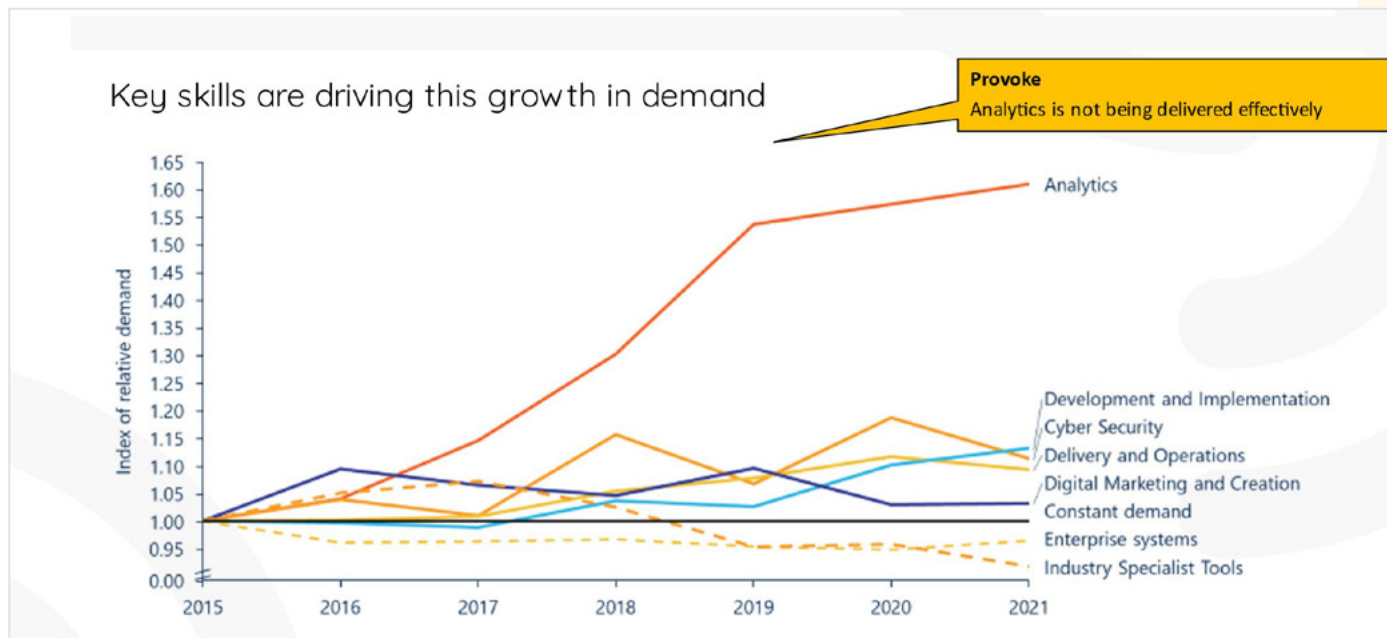
Source: *Nous Analysis, Lightcast™, 2022 (Formerly Burning Class) and ABS*

The Supply of People with Digital Skills

As the unprecedented rate of technological change increases it is feasible to assume that the gap between the demand and the supply of people with digital skills may widen, unless the National Training System has the required capability and capacity.

Australia's main sources of digital skills development includes schools, universities, vocational education and training (VET) providers such as TAFE Institutes, community education providers, dual sector universities, and private training providers. This section of the paper will primarily focus on the supply of digital skills from the VET sector but will also explore the supply of digital skills through higher education. The aim of this section is to define the challenge of digital skilling for the VET sector.

Learners can earn qualifications for a variety of occupations. This includes specialised skill sets for identified skill shortages as well as relevant skilling, reskilling, and upskilling development to meet changing workplace needs. Investing in VET is critical for providing essential skills required by industry and enables a robust and productive workforce.

It is important to note that investment in the VET sector is substantial: "In 2021, government funding provided through VET appropriations and intergovernmental funding arrangements totalled $10.5 billion, an increase in nominal terms of $2.8 billion (37.0%) from 2020" (National Centre for Vocational Education Research, 2022).

However, the VET sector faces numerous challenges in effectively addressing these skill needs. There appears a consensus amongst employers that current learning systems are not agile enough to provide scalable training that meets the demands of a skills-based labour market. In fact, there is a growing group of subject matter experts working to develop agile and relevant skill taxonomies to better align with the supply and demand of learning (World Economic Forum, 2021). According to the Australian Academy of Technological Sciences and Engineering (2022), a National Skills Taxonomy will facilitate consistent communication about skill requirements and career pathways among individuals and organisations (Australian Academy of Technological Sciences & Engineering, 2022).

Supply of Digital Skills in VET

The VET sector plays a vital role in developing the skills of the workforce. However, recent reports indicate that the VET sector's ability to generate people with digital skills is declining (Dean & Skujins, 2021). Across measures of enrolment numbers, completions, and student job outcomes, the VET sector is not meeting demand for skilled workers in the digital sector. Thisris expected to have deleterious effects as digital technologies beomce increasingly integral to both established and emerging industries in the Australian economy

Table 3: *Enrolments vs Completions ICT Qualifications VET Australia 2019-2021*

Program level of education	2019			2020			2021		
	Enrolments	Completions	Completions (%)	Enrolments	Completions	Completions (%)	Enrolments	Completions	Completions (%)
Diploma or higher	18394	5881	32%	18091	6672	37%	14404	5124	36%
Certificate IV	12306	3227	26%	12974	3060	24%	14808	3685	25%
Certificate III	12363	3028	24%	12608	2436	19%	14537	2760	19%
Certificate II	9729	3393	35%	8612	2939	34%	6428	2515	39%
Certificate I	11795	5102	43%	10177	4545	45%	7221	3930	54%
Total	**64578**	**20625**	**32%**	**62463**	**19653**	**31%**	**57399**	**18020**	**31%**

Source: *(ncver, VOCSTAT Total VET Students and Courses (TVA))*

Enrolment Numbers

The total number of enrolments in ICT VET programs has decreased over the past three years, from 64,578 in 2019 to 57,399 in 2021.

Completion Rates

The sector continues to have less-than-ideal completion rates, which makes it hard to meet industries' demand for people with technology skills. Taking into account the rates of completion, this means that the supply of technology skills to the industry from VET has dropped from 20,625 (32% of enrolments) in 2019 to 18,020 (31% of enrolments) in 2021. See **Table 3** above.

Student Outcomes

As shown in **Table 4** below, only 9.6% of people who finished an ICT qualification in 2022 found work in ICT. This indicates that only a relatively small number of ICT VET qualification completers in 2021 are employed in an ICT occupation after finishing their training. The review of student outcomes indicates that there is a supply-demand gap, which if not addressed will continue to widen.

Table 4: *VET Student Outcomes 2018-2022*

Student Outcomes Survey - Employed in the same occupation as training course					
Category	2018	2019	2020	2021	2022
02 - Information Technology	9.0	9.4	6.4	5.8	9.6
All VET Enrolments	27.2	27.5	25.4	24.8	26.3

Source: *(ncver, VET student outcomes 2022: DataBuilder, Category, Outcome by Year, qualification completers)*

Employer Satisfaction

Employer satisfaction with nationally recognised VET training has declined over the last decade, falling from 89.2% in 2011 to 78.7% in 2021. This decline is mirrored by a similar decline in employer satisfaction with non-accredited training. **Figure 2** below demonstrates this trend.

Figure 2: *Employer satisfaction with VET 2011-2021*

Employer's Satisfaction of the VET System

— Employers satisfied with nationally recognised training
— Employers satisfied with unaccredited training
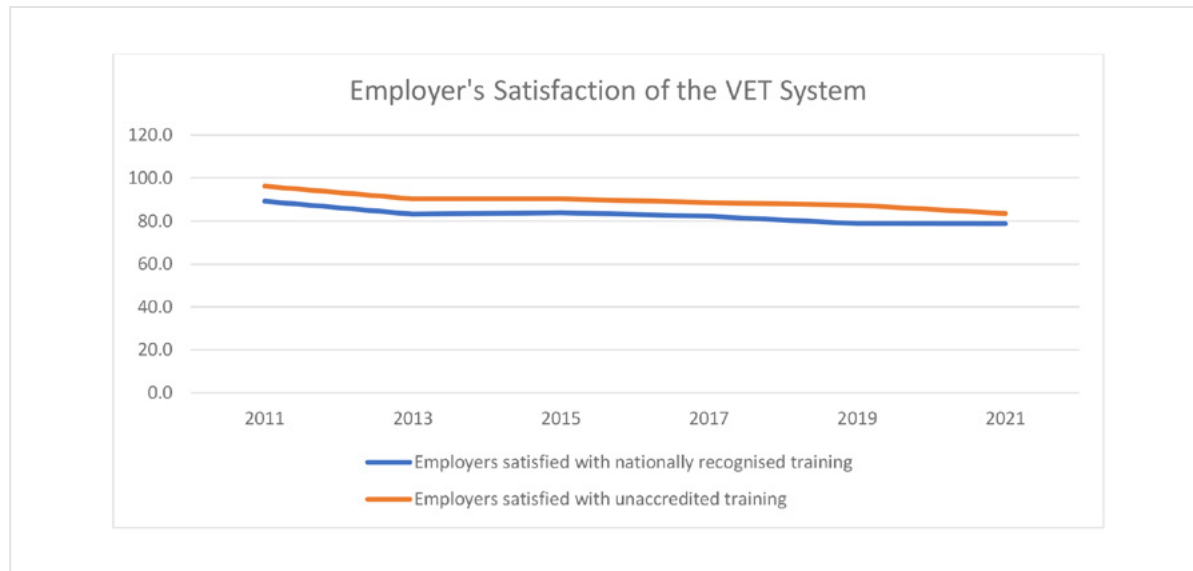
Source: *NCVER (2021), Employer's Use and Views of VET System 2021*

It is proposed that employers' satisfaction with the VET system could be increased by implementing strategies to involve employers more in planning and delivering training as well as by the training system being less opaque.

Supply of Digital Skills in Higher Education

Enrolments

In comparison, **Figures 3 and 4** below shows that the number of domestic enrolments in higher education ICT has increased by 46.6% over the last five years to 2020. Although higher education is showing a healthier improvement in ICT enrolment numbers than the slight decline in VET ICT enrolments (2019-2020), it should be noted that overall higher education enrolments are lagging behind VET enrolments.

Figure 3: *ICT Higher Education Program Enrolments & Completions (Domestic)*
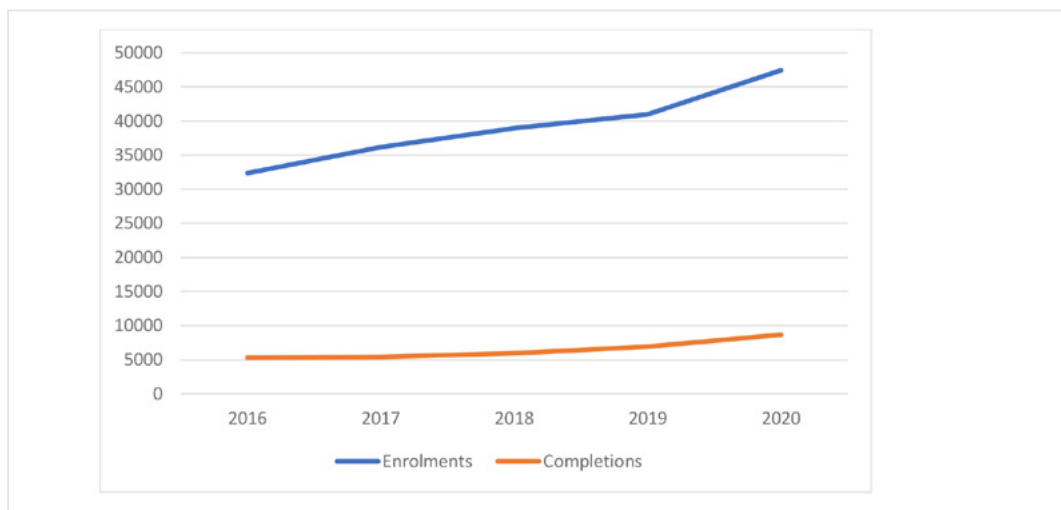
Figure 4: *ICT Higher Education Program Enrolments & Completions (Domestic) (continued)*

	2018	2019	2020	2021	2022
Enrolments	32369	36199	38970	40980	47446
Completions	5317	5408	5921	6952	8675
% Completions	16.4%	14.9%	15.1%	17%	18.2%

Source: *Higher Education Statistics, Department of Education (Department for Education, 2021)*

Completions

The number of people who finish their ICT qualification is consistently much lower in higher education (2020: 18.2% HE c.f. 31% VET). In 2020, VET had more than double the number of ICT qualification completions compared to higher education.

Employer Preference

Figure 5 below indicates employers' preference for higher education credentials over VET credentials, particularly for occupations that require more advanced digital professional skills.

Figure 5: *Level of Education Obtained by Digital Intensity of Occupation*
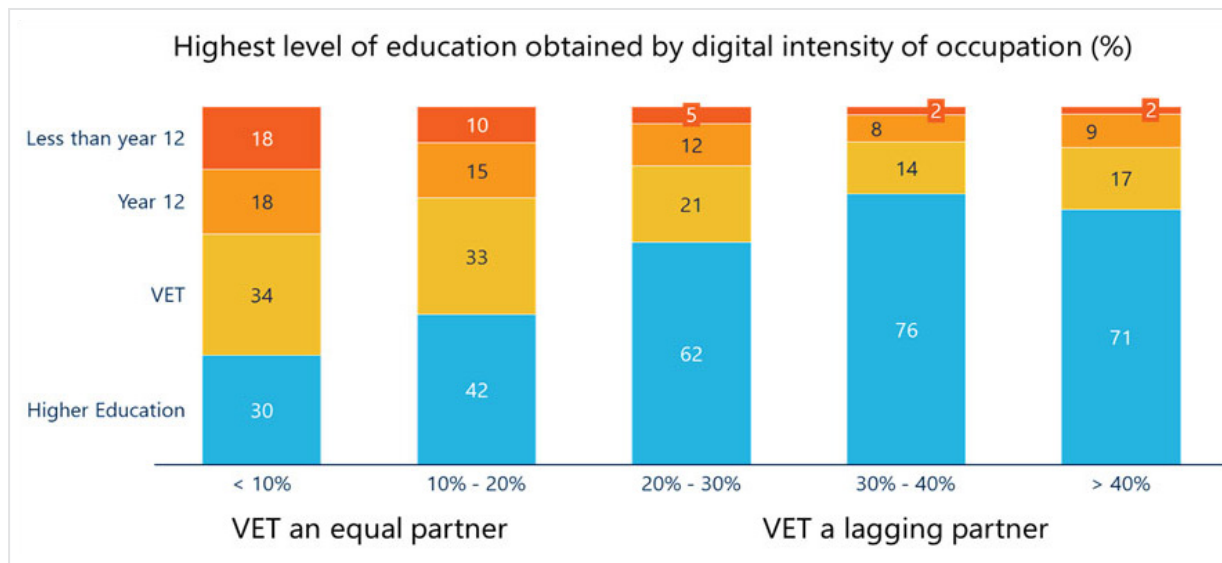
Source: *Nous Analysis, ABS*

What Does This Indicate About the Supply of Digital Skills?

The current state of digital skills in VET and higher education in Australia shows that traditional ways of teaching digital skills will not keep up with the demand for digital workers in the business world. As a result, alternative models are required that specifically address industry's challenges with digital training that have the potential to be implemented within Australia's education system.

The Capacity of the VET Sector

Less than 30% of registered training organisations (RTOs) in Australia deliver ICT training. According to a review of the data on training.gov.au, (Accessed on 15th January 2023) only 429 of Australia's RTOs deliver one or more qualifications that are included in the ICT training package.

There are also another 1,100 RTOs who implicitly deliver ICT units of competency (UoCs) as part of a qualification within another training package. As such, the capacity of RTOs to deliver digital skills at scale to address industry demand in the volume required will be restricted by the small number of RTOs registered to deliver digital skills training, particularly if they rely on traditional models of digital skills training.

The Digital Skills Supply-Demand Gap

Figure 6: *Change in Australian Digital Workforce 2021 – 2026 (Accenture & Nous Analysis on behalf of DSO)*

Change in the Australian digital workforce overtime
Millions of workers, 2021 - 2026
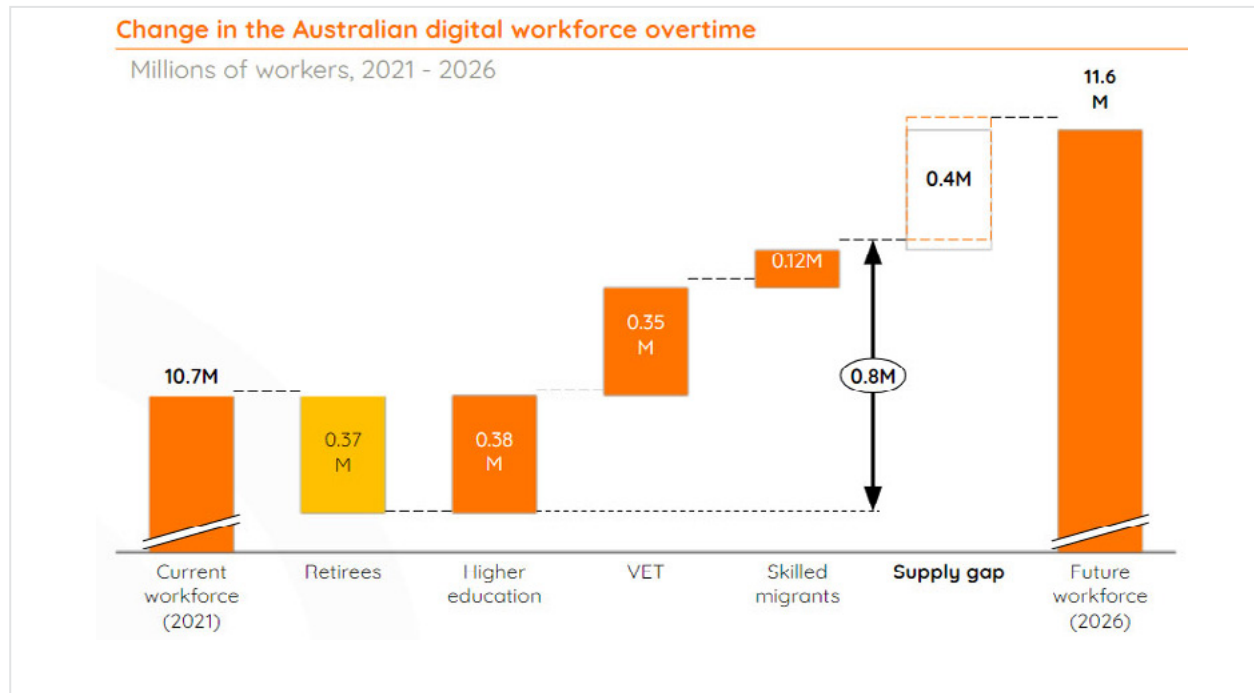
Figure 6, Accenture & Nous research indicates that the demand for digital skills across the whole workforce in Australia will require 11.6 million workers to have at least one digital skill by 2026 for them to be able to execute their jobs. Considering the current workforce and inclusive of retirements, this equates to the need to produce an additional 1.26 million workers with at least one digital skill. The existing supply pipeline from higher education, VET, and skilled migration is estimated to produce 0.84 million trained professionals by 2026, leaving a **shortage of 0.4 million**.

In summary, it is anticipated that an additional 80,000 **digital workers** above the existing estimated maximum supply will be required annually to meet the increasing demand for digital skills to 2026. It should be noted this includes the 60,000 **digital professionals**.

Agile Skilling Response to Widening Digital Skills Gaps

Rapid technological change and the disruption caused by the COVID-19 pandemic is continuously altering the digital skills landscape. Job requirements are changing continuously, at different rates and in different ways. In this environment, the VET sector in its current form will face difficulties bridging the expected digital skill gap. Therefore, new models need to be explored and trialled.

Closing the Digital Skills Supply-Demand Gap by Increasing Capacity and the Relevance of VET

Increasing the Capability and Capacity of RTOs

In a recent NCVER study (2022), participating RTOs identified the following **barriers** to the quality provision of training:

- Training program funding and viability

- Regulatory and operational risks vs cost factors

- Excessive prescriptive and restrictive Training Package Requirements

- Challenges in attracting, nurturing, and retaining teachers *(Guthrie & Waters, 2022)*

Training Program Funding and Viability

When RTOs make the decision to offer training programs, they prioritise viability, compliance with regulatory requirements, and the ability to draw government or other funding over meeting the demand for skills in the industry.

In addition, regulatory requirements stipulate that RTOs are only permitted to conduct training programmes if they meet all resource criteria, such as having qualified trainers and assessors, educational and support services, learning resources, facilities, equipment, and assessment systems prior to offering the course on training.gov.au or undertaking any marketing of the course.

Many RTOs find that it is not financially feasible to offer programs that require highly qualified teachers and expensive learning resources, facilities, or infrastructure. Given that professional digital skills training can be very complex and challenging to deliver, RTOs may deem these programs unviable and deprioritise them against less complex programs that attract similar funding.

Regulatory and Operational Risks vs Cost Factors

RTOs are less likely to take on new training areas due to the extensive amount of regulation in the sector and the expense of maintaining compliance. This is exacerbated if the training is in a niche market, involves significant modifications to the current delivery model or could raise concerns about the RTO's quality provision. In addition, the rapidly changing nature of technology exposes RTO's to regulatory actions if they do not teach aspects of a training package that may not address the skills needed for new technology used by employers.

Excessive Prescriptive and Restrictive Training Package Requirements

Some RTOs consider the training packages requirements for full qualifications overly restrictive and prescriptive and may instead opt to deliver part qualifications such as skill sets, mixed with non-accredited training, if the non-accredited training is funded by the employer and/or the student.

Additionally, the rapid change in digital skills required by employers may mean RTOs teaching to the strict requirements of a training package may not fully meet the skill needs required by employers.

Meeting the demand for digital skills in fast-changing digital environments will require training to be done close to the place of work. This in turn can create concern amongst RTOs about compliance and the high cost and effort of work-based delivery. Due to the concerns outlined above regarding training packages, many RTO's instead favour classroom-based and simulated work contexts for training delivery.

Challenges in Attracting, Nurturing, and Retaining Teachers

The capability and capacity of the VET sector to supply digital skills at scale, utilising agile and innovative pedagogical approaches, require a human resources strategy to attract, nurture, and retain talented teachers. Expanding on this will require identifying strategies to utilise technical expertise of industry experts in the workplace to deliver training. Currently, VET teachers are required to complete the Certificate IV TAE qualification to be employed as a teacher.

Training models for developing digital skills that are promoted on the market requires a good understanding of the problems RTOs face when trying to implement training that is aligned with industry needs. The success of this model depends on assisting and enhancing RTOs' capacity to offer digital skilling solutions on a large scale.

Increasing the Relevance of VET

In this section of the paper a review of current training resources is provided. Firstly, some introductory information.

The Australian VET system is based on a competency-based approach to learning which is focused on the demonstration of specific skills and knowledge, rather than the accumulation of credit hours or time on the job. It emphasises the acquisition of specific competencies or abilities that are deemed necessary for success in a particular field or profession. In a competency-based program, learners progress through the material at their own pace and are able to demonstrate their abilities through assessments, projects, and other forms of evaluation. The goal of a competency-based approach is to ensure that learners have the skills and knowledge they need to be successful in their chosen field or profession.

Units of competency (UoC) within training packages and accredited courses define occupational skill standards in VET (Department of Education and Training, n.d.). A UoC describes:

- a specific work activity
- the conditions under which it is conducted
- the evidence that may be gathered to determine whether the activity is being performed competently.

The impacts of the competency-based approach to the relevance of digital skills teaching are detailed below.

Challenges with UoCs

UoCs, which are distinct modules, do not easily describe workplace requirements. Because they describe individual work requirements, this approach is less well suited to roles and skills which are changing quickly (Leesa Wheelahan & Gavin Moody, 2011; Tony Bates, 2014).

Competencies Based Approaches (CBA) Fail to Focus on Future-Ready Skills

Competency Based Training (CBT) is less focused on preparing learners with the flexibility needed for a more uncertain future. Digital competencies in new and emerging technology areas are difficult to prescribe to specific needs and are hard to rapidly accommodate into training.

CBT ties UOCs to exisiting tasks with the tools and methods already in place. This keeps people from learning how to be creative and think about the future, which, as stated above, is an important part of developing digital skills that can be used effectively in a technology landscape that is always changing.

A Competency-Based Approach Limits What Can be Taught

The CBT approach limits the skills and the knowledge that are covered within the qualifications to what is outlined in each UOC. For example, there are 68 training packages, made up of more than 17,000 UOC and 1450 qualifications and 1300 skills sets. (training.gov.au accessed February 2023)

Given the ubiquity of digital skills, all of the qualifications should include a definition for the associated digital skills. However, with the pace of digital change and the complexity of updating training packages, it is unachievable to keep UOCs up to date. Digital technology has permeated every facet of work and its rate of change is accelerating. As a result, learners may find it necessary to gain wider knowledge beyond the confines of the UOC.

To address the above outlined challenges of digital skilling in the VET sector, a comprehensive digital skills development model has been designed. This model aims to increase the capacity and capability of the sector to produce digitally skilled workers whilst ensuring employer satisfaction and confidence in the VET sector. By addressing the current challenges of digital skilling in the VET sector, this model seeks to equip learners with the skills and knowledge they need to thrive in the digital economy.

The Digital Skills Development Model

The Digital Skills Development (DSDM) proposes an approach to the training of digital and technology skills and considers how this approach can be implemented by RTOs.

A Skills-based Approach to Digital Skilling

The World Economic Forum's report, *Building a Common Language for Skills at Work a Global Taxonomy* (World Economic Forum, 2021), was used in support of the DSO's decision to refocus attention from a traditional qualification-based approach of describing skills to instead look at a skills-based approach.

A skills-based approach to learning focuses on developing practical skills and abilities instead of acquiring knowledge. This approach emphasises hands-on learning and real-world application of skills rather than knowing how they work. It is often used in vocational education and professional development to prepare people for specific jobs or industries.

Güne and Söyleme (2018) define skills as:

*"a process that an individual performs consciously, actively, and wishfully, using
his/her cognitive and physical resources. Skill cannot be taught easily through education;
it is developed through the active efforts of an individual and based on real practices."*

(Güne & Söylemez, 2018, p. 9)

Skills have been identified as the key to an agile workforce that can rapidly respond to a changing work environment. (2021, World Economic Forum) The approach proposes articulation of the needs of employers by focusing on the skills, rather than background, experience, and qualifications. A skills-based approach supports and enables a more dynamic and fluid job market in which people are recruited based on their recognised skills and potential rather than the traditional approaches focusing on experience and education levels.

*"New data-driven methods demonstrate the power of using a skills-based approach to
reskill, upskill, and redeploy talent. Breaking job roles down into required skill sets can allow
employers to better understand viable job transition pathways based on the level of similarity in the
skills required for different roles and can enable employers to make more informed decisions
on the kind of reskilling and upskilling required to support those transitions."*

(World Economic Forum, 2021)

Summary

In response, the DSO Digital Skills Development Model (DSDM) uses a skills-based approach to deal with the challenges identified above and supports the VET sector to adapt to the changing digital needs of industry. The following section of the paper will examine this model in more detail.

Paper Two:

DSO Digital Skills Development Model – Work-ready Skills for Today and Tomorrow

This section describes approaches to delivering a skills-based approach with a specific focus on the digital sector.

The section describes:

- the foundations of the model;
- the components;
- and how the model might be delivered through the establishment of 'Networks of Digital Excellence' (NoDE).

It also introduces the underlying principles and theories that inform the design of the Digital Skills Development Model (DSDM). The DSDM is a skills-based approach that aims to develop adaptable, modifiable skills that meet the current and future needs of the digital workforce.

This section presents Output-based Human Capital Theory (Becker (1964) and Rosen (1977)) and the Dreyfus Model of Skill Acquisition (Dreyfus & Dreyfus, 1980) as the theoretical foundations for the DSDM. A range of skills frameworks are reviewed that aided the formation of the DSDM by providing a common language to articulate skills, and to create employer-driven digital skills standards that underpin training.

The DSO pathways model is also presented, which demonstrates an alignment between employers, learners, and training providers and focuses on the digital skills needed for careers, and thus, enabling individuals to enter the digital workforce faster.

The final discussion highlights the importance of the Networks of Digital Excellence. (NoDE) This part of the model describes operationally how the local network of training and education providers and employers, work to apply the DSDM in a planned way, providing digital skills at scale in a prescribed local area.

In conclusion, this section of the paper recommends a comprehensive and effective model that will address the digital skills gap in the Australian workforce based on a theoretical approach.

Key Points

The underpinning logic for the design of the DSDM is based on:

✔ Output-based Human Capital Theory (Becker, 1964; Rosen, 1977), which states that the acquisition of knowledge and skills is most effective when these are immediately applied to real-world tasks and problems.

✔ The view that a skills-based approach fosters the development of adaptable, modifiable skills to meet current and future industry needs.

✔ The Dreyfus Model of Skill Acquisition (Dreyfus & Dreyfus, 1980), which outlines five stages of proficiency, from novice to expert and will produce job-ready workers much quicker than the traditional qualification-based system.

✔ Skills taxonomies, such as the Skills Framework for the Information Age, (SFIA). This aided the formation of the DSDM to provide a common language to articulate skills.

✔ Skill standards which underpin training, leading to part or full qualifications, making it quicker and easier to train people with the digital skills the industry needs.

✔ 'Skills clusters', which Jobs and Skills Australia have argued illustrate a new way of looking at the labour market at a 'deeper' level rather than occupational classifications or qualifications

✔ Pathways (Career; Skill; Learning) that align employers, learners, and training providers on the digital skills needed for careers, and will enable people to enter the digital workforce faster.

✔ Networks of Digital Excellence which allow for a local network of training and education providers as well as employers to apply the DSDM in a planned way, providing digital skills at scale.

The Foundations of the Digital Skills Development Model

The DSO digital skill development model (DSDM) is designed to address the urgent need for a more efficient approach to skilling, upskilling, and reskilling workers for digital jobs in a rapidly changing technological landscape.

The model is a hypothesis driven framework which was used to explore different opportunities to make changes to the existing system.

The model is a formalised definition of technology career pathways that explain the skills required for various digital jobs and arrange them into clusters depending on their industry relevance.

It also introduces the concept of employer driven skills standards, which explain a strategy in which employers' demands are recorded and then defined in a skills standard. The standard provides clarity as to the desired outcome of training rather than focusing on the process of training itself.

The model's last section proposes a collaborative approach to training delivery via a "Network of Digital Excellence," which aims to develop and share best practice to enable employers and diverse training providers to come together to deliver customised skilling solutions which meet local skilling concerns. The DSDM intends to use this approach to help build capability across the RTO sector to meet the demand for people with digital and technology skills.

The DSDM can be used to:

- Create workplace skills profiles and identify the skills gaps of employees.

- Develop in-house training and development programs for employees based on identified skills gaps to improve productivity, innovation, and competitiveness.

- Develop education and training programs for entry level talent that more closely matches the skills requirements for job roles.

- Create job descriptions based on skills-standards which support greater mobility of workers.

- Engage with others to co-design a skills-based approach to workforce development and recruitment utilising the expertise of the educator/trainer.

The DSDM has been developed with a representative sample of employers, including several small to medium enterprises (SMEs) and start-ups as well as other key stakeholders.

Theoretical Framework for DSDM

The Output-Based Human Capital Theory (Becker, 1964; Rosen, 1977) and the Dreyfus Model of Skill Acquisition (Dreyfus & Dreyfus, 1980) of skill acquisition combine to form the basis of the DSDM.

Output-Based Human Capital Theory

According to the Output-Based Human Capital Theory, the value of an individual's education and training may be assessed by the economic output they produce. This theory emphasises the significance of learning outcomes and the development of practical skills that are directly transferrable to industry needs.

An output-based human capital approach in the context of digital skills development means that training programmes should be intended to generate individuals with the precise digital skills and competences required by the sector. This includes matching training outcomes with industry demands, assessing training efficacy in terms of real skills acquired, and offering opportunities for continuous upskilling and reskilling.

Collaboration between industry, education and training providers, and government is required to create an agile, future-focused, and industry-driven digital skills development model. Industry requirements must be clearly identified and conveyed to education and training providers, who must then build programmes to meet these requirements.

Training programmes must be adaptable and flexible in response to changing industry requirements, and learners must be supported in their continued growth and upskilling to ensure their skills stay relevant and up to date. Furthermore, systems must be in place to monitor the success of training in terms of real skills acquired, as well as to continuously improve training outcomes based on these measurements.

Ultimately, an output-based human capital strategy to digital skills development is crucial for developing a sustainable and responsive workforce with the abilities necessary to prosper in the digital age. This strategy can help to produce a workforce that is nimble, future-focused, and well-positioned to meet the demands of the digital economy by focusing on practical skill acquisition and matching training outcomes with industry objectives.

Dreyfus Model of Skill Acquisition

The Dreyfus Model, which is consistent with output-based human capital theory, depicts how a learner's cognitive skills develop across five stages, from novice to expert.

People can progress through these stages, according to the paradigm, becoming less dependent on rules and more capable of depending on instinct and experience. This explanation is used by the DSDM to characterise proficiency in relation to the five stages of skill development as individuals travel along and across career pathways.

The DSDM follows the logic of Dreyfus:

1. As individuals progress through the five stages, their level of **consciousness** and **awareness** of their abilities and the task at hand increases.

2. During the early stages of skill acquisition, individuals rely on **rule-based** reasoning, while at later stages, they rely on intuition, experience, and knowledge-based reasoning.

3. As individuals progress through the stages, their actions become more **automatic** and less deliberate, allowing them to focus on more complex tasks.

4. Identification of the stage individuals are at enables them to **reflect** on their actions to improve their performance and adapt to new situations.

Applying Dreyfus and Human Capital Theory into DSDM

Australia's present vocational education and training (VET) system is falling behind the expectations of a fast-expanding digital economy. The DSDM attempts to overcome this challenge using the Dreyfus model and Output-based Human Capital Theory as its theoretical foundation.

As previously stated, the Dreyfus model is a paradigm that outlines how people grow from novice to expert in a specific skill or topic. It recognises that different degrees of proficiency are required for different job tasks and that developing people's abilities in accordance with these requirements is the most efficient method to skill them for the workplace. The Output-Based Human Capital Theory, on the other hand, is concerned with enabling individuals to gain the abilities required for a certain profession.

The current system seeks to teach everyone the same skills at the same level, regardless of the performance requirements of their job role. In a world where digital skills are becoming increasingly specialised and sophisticated, the current one-size-fits-all skill development strategy will not meet learner nor employer needs.

DSDM will equip learners with more relevant and practical skill development by focusing on enabling individuals to build the abilities required to accomplish their unique work duties. This will not only boost their employability, but also ensure that they have the necessary abilities to flourish in the digital economy.

For employers, the model will develop a workforce that have the required skills to assist businesses to flourish in the economy now and into the future.

To summarise, Australia's current VET system has to be revamped in order to meet the needs of both learners and businesses in the digital age. The DSDM, which incorporates elements from the Dreyfus model and Output-based Human Capital Theory, offers a practical and relevant approach to training and assisting individuals in developing the skills required to succeed in the digital economy.

Integration of Multiple Frameworks

Whilst there are several frameworks for describing digital skills, they do not successfully provide a uniform approach to convey digital skills at different levels of job performance.

The DSDM has been shaped by the following fundamental frameworks:

- The Australian Qualifications Framework (AQF) provides Australian Skills Classification (ASC) which categorises occupations
  and jobs based on the skills and knowledge required.

- The Australia Core Skills Framework (ACSF) defines various degrees of knowledge and focuses on core skills such as digital literacy.

Core ideas incorporated include:

- Skills are classified into five levels that represent how people learn and improve abilities over time, such as from digital literacy to digital professional.

- Integration of important information from current frameworks into a uniform format.

Further to the above, the following frameworks have been researched and have been used to ensure comprehensive coverage of all digital skills across all types of employment. Below are the frameworks utilised:

- Australian Digital Capability Framework (ADCF);

- DESE Digital Literacy Skills Framework (DLSF);

- Digital Competence Framework (DigComp);

- Skills Framework for the Information Age (SFIA);

- Australian Signals Directorate Cyber Skills Framework, and

- National Initiative for Cybersecurity Education (NICE),

The following important aspects were identified:

- Australian Digital Capability Framework (ADCF) outlines a broad variety of digital competences required for the Australian workforce. The framework employs standard, easily understood terminology and a simple intuitive structure that can be utilised for a variety of reasons. This framework unifies and improves a wide range of efforts to enhance the digital capabilities of the nation's workforce. The ADCF is a general digital skills workforce framework that covers foundational, intermediate, advanced, and specialist digital skills needed across the entire workforce.

- Skills Framework for the Information Age (SFIA) is a competence model that specifies the abilities required for ICT professional occupations and is widely utilised for ICT skill demands. While SFIA does not provide a comprehensive perspective of an employer's digital skill requirements across all work types, the DSDM has used SFIA's skill and level descriptors to identify skill requirements for ICT professional roles.

- The Australian Signals Directorate Cyber Skills Framework and the National Initiative for Cybersecurity Education (NICE) Framework both provide cybersecurity skill descriptors that the DSDM has utilised. The frameworks specify cybersecurity roles, tasks, and the skills required to carry them out.

The DSDM leverages specialised digital skills and capability framework and job-family oriented specialist frameworks to develop specific digital skills needed for identified job roles. This enables a more targeted and personalised approach to digital skills development, allowing individuals to acquire the precise skills required for their work positions and businesses to handle their specific digital skills demands more effectively. Overall, the DSDM model utilises various frameworks to ensure that an organisation's digital skill needs are comprehensively assessed and addressed.

Components of the Digital Skills Development Model (DSDM)

The DSDM is based on the following main components, all of which are intended to operate in tandem to address the demand for digital skills across the economy.

- Digital career paths are a way to display and explain digital job roles and their corresponding skills. These paths can be used by individuals, employers and training providers to understand the different types of digital roles available and the skills required for each job. Digital career paths can assist in developing an understanding of career progression and the identification of skills required to stay relevant in a rapidly changing digital landscape.

- Clusters of talents refer to the primary groups of skills required for different digital roles. These skills can be grouped into categories such as technical skills. For example, technical skills may include coding, data analysis, and digital marketing.

- Standards for Skills: Standards for skills are guidelines that outline the intended outcomes of digital skilling programs. These standards can be used to ensure that individuals who complete a particular training program have acquired the necessary skills to perform specific digital roles. Standards for skills can help training organisations design training programs that align with industry needs.

- Digital Excellence networks investigate how training can build the abilities needed to give digital skilling. These networks bring together stakeholders from various sectors to identify digital skills gaps, develop best practices for digital skilling, and share resources and knowledge.

Figure 7: *The DSDM Core Components*
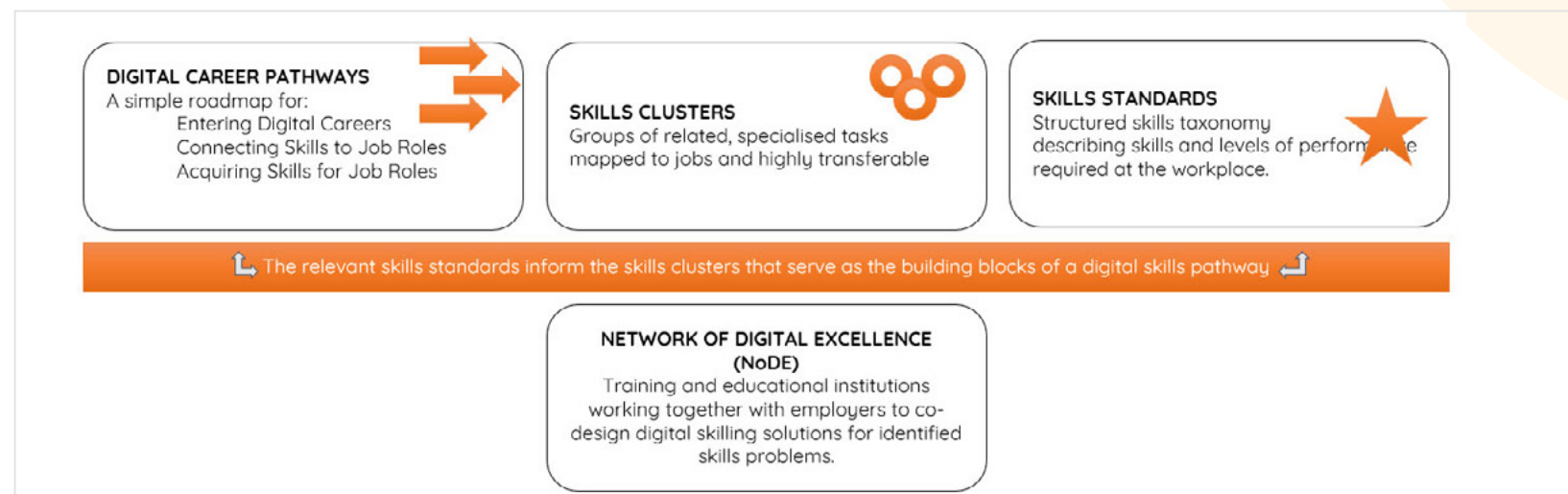
Digital Career Pathways

Digital Career Pathways set the primary framework for the DSDM. It provides:

- individuals with a signposted journey that offers entry points into digital careers and career progression guidances

- description of the essential digital skills needed for various job roles within a career pathway, including the transferability of skills to other job roles

- skills assessment guidance for evaluating an individual's aptitude, current skills, and aptitude and identifying skill development needs

- most-effective and efficient skill development pathway to step into or advance in a digital career.

The DSDM pathway approach is designed to withstand the rapid shifts and changes in technology to ensure consistency of narrative. It aligns employers, learners, and training providers with the digital skills needed for careers. The DSDM uses the idea of a "pathway" to map the digital skills and the core critical skills needed for a job role clustered within job functions as well as the learning progression needed to take to acquire those skills.

Representing Pathways Within the DSDM

Digital Domains

Career pathways are described in eight digital domains, including digital fluency, that provide overarching support across all other domains.

Each domain is aligned with an identifiable and understandable purpose which is associated with several skill clusters These include:

1. **Design:** Content, experience, and product design.
2. **Analyse:** Data, information, and intelligence analysis.
3. **Innovation:** New and improved products, processes, and services creation.
4. **Protect and Defend:** Safety and security of data, systems, networks, and identity.
5. **Build:** Infrastructure, software development, and operations and support.
6. **Govern:** Strategy, integration, and management of technological change.
7. **Operate and Maintain:** Administration, management, maintenance, and configuration of digital systems.
8. **Fluency:** Digital readiness, resilience, and leadership.

Figure 8, depicts to employers, employees, training organisations, and learners the digital domains in clear, easy-to-understand language, offering a simple depiction of the primary functions linked to a job families. These digital domains communicate the nature of the defined job role by identifying the dominant skill set required for positions within the domain.

Figure 8: DSO Digital Domains

The aim of these digital skills domains is to provide a comprehensive and structured approach for describing digital skills that is easy to understand and uses consistent language. The domains are organised into a manageable model, which is based on the core functions required for digital skills. These functions include building, designing, protecting, and defending, operating and maintaining, innovating, governing, and analysing data and technology that power the digital skills of the work-world. The model also emphasises the importance of adapting to the changing digital environment to ensure continued relevance and success in the digital landscape. Overall, the digital skills domains provide a clear framework for understanding and developing digital skills that are essential in today's rapidly evolving digital workplace.

Together these form the core purpose of digital skills training in this model, and each defines the basis of a digital domain that generates the career pathway 'tube lines' in Figure 10 above (Schueler, 2021). That is, the domains enable employees and learners, and in some cases employers, to determine career pathways based on their aptitude, potential and interests.
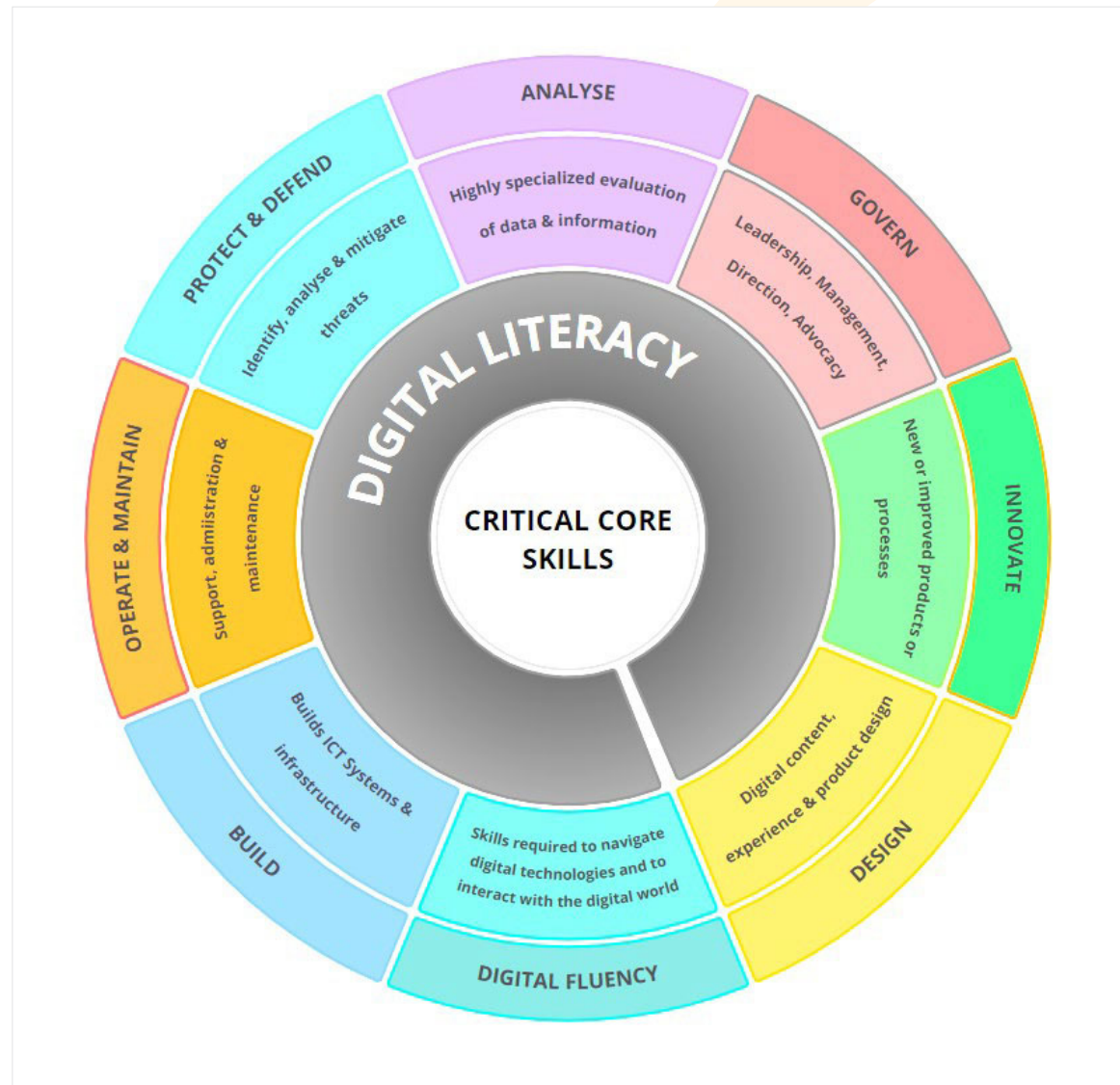
The Pathways Map

The utilisation of a skills-based approach necessitates the provision of supporting information for key stakeholders, which can aid in fostering a shared understanding of career pathways. For example: **Figure 9** which illustrates the interconnected routes and numerous entry points available to individuals seeking jobs, regardless of their level of education or qualification. The model allows for the pursuit of various dominant professions in areas such as innovation, analytics, building, operating, maintaining, protecting, defending, or controlling, based on an individual's abilities, interests, and strengths.

Figure 9: 'Underground Map' of Career Pathways using Technology Careers as an Example

The career pathway map indicates there are numerous alternatives for pursuing a technology profession based on abilities achieved or to be acquired. Whilst many abilities in technological professions are transferrable across job families, there are several key core talents, or human traits, that everyone should possess, such as collaboration and teamwork. As this career pathway map evolves, it will be possible for companies, employees, and learners to self-explore career paths as part of workforce or career planning.

Employers: Creating Job Profiles - Workforce Planning, Labour Market Signalling

Job profiles describe the skills that are required for job roles within the career pathway. Skills pathways and domains help employers align the skills they need from potential employees with the identified job roles they are trying to fill. The skill descriptions within job profiles provide high-level skills assessment information for evaluating an individual's aptitude and suggest the skill development needs of the individual. The specific detail of skills within job profiles will be examined later in this paper. This will provide more thorough information regarding skill assessments and criteria for evaluating an individual's skill development requirements.

Training Providers: Digital Skills Learning Pathways to Jobs

To establish learning pathways, various accredited, non-accredited, and industry certification training programs are incorporated and customised to create short-form micro-credentials that specifically align with job profiles that are created under workforce planning and labour market signalling. Detailed skill requirements are provided by digital skills standards, which correspond to skills clusters within job profiles. This information is used to design learning pathways that reflect the skill needs of employers.

Each micro-credential represents an individual unit of learning that can be utilised to create learning pathways for several job roles. The ultimate objective is for these units of learning to be stackable, enabling learners to accumulate them over time and earn a formal qualification that corresponds to the Australian Qualifications Framework (AQF).

Figure 10: *Micro-credentialing Model for Digital Skills Pathway Implementation*
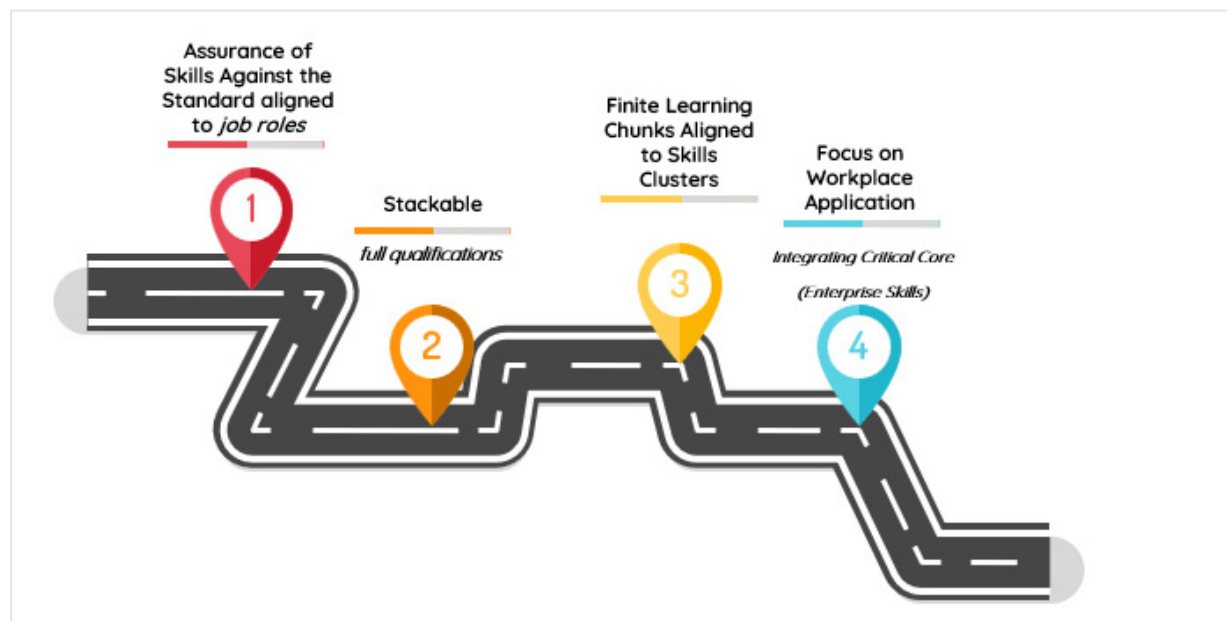
As shown in **Figure 10**, learning pathways can consist of a sequence of micro-credentials that can be delivered through various training options. These micro-credentials are designed to develop the specific skills at the required proficiency levels outlined in job profiles for potential employees.

To summarise, Digital Pathways provide a clear and structured roadmap for training and skills development in any area of digital skills. This approach is beneficial for employers, training providers, and learners, as it allows them to focus solely on the specific skill requirements needed in the workplace. By concentrating on workplace skill requirements, it becomes feasible to create a workforce that can progressively upskill to become more qualified as job roles continue to evolve in response to changes in the digital landscape.

The Digital Pathways approach facilitates a more targeted and effective training strategy, as learners can develop the skills that are most relevant and applicable to their specific job roles. Additionally, training providers and employers can use the Digital Pathways model to ensure that training programs are aligned with industry needs and standards, and that the skills acquired by learners are recognised and valued in the job market.

Overall, Digital Pathways provide a powerful tool for building a workforce that is equipped with the skills and knowledge needed to thrive in the rapidly evolving digital landscape. By focusing on workplace skill requirements and providing a clear roadmap for skills development, Digital Pathways can help organisations create a more skilled, productive, and adaptable workforce.

Digital Skills Clusters

Digital Skills clusters refer to groups of skills that are combined to form the fundamental elements of specific jobs and job roles. These clusters comprise skills that are typically performed together, providing a more accurate and comprehensive understanding of the skills required for a particular job or role.

Skills clusters according to Jobs and Skills Australia, (JSA) - formerly the National Skills Commission https://www.jobsandskills.gov.au/australian-skills-classification#clusters last accessed 23 April 2023), offer a deeper and more nuanced perspective of the labour market compared to traditional occupational classifications or qualifications. In today's post-industrial economy, job roles often hold greater relevance than occupations, and skills clusters reflect this shift in the labour market structure.

Figure 11 of the Digital Skills Development Model (DSDM) showcases the utilisation of skills clusters as building blocks for job roles, as well as for transferable and shared skills across multiple job roles. By grouping the digital skills required for digital jobs into clusters and identifying the expected performance level in each, these skills can be adapted and applied across the workforce. This makes it possible for individuals to enter the digital sector more swiftly and be more mobile, leading to greater opportunities and career flexibility.

Promoting Skill Portability and Mobility

Figure 11: *DSDM's Skills Clusters: Example of Promoting Skill Portability and Mobility Amongst Cybersecurity Jobs*
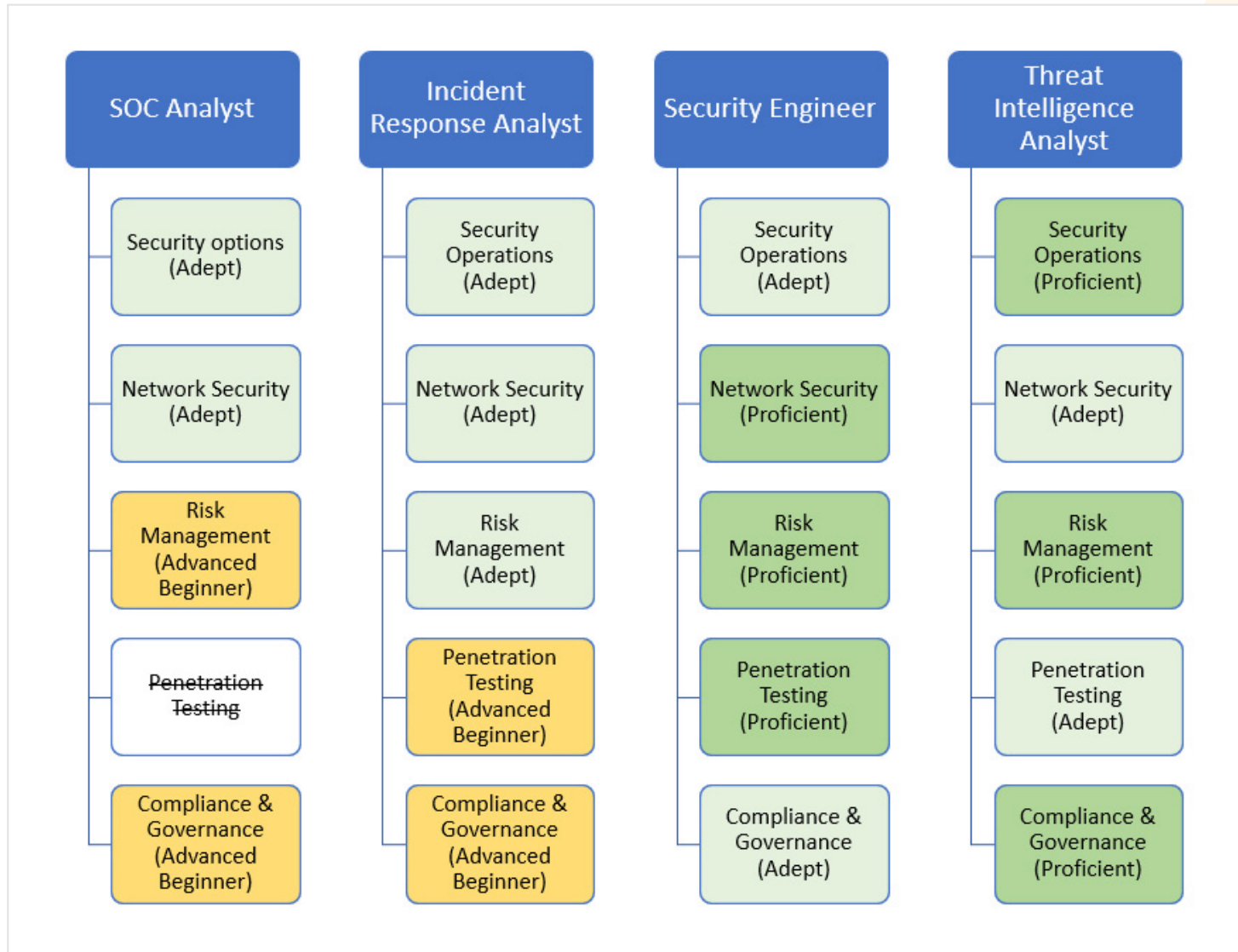
The Digital Skills Standards for the Cyber Security job family are expressed within several Skills Clusters such as Security Operations, Network Security, Risk Management, Penetration Testing, and Compliance & Governance. Each of these skills clusters comprises a range of individual skills (clustered) against which proficiencies are attained.

In order to perform a job effectively, individuals must possess a specific set of related skills that meet industry standards for that particular job function. The level of proficiency required for these skills varies depending on the job function. For instance, **Figure 11** of the Digital Skills Development Model demonstrates that a threat intelligence analyst needs to have a high level of proficiency in the 'Risk Management' skill cluster, while a SOC analyst requires a lower level of proficiency and should be able to follow instructions and perform the job function adequately. A threat intelligence analyst with a higher level of proficiency should be able to utilise more advanced cognitive skills within their job and perform this skills cluster more effectively.

To effectively meet the learning requirements for a range of job roles, including those of a junior cyber- analyst and a threat operations analyst, the DSO has partnered with the Canberra Cyber Hub to conduct a pilot. This pilot aims to develop a series of micro-credentials based on skills clusters and explore how these micro-credentials can be organised. The goal is to test the transferability of these cyber-skills cluster-based micro-credentials to other job roles. Through this pilot, the DSO seeks to identify a more effective way of developing and organising micro-credentials based on skills clusters, which will help individuals acquire the necessary proficiencies to succeed in various job roles.

Revealing In-Demand Skills Clusters Across Job Families

Figure 12: *DSDM representation of job families, skills clusters, skills, and standards (a taxonomy of a skills-based approach: Cyber Security).*
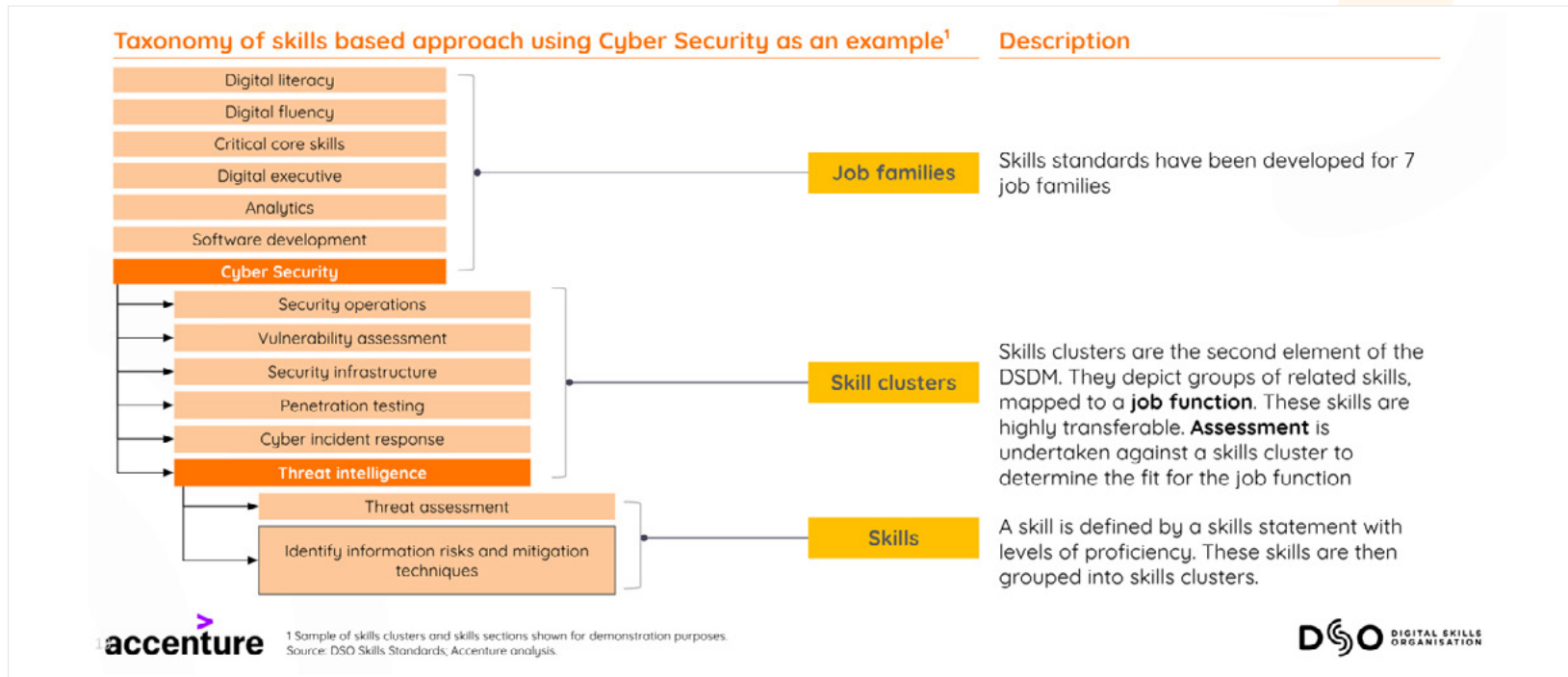
In order to facilitate the identification of skill clusters and to provide tangible evidence to support the model, the DSDM has identified the digital skill clusters present in seven different job families, as depicted in the figure above. By identifying skill clusters within these job families, it becomes possible to create a comprehensive set of skill clusters that accurately reflect the skill requirements for individual job roles within those families.

Additionally, the process of identifying skill clusters can reveal transferable skills that are applicable across multiple job families. For example, the "Penetration Testing" skill cluster is a part of the "Cyber Security" job family, but it can also be found in certain job roles aligned with the "Software Development" family. This example of how skill clusters from different job families can be used together is a critical aspect of the DSDM because it highlights the interconnectedness and transferability of skills.

Digital Skills Standards

As an employer-led model, the DSDM will respond to workforce skill demand to drive the growth of digital skills in Australia. Creating an easy-to-understand set of standards for digital skills that describe the foundational, technical, and leadership abilities needed in the workplace is a key element of the model. These skill standards can underpin training, leading to qualifications and making it quicker and easier to train people with the digital skills the industry needs.

To develop a comprehensive and accurate set of skills standards, DSDM used various methods to determine the current and future workforce skill requirements for each job family. This included analysing workforce skill databases and reviewing existing skill frameworks. The goal was to ensure that the skills standards are relevant to the needs of the industry and reflect the digital skills required for each job family.

As shown in **Figure 12,** the identified skill clusters within each job family were broken down into specific skills defined by a skill statement combined with a range of performance standards for that skill. This level of detail provides a more accurate representation of the digital skills needed for each job than traditional occupational classifications or qualifications, and aligns with the rationale presented in the Australian Skills Classification.

Furthermore, the DSO Skills Standards recognise the importance of critical core skills or human skills that are crucial for successful job performance. These skills include Problem Solving, Communication Skills, Analytical Thinking, Critical Thinking, Decision Making, Creative Thinking, and Teamwork. By incorporating these critical core skills clusters into workplace skill development initiatives, the DSO aimed to ensure that digital skills development is comprehensive and includes the skills necessary for effective job performance.

Figure 13: *Skill Statements and Proficiency Levels*
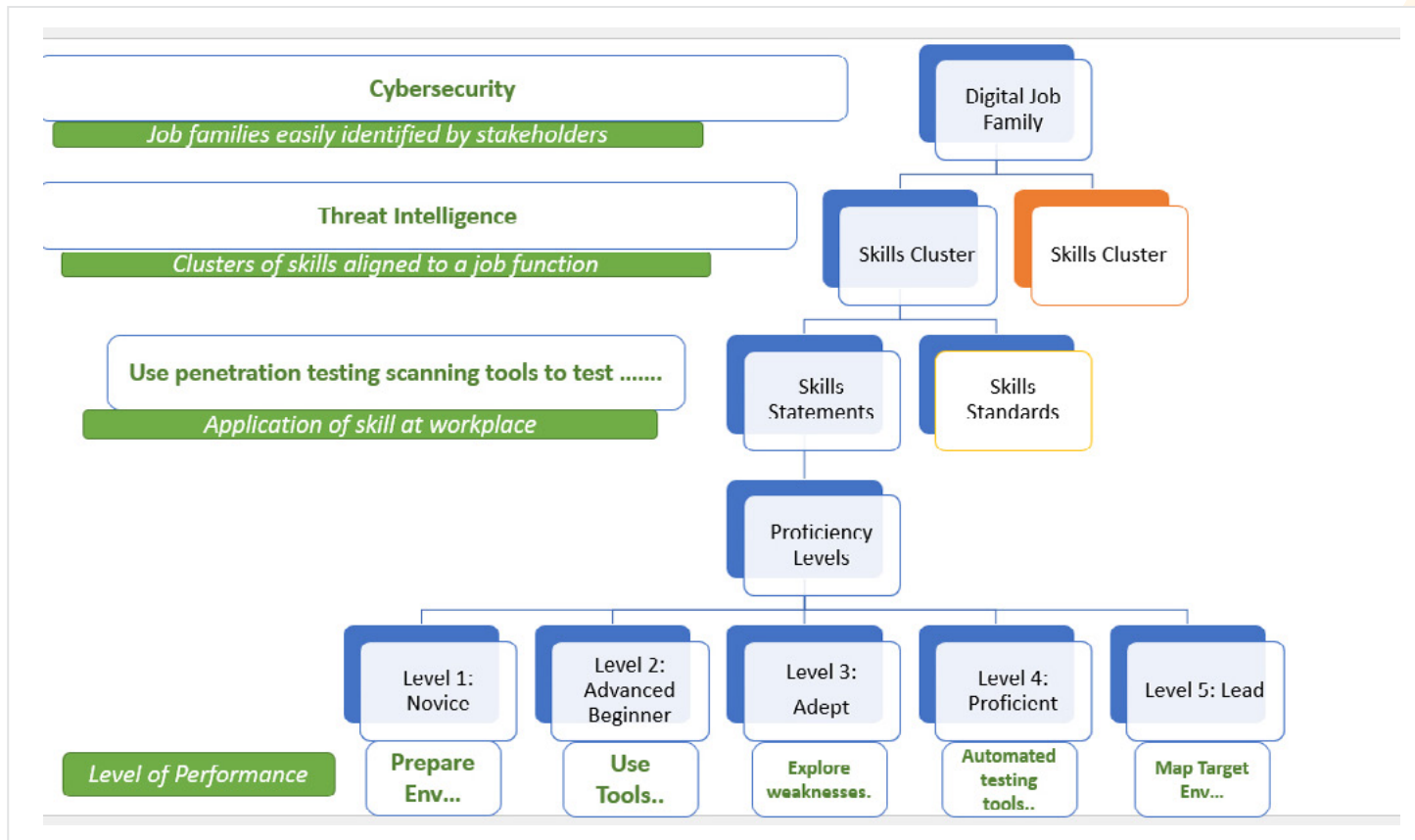
Skills Statements

Every skill within a skills cluster is described using a skills statement, which specifies typical tasks and activities connected with that cluster. Skills statements define a certain skill, which might be foundational, technical, or leadership-related. These can contain both generally required abilities that are applicable across all industries and any specialist skills that are exclusive to specific industries, vendors, or employers.

Proficiency Levels

The DSDM adopts five proficiency levels to describe an individual's expertise in a particular skill: novice, advanced beginner, adept, proficient, and lead. These levels are crucial for assessing an individual's skills for a job and tracking their progress in developing a skill.

Within the DSDM model, each proficiency level of a skill standard is precisely described to determine the required breadth and depth of skill performance necessary in the workplace. This approach ensures that the level of proficiency needed for a specific job role is achieved and that the skills have been learned to the appropriate standard. By setting these clear proficiency levels, individuals and employers can effectively measure skill development progress.

Table 5: *Proficiencies and Descriptors*

		Descriptor
1	Novice	✔ Apply specific rules in specific situations. ✔ The responsibility is to follow the rules without the big picture or contextual meaning.
2	Advanced Beginner	✔ Follows guidelines and develops and identifies rules or conditional rules. ✔ Capable of performing a task as requested but unable to plan, change course, or prioritise. ✔ Seeks for quick solutions. ✔ Is not concerned with the bigger picture and doesn't feel as part of the team.
3	Adept	✔ Has the ability and fitness to perform a job function within the guidelines and principles attached to the position. ✔ Engage in planned, deliberate, short-term, or long-term workplace activities within the strict context of the job role. ✔ Actively make decisions, set priorities, plan, and troubleshoot within the context of the job role. ✔ Will use the advice of experts. ✔ May not be able to think beyond the moment and distinguish the important details.
4	Proficient	✔ Capable of thinking beyond the moment and applying rules to determine how to perform workplace functions across multiple platforms and heterogeneous contexts. ✔ Can self-correct and apply learnings from other projects and contexts. ✔ Can apply different guidelines and principles for different contexts.
5	Lead	✔ Responsibility extends to others and the environment. ✔ No longer needs guidelines or rely on them. ✔ Recognises patterns, responds intuitively, and makes quick decisions. ✔ A discipline leader who is authoritative and absorbed in all areas of practice. Best in pattern matching and almost instantaneously sees important details and produces actions. ✔ Can apply best practice models in a variety of contexts.

Based on the definitions of skill proficiency levels established by the DSDM, individuals can be classified as novice, advanced beginner, adept, proficient, or lead based on their skill level as specified in the relevant skills standard. These proficiency levels represent the various stages of development and mastery of the component skills that comprise job roles and are designed to be adaptable and straightforward and able to be revised in response to evolving job requirements and changing technological landscapes.

The levels of proficiency are carefully aligned with the skills standards, which enables employers, training providers, and learners to obtain a clear and concise understanding of the standard of workplace performance required for a specific job role. By mapping proficiency levels to skills standards, the DSDM facilitates the identification of appropriate training and development pathways to enable individuals to acquire and refine the skills necessary to perform effectively in their job roles. This ensures that the workforce remains up-to-date with the latest industry practices and technological advancements, which in turn promotes sustained business success and competitiveness.

Developing Industry-Driven Digital Skills Standards within Skills Clusters - An Example.

The development of industry-driven digital skills standards within skills clusters was a rigorous process undertaken by the DSO, which involved several steps. To begin, the DSO identified several digital professional pathways, including Cyber Security, Analytics, and Software Development, and two foundational skill standards: Digital Literacy and Digital Fluency.

In **step one,** an initial functional analysis was performed to identify the primary objective of each job family and the main group of specific functions attached to it. For example, in the Cyber Security job family, the primary objective is to prevent data breaches, identity theft, and cyber-attacks, as well as risk management in some cases.

In **step two,** specific skills were identified and defined for each job family based on their intended purpose, using established skills frameworks such as SFIA, DigiComp, and ACSF, as well as skills databases. These frameworks and databases provided a clear understanding of the skills needed for a particular job or task.

To develop the digital skills standards and obtain endorsement from relevant employers, the DSO partnered with IBM Australia in **step three.** This involved determining the key digital professional/general pathways corresponding to a specified job family, identifying existing industry/employer-led skills and capability frameworks, as well as the skill clusters to compose the elements of the selected primary Digital Skills Pathway for a sample of job roles within the family. Skills statements were developed to describe the essential skills required for workplace productivity in each job role and were grouped under the Skills Section Title to improve the readability of the skills standards. Finally, proficiency levels for each skill statement were determined, represented by novice, advanced beginner, adept, proficient, and lead.

In **step four,** the DSO sought feedback on the developed digital skills standards from selected employers and/or industry bodies. Based on this feedback, IBM and DSO adjusted and reviewed the skills standards to ensure they were aligned with industry needs and expectations. This collaborative approach ensured that the resulting digital skills standards were comprehensive, relevant, and tailored to the specific needs of the industry.

Table 6 presented below showcases a clear example of the skills statements for Cyber Security, specifically for the skills cluster of 'penetration testing', along with the associated proficiency levels. These skills statements and proficiency levels serve as the fundamental building blocks for designing training and assessment programs that align with the specific functions of a job role.

Table 6: Digital Skills Cluster example- Penetration Testing - See Next Page

The digital skill standards presented through skills statements, along with proficiency levels, focus on outcomes instead of processes, making them adaptable to both accredited and non-accredited training options. This aspect provides greater flexibility in the rapidly evolving digital and technological landscape, as the standard can be integrated into all types of training programs, facilitating the development and recognition of the required skills for different job roles.

Pathways, Skill Clusters, and Skills Standards in Use

By defining the skill needs of a job role, employers can effectively guide and influence the design of training programs to prepare individuals for specific positions. To accelerate the development of employee skills, employers and training providers can collaborate to co-design training programs that align with the identified skill clusters and corresponding skills standards within a particular job family.

For example, the following job profile for a cybersecurity engineer was created by combining skill clusters from the cybersecurity job family, which are linked to the abilities needed by security professionals, such as secure programming, secure software development, secure infrastructure, security practice management, and other security-related skills. The job profile will identify the specific skill clusters required for the cybersecurity engineer role, as shown in **Figure 14**.

Figure 14: *Job Profile for Cybersecurity Engineer*

JOB ROLE PROFILE	Cyber Security Engineer	ANZSCO Code	261315
DOMINANT DIGITAL SKILLS DOMAINS (Choose as relevant)			
Design	Build	Protect & Defend	
Summary Statement	*"I enjoy being a Cyber Security Engineer because I get to implement the best practices for building secure software products."*		
Purpose	*I often meet with our cybersecurity architects to understand their security standards and the design of their authentication flows, and I relay this information to our software developers. I often write the code for authentication myself.*		

SFIA CATEGORY			
Development & Implementation	Delivery & Operations	Strategy & Architecture	Change & Transformation

MAIN DIGITAL SKILLS CLUSTERS (Proficiency Level)	MAIN DIGITAL SKILLS CLUSTERS (Proficiency Level)
Software Design SWDN (4)	Vulnerability Assessment VUAS (4)
Systems Design DESN (4)	Threat Intelligence THIN (3)
Software Development/Programming PROG (4)	Measurement MEAS (3)
Testing TEST (4)	Penetration Testing -PENT (4)
Systems Installation & Removal HSIN (3)	Network Support – NTAS (3)
Security Operations – SCAD (5)	Incident Management – USUP (5)
IT Infrastructure ITOP (3)	Continuity Planning – COPL (5)
CRITICAL CORE SKILLS	
Problem-Solving	Critical Thinking
Communication	Creative Thinking
Analytical Thinking	Time Management

The creation of a job profile is a crucial step in preparing individuals for a cybersecurity job role, as it provides a clear understanding of the required abilities to both the individual and training provider. A job profile-based career pathway can aid individuals in assessing their eligibility for a specific job, identifying their current abilities, and identifying areas where they need to improve their skills in order to effectively perform the job. Training providers can also use job profiles to select appropriate training products that align with the skill clusters and competency levels required for the cybersecurity engineer job role.

The use of job profiles that detail skill clusters and competency levels can also increase opportunities for individuals with diverse employment backgrounds, as transferable skills and potential career advancement pathways can be more easily identified. Additionally, the stacking ability of training products can lead to the attainment of full cybersecurity or other relevant qualifications while maintaining national consistency in skills and competency development. Overall, the implementation of job profiles can facilitate more efficient and effective training and career development for individuals in the cyber-security field.

Figure 15 below presents a micro-credential-based learning pathway that demonstrates how training providers can create targeted training programs for a cybersecurity engineer job role. By grouping related skills into a variety of skill clusters, essential abilities can be divided into agile training programs. This approach allows individuals to acquire specialised skills and micro-credentials in a more efficient and targeted manner, rather than completing a large, generic training program that may not lead to specific job outcomes.

Figure 15: *Micro-Credentials Based Digital Skills Learning Pathway for a Cyber-Security Engineer Role*
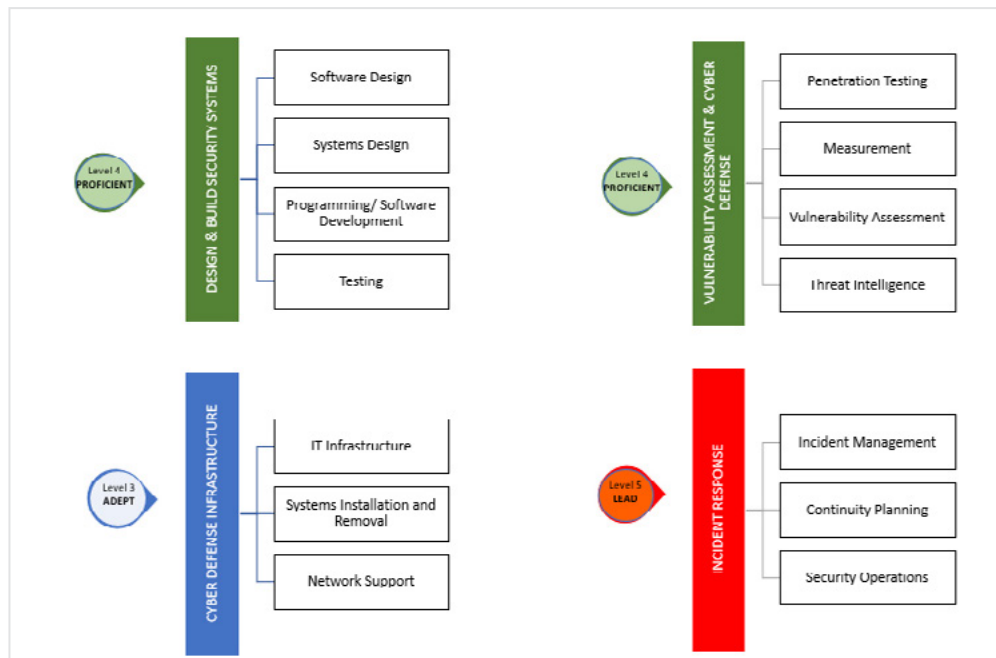
This approach provides training providers with the flexibility to design training programs that meet the specific needs of industry, job roles, and learners. By aggregating the essential abilities into specialty areas, the training can be more concentrated and effective, resulting in a more efficient and effective learning experience. This approach allows individuals to acquire skills that are in high demand by industry, which can lead to better career prospects and increased earning potential.

Making a Case for the Transferability of Skills Between Job Roles

As shown in **Figure 16**, identifying skills clusters within job families and then establishing job profiles for specific job positions within the family using skills clusters facilitates mobility within and between families.

Figure 16: *Transferability of Skills across Job Roles*
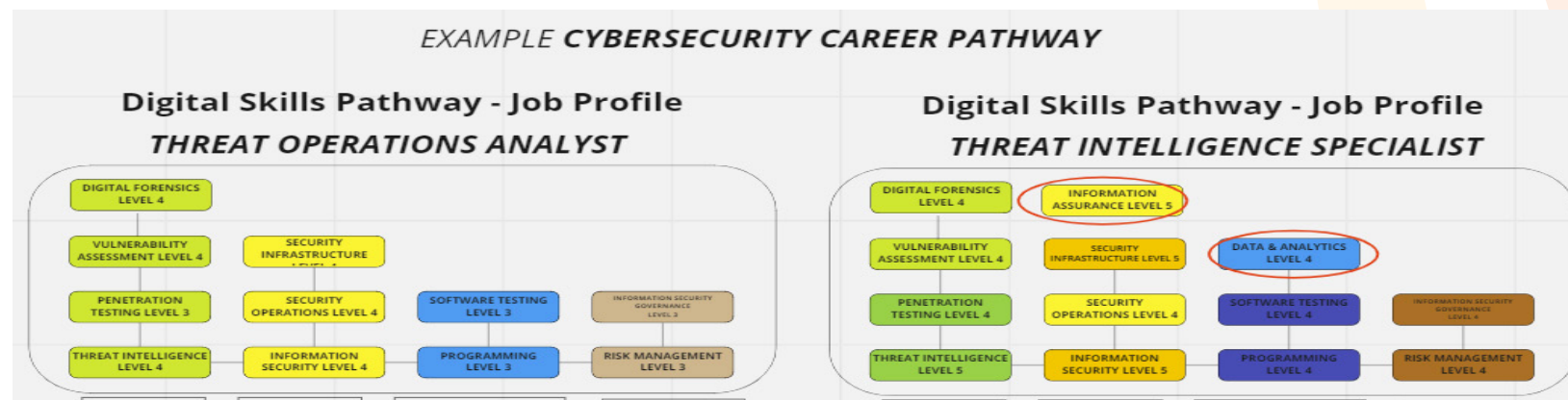
In the context of the Cyber Security example depicted in **Figure 16**, individuals seeking to enter the field or those looking to re-skill could utilise the digital skills learning pathway to progress from a threat operations analyst to a threat intelligence specialist. This can be achieved by improving their existing skills, acquiring proficiency in security infrastructure and information security skill clusters, and gaining new skills clusters for information assurance and information security. The proposed approach allows individuals with pre-existing skills to advance in their career without having to start from the beginning.

Network of Digital Excellence (NoDE)

As mentioned earlier, the digital skills gap is hindering the growth and productivity of Australian companies, especially SMEs and start-ups. Traditional training and education systems need to provide adaptable and industry-relevant digital skilling solutions. Therefore, a more agile, decentralised, demand-driven, and employer-aligned approach to digital skilling is necessary to cover skill gaps in the local workforce.

The Network of Digital Excellence (NoDE) is a crucial component of the DSDM, which aims to develop and share best practices and promote excellence in training across the network of training providers. NoDEs facilitate the collaboration of training and education institutions with local employers to create tailored digital skilling solutions that address skill gaps within the workforce. By utilising the DSDM skill-based approach, NoDEs can design and implement flexible training programs that meet the demands of a disruptive technology environment.

For instance, the Cybersecurity NoDE in Canberra, established by DSO in collaboration with the Canberra Cyber Hub, brings together several institutions, including the Canberra Institute of Technology, TAFE NSW, Risk2Solutions, ACFA, Maxme, and Fifth Domain. The NoDE provides an industry-driven training solution that closes the cyber-skills gap in Canberra. The best-practice model developed within the Canberra Cybersecurity NoDE can then be replicated and utilised in other locations across Australia to address local cyber-skills needs.

NoDEs play a key role in overseeing the rollout of the DSDM and could become part of a nationwide network of training institutes. These entities would promote the adoption of digital skills among new entrants and existing workers to increase the capacity of businesses, including SMEs and start-ups, to thrive in the economy driven by digital skills.

It is important to note the DSDM model proposes that training be delivered closer to the workplace to ensure alignment with industry digital skills requirements. Learners would be exposed to work-integrated digital skilling in actual or simulated workplaces. This approach requires capacity and capability building for teachers and workplace supervisors, which could be greatly enhanced via industry engagement in NoDE arrangements.

Figure 17: *Network of Digital Excellence Concept*
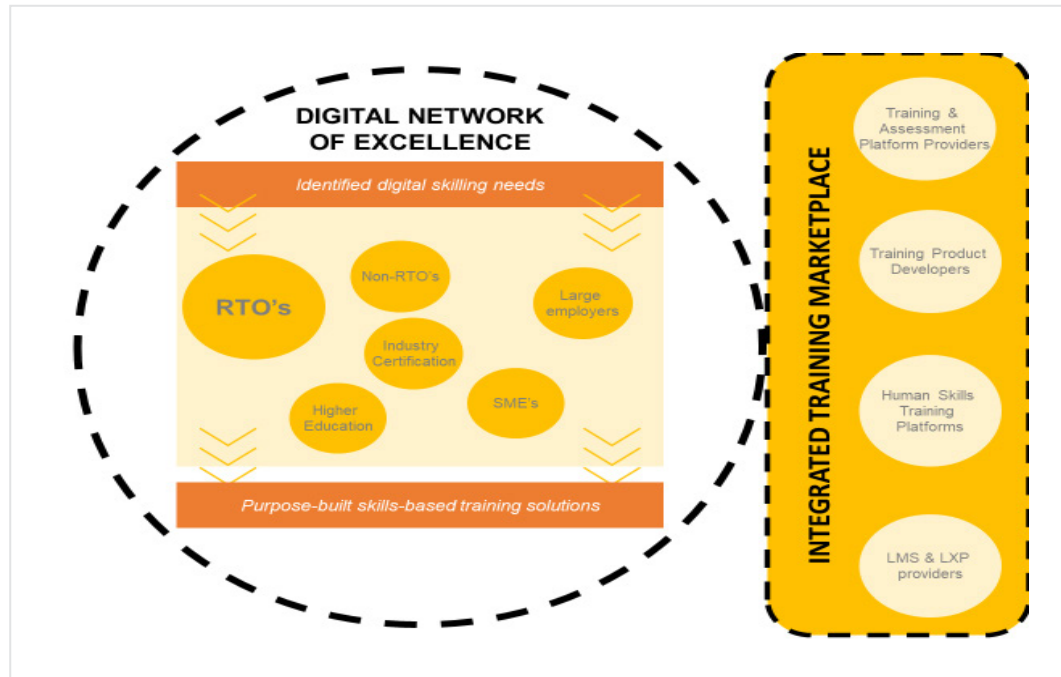
The DSO will continue to work with key stakeholders, including training and education providers, to develop a DSO RTO Capability Framework, which will provide active support for training providers to deliver large-scale digital skilling solutions.

To better contextualise the significance of the NoDE concept, a second paper entitled **Networks of Digital Excellence** has been authored to sit alongside this paper. This second paper is intended to offer a comprehensive description of the establishment and intended functions of NoDEs as the fourth component of the DSDM.

Training and Assessment Strategy Design

The RTO Capabilities Framework is designed to support training providers in implementing the DSDM and NoDE concept by providing clear guidance on how to incorporate these key components into training and assessment programs.

Training Strategy

In order to achieve specific work outcomes within a job function, the DSDM's skills standards and proficiency levels provide a comprehensive guide for the knowledge, skills, and performance required. Therefore, any training strategy must be developed with these standards in mind to ensure that learners have the necessary digital skills to perform effectively in their roles. By aligning training with the DSDM skills standards, organisations can ensure that their workforce possesses the requisite skills to keep pace with the ever-changing digital landscape.

Moreover, to ensure national consistency and confidence in VET delivery and credentials, the model includes an independent assessment mechanism that goes beyond external validation. This mechanism is a vital tool for ensuring that certifications and digital skills training remain relevant and responsive to local industry needs. It is essential for organisations to adhere to this mechanism to maintain a high standard of training and keep their workforce up-to-date with the latest digital skills required in the industry.

Assessment Strategy

The DSO assessment guidance documents are a valuable resource for training providers seeking to conduct assessments of skill achievement in a consistent and effective manner. These documents ensure that assessments are valid and reliable while still being flexible enough to cater to individual learners' needs. By following the assessment guidance, training providers can create fair and consistent assessments that offer learners a level playing field to demonstrate their skills and knowledge.

This approach builds confidence in the VET delivery and credentialing system, ensuring that digital skills training and certifications remain relevant and responsive to the local industry's ever-changing needs. The DSO assessment guidance documents are a critical tool in promoting training and assessment excellence and equipping learners with the skills and knowledge needed to thrive in today's fast-paced digital workforce.

Table 7: *Application of DSDM: Assessment Guidance*

	1. Novice	2. Advanced Beginner	3. Capable	4. Proficient	5. Lead
Skill statement	Implement specified information security controls to mitigate the risk as per the provided instructions.	Implement specified information security controls as per the provided instructions.	Design, plan, and evaluate the implementation of cyber and information security controls to mitigate identified risks.	Develop an implementation and evaluation plan for implementing and evaluating the security controls. Evaluate and improve the security controls, resourcing plan and communication strategies.	Establish security governance processes for the effective implementation of security controls and improve the security posture.
Assessment Guidance	Implement the common security controls adopted to mitigate the risk based on the specified guidelines.	Implement the common security controls adopted to mitigate the risk based on the specified guidelines.	Design the implementation and integration of security controls for effective threat management. Create applications of defences against known threats and devise a plan to secure the attack surface against identified cyber-threats. Evaluate the implemented security controls with the established criteria and metrics, such as SLA and KPIs.	Develop an implementation and evaluation plan for implementing and evaluating the security controls. Oversee the implementation of security controls. Recommend compensating controls if the proposed controls are missing or ineffective. Develop a resourcing plan for the effective implementation of security controls. Document and communicate the implementation plan and effectiveness of controls to relevant stakeholders.	Prepare a report outlining technical risks, as well as tactical and strategic recommendations for mitigating them before a security incident occurs. Audit the implemented security measures to manage risk associated with threats. Document and communicate the audit findings to management to take needful actions to improve the security posture. Identify and implement administrative controls, such as policies and procedures for proactively managing threats.

Summary

The DSO Digital Skills Development Model is a systematic and comprehensive taxonomy designed to identify job families within the ICT sector and other industries that require digital literacy and fluency skills. The model groups these skills into clusters and defines them using clear standards that expand within the clusters into specific skill statements.

Furthermore, the model classifies the performance of each skill into five proficiency levels that correspond to the complexity, autonomy, and familiarity of the context in which it is applied. This approach ensures that the skill requirements for each job role are explicitly defined and aligned with the necessary proficiency levels required for optimal performance.

Overall, the DSDM is a robust and rigorous model that enables the identification and development of digital skills required for various job families. This approach fosters alignment between employers, training providers, and learners, ensuring that skill requirements are tailored to specific job roles. Consequently, this leads to improved job mobility, transferability of skills, and faster production of skilled workers.

Paper Three:

The Digital Skills Development Model (DSDM) and its Role in Enhancing the VET Sector

This section explores the challenges facing Australia's Vocational Education and Training (VET) sector, with a specific focus on the digital and technology industry. Given the constantly evolving skill requirements of the workforce and the ongoing need to further develop digital and technology skills, an agile approach to training is necessary. Furthermore, a new VET qualification system that incorporates micro-credentials is essential to keep pace with industry digital needs.

To address these challenges, this section examines the Digital Skills Development Model (DSDM) and its presented initiatives, with an emphasis on the importance of combining specialisations with digital and technical abilities to enhance employability and meet evolving technological demands. Further to this, the discussion highlights the significance of recognising prior learning and the utilisation of micro-credentials to offer more flexibility and opportunities for upskilling and reskilling.

Additionally, this section notes the ongoing VET sector and qualification reforms in Australia aimed at enhancing training quality and meeting the needs of both industry and students.

Finally, the section provides insights into the challenges and opportunities confronting digital skills development in the Australian VET sector and how the DSO DSDM can be employed to tackle them

**DIGITAL SKILLS
ORGANISATION**

Key Points

✔ An agile approach to training is needed to address the changing skill needs of the workforce and develop digital and technology skills.

✔ There is a need for a new VET qualification system incorporating micro-credentials to keep up-to-date with industry needs.

✔ The challenges faced by the VET sector include the need for quicker development of training products, proper integration of employers within the VET sector, and the need for new skill training models.

The DSDM:

✔ Offers several opportunities to bridge the gap between the VET system and industry needs by providing learners with the flexibility to pursue stackable micro-credentials.

✔ Offers a common language that defines the minimum skills required for current and emerging digital roles, clustering skills into manageable units.

✔ Emphasises the application of knowledge and skills to produce work outcomes.

✔ Provides a collaborative approach for training providers to share information and improve the quality of digital skills training collectively through the establishment of Networks of Digital Excellence.

✔ Creates visible, stackable, portable, flexible, and relevant digital skills pathways for all learners and training providers, which can lead to building employer confidence in the VET system, unlocking its full potential, and preparing learners for the digital job market of the future.

Challenges Faced by VET Sector

Need for Quicker Development of Training Products

The significant gap between supply and demand for skilled workers highlights the need for a more efficient and effective system for delivering emerging skills training, qualification development, and overall training to meet the workforce's needs (Department of Education, Skills and Employment, 2020, p. 2).

The existing national training system's excessive complexity prevents employers from easily recognising the qualifications and skill sets required to create their workforce (Department of Education, Skills and Employment, 2020, p. 3). As a result, there is a significant desire for increased corporate collaboration to develop cross-sector career pathways and maximise worker mobility.

Several recent reviews of the VET sector have found that timing and "speed to market" in establishing and implementing qualifications is important, particularly in fast-changing occupations and technologies. Joyce (2019) identified "a complex credentials system that is slow to respond to changes in industry skill needs" as a major issue in the VET sector and the Productivity Commission reinforced this view in its review of the National Agreement for Skills and Workforce Development (NASWD) in its Key Points Summary:

> *"Efforts to improve quality should be ramped up through faster changes to training packages, developing an evidence-based VET workforce strategy, and a phased introduction of independent assessment".*
>
> *Productivity Commission, (2020), National Agreement for Skills and Workforce Development Review. Overview p.2*

Gonski and Shergold (2021), in their review of the NSW VET sector, identified that shorter duration, employer-specific courses, and industry-focused micro-credentials would become increasingly important in providing coherent, employment-focused training that addresses changing skill requirements (Gonski & Shergold, 2021, pp. 13–14).

Establishing a new VET qualification system, including a framework for micro-credentials, will be increasingly important for guaranteeing that digital and technology skills remain current and relevant to business needs. Prior learning recognition and the appropriate usage of micro-credentials in the digital and technology domains can also provide greater flexibility and more options for individuals to upskill or reskill quickly.

Integration of Employers Within the VET sector

To meet the needs of the workforce, there needs to be an effective and efficient way to incorporate the needs of employers and involve them as a key part of the value chain.

Employers have become increasingly disengaged from VET. Research shows that employers do not have confidence the training delivered will match the skills needed at work, and because the national training system is so complicated, it is hard for them to productively engage with VET providers.

Closer partnerships between training providers and industry will ensure that training programs meet employers' needs and address skills shortages, thereby minimising mismatches in the labour market. Training programmes should be more in line with what employers want so they can better meet the constantly changing skill needs in different fields. By combining local businesses with local VET, the needed skills will be developed closer to where they are needed.

New Skill Training Models for the Digital Age

The COVID-19 pandemic and the rapid advancement of technology have resulted in significant transformations within the global economy and job market. As a consequence, both VET and tertiary education systems are facing the challenge of adapting to these changes. Traditional educational models, combined with the absence of up-to-date skill training methodologies, are making it harder for learners to acquire the essential skills required to thrive in today's fast-paced technological world, leading to a critical skills gap that may impede workforce growth.

It is imperative to address the need for new skill training models within the VET and broader tertiary education systems to ensure continuous learning and skill development. Timely updating of training models to account for new technologies and changing job market demands is essential to guarantee that students receive the best education for gaining and retaining employment. Individuals can keep their skills current and applicable in their respective fields by focusing on lifelong employability and learning. Achieving this goal requires a collaborative effort between training and education institutions, employers, and government agencies to ensure that training programs are up-to-date and meet the dynamic skill requirements of the workforce.

Simple and Agile Career Pathways

The digital age has created a complex web of career pathways, requiring a responsive VET sector to meet the demand for specialist technology positions and general digital and technology skills across various occupations. However, the current representation of digital career pathways is not simple or engaging, hindering an understanding that transferable skill sets are required across jobs within these pathways. This lack of clarity can result in a skills gap, impeding workers' ability to move from one career to another with minimum re-skilling.

Describing and representing digital career pathways simply and engagingly is crucial in articulating the transferable skill sets required across jobs. Workers and new talent pipelines must understand the skill requirements for identified jobs within these pathways, emphasising the need for specific skill sets rather than industry or educational qualifications. To achieve this, the collaboration between training and educational institutions, employers, and government agencies is essential to identify skill requirements and develop simple and agile career pathways that cater to the changing digital landscape. These pathways should also provide opportunities for upskilling and reskilling to help workers move between careers with ease. By building simple and agile career pathways, a skilled workforce capable of meeting the evolving industry demands can be achieved.

Proposed Programme of Reforms

The VET sector in Australia is facing challenges in terms of the quality of training and meeting the needs of industry and students. To address these challenges, the Australian government is considering several reforms. This is being led by the Department of Employment and Workplace Relations (Department of Education, Skills and Employment, 2020)

Recent studies have highlighted concerns about the inability of the VET sector to meet the needs of industry, employers, and learners. This has led to a loss of confidence in the VET system among stakeholders including industry and learners. Skills shortages and mismatches in the labour market are also driving the need for reforms.

The proposed reforms aim to improve the quality and relevance of VET by aligning training programs with the needs of employers and ensuring that students gain the skills and knowledge they need to succeed in the workforce. A vital aspect of the proposed reforms is the development of a new system of VET qualifications that provides the required agility, possibly through a micro-credentialing framework, and the ability to leverage non-accredited and industry certification programs to addresses current and future industry skill requirements. This approach will enable workers to improve their opportunities in line with shifts in labour force demands and offer greater flexibility and more opportunities for upskilling or reskilling.

Reforming VET and VET Qualifications

The proposed reforms aim to improve the quality of VET training and ensure that it meets the needs of industry and students. The development of a new system of VET qualifications will include a framework for micro-credentials (Skills Ministers' Meeting Communiqué – 7 October 2022, 2022) that combines industry specialisations with transferable skills. This will enable employees to upskill or reskill quickly and recognise prior learning more effectively.

Addressing Skills Shortages and Mismatches

The Australian government has identified certain industries and occupations experiencing skills shortages and has prioritised funding for VET courses in these areas (National Skills Commission, 2022). The proposed reforms aim to ensure that training programs are better aligned with the needs of employers and that students gain the skills and knowledge they need to succeed in the workforce.

Overall, the proposed reforms aim to improve the quality and relevance of VET in Australia. By developing a new system of VET qualifications that include a framework for micro-credentials, the reforms offer greater flexibility and more opportunities for upskilling or reskilling quickly in line with shifts in labour force demands.

Role of DSDM in Mitigating Digital Skilling VET Challenges

In order to address the challenges facing Australian VET, including its qualification system, it is important to identify and implement a range of tools, processes, and procedures that leverage the strengths of the entire training eco-system, including various training providers such as RTOs, non-RTOs, industry, and higher education institutions.

The DSDM presents a promising opportunity to bridge the gap between the VET system and industry needs by:

- Providing learners with the flexibility to pursue micro-credentials and stack them to create full or partial qualifications that offer skills that are directly relevant to specific digital jobs, while also preparing them for life and citizenship.

- Offering a common language that defines the minimum skills required for current and emerging digital roles across job families, ensuring that skills can be verified against transparent, industry-driven Digital Skills Standards. This provides learners with greater clarity in building their career pathway and enables employers to more easily communicate their specific job role requirements to training providers.

- Utilising skill clusters which can be applied across multiple job roles and become the building blocks between roles. The skills clusters integrate critical core skills such as problem-solving, critical thinking, and teamwork to enhance workplace performance, personal interaction, and lifelong learning.

- Emphasising the application of knowledge and skills to produce work outcomes, rather than solely focusing on the acquisition of knowledge and skills through learning programs, is crucial to improving the quality of digital skills provision for the workforce.

- Implementing the Networks of Digital Excellence model which provides a collaborative approach for RTOs to share information and improve the quality of digital skills training collectively. By implementing the DSDM and the Networks of Digital Excellence model, the VET system can better prepare learners for the rapidly changing digital landscape and meet the skill needs of industry.

Skills Clusters and Relevant Training

Facilitating Flexible and Relevant Training Through Skills Clusters

Skills clusters are a useful tool for developing training and assessment products that are tailored to specific job functions shared by several job roles and aligned with employer co-designed digital skills standards. This means that learners can achieve proficiency in specific skills clusters that are relevant to their chosen job role, rather than undertake generic qualifications that may not meet employer requirements.

Digital Skills Standards define the specific skills within each cluster, enabling the creation of learning programs that equip learners with the knowledge, skills, and practical application required for the workplace.

By aligning the Jobs and Skills Australia Skills Classification and skills clusters described through the DSO digital skills standards, employers, educators, and job seekers can have a better understanding what is required for each job, leading to informed decisions about training, career development, and recruitment.

Digital Skills Clusters also enhance skills portability across various workplaces and industries, allowing digital skills to be easily integrated into standard training package qualifications in other industries. Mapping Digital Skills Standards to the AQF and other international qualification frameworks makes it possible to transfer skills clusters across qualifications aligned with different industry sectors.

Additionally, the use of skills clusters helps facilitate a more flexible approach to training. This is because it allows learners to pursue micro-credentials and stack them to create full or partial qualifications, providing them with skills that are directly relevant to their job.

Assurance of Outcomes

DSDM recommends a practice-based, work-integrated assessment against a skills standard as the best way to assure outcomes and training are aligned with industry needs. This type of assessment evaluates a learner's ability to apply their skills, knowledge, and abilities acquired through training in a practical way that assesses their ability to perform an actual work activity. It also includes evaluating essential technical, business, leadership, and human centred skills for effectively completing work tasks.

Facilitating Recognition of Prior Learning (RPL) Against Skills Standards

In the digital sector, there are many avenues for individuals to acquire digital skills, both formally and informally. However, informal learning can make it difficult to assess and recognise an individual's knowledge and skills. Without recognised qualifications, individuals may struggle to move between jobs and industries, hindering their career progression.

The implementation of defined digital skill standards is an effective solution to this problem. These standards provide a way to evaluate the skills that individuals have learned through job and life experiences. By assessing an individual's skill achievement against the standard, recognition of prior learning (RPL) can be claimed against any skills-standards-based qualifications, micro-credentials, or training program. This allows individuals to have their skills recognised and validated, making it easier for them to move between jobs and industries and providing a more accurate representation of their capabilities to employers. Ultimately, this leads to a more skilled and adaptable workforce, better able to meet the demands of the ever-evolving digital landscape.

Using Digital Skills Standards as a Benchmark for Validation

Validating training outcomes is crucial to ensuring that training programs effectively meet industry skill needs. However, the process of validation can be complex, particularly for non-accredited providers, and can make it difficult for individuals to demonstrate their skill achievements in a formal capacity.

The Digital Skills Standards solves this problem by offering a framework for assessing and validating training outcomes. AQF-accredited awarding organisations, non-accredited providers, and other training providers can use formative assessments against the standards to gauge the effectiveness of their training programs.

To achieve more formal recognition of skill achievements, registered training organisations or other qualification-issuing authorities can conduct summative assessments against qualifications that are developed based on digital skills standards. A summative assessment is an evaluation of learning that typically takes place at the end of a course or program, to determine the level of skill that a learner has gained.

Alternatively, an organisation can map the digital skills standards to existing qualifications. By assessing against industry-aligned digital skills standards, individuals can receive assurance of their achievement, confirmation of workplace-aligned skills, and a recognised qualification all at the same time. This approach provides a user friendly and consistent framework for validating and recognising an individual's digital skill achievements and helps to ensure that qualifications are aligned with industry needs.

Decoupling Assessments From Learning

The current system of assessing an individual's skills proficiency is often linked to their learning outcomes, creating barriers for individuals who have gained skills outside formal training programs. This can make it difficult to demonstrate achievement of skills to potential employers and can also limit the ability to pursue recognition of prior learning for skills standards-based qualifications.

"Decoupling" assessments refers to separating the evaluation of specific skills or competencies from broader, holistic assessments of a student's overall performance. There is evidence to suggest that this approach can be effective in teaching skills.

Research has shown that decoupling assessments can provide students with more targeted feedback and can help teachers to better identify areas where students may be struggling. This approach can also reduce the impact of factors such as test anxiety or prior knowledge on overall performance, allowing students to focus more specifically on the skill being assessed.

For example, a study published in the Journal of Educational Psychology found that decoupling assessments in mathematics, such as separating problem-solving from computation, led to improved performance on both types of tasks (L. Verschaffel et al., 2009). Another study published in the Journal of Learning Analytics showed that decoupling assessments in a programming course led to better retention of programming concepts and improved overall performance (Lovett et al., 2008)

The Digital Skills Standards offer an independent assessment framework that enables individuals to demonstrate their skills proficiency through summative practice-based, work-integrated assessments decoupled from learning outcomes. Independent assessing organisations can use the standards as a benchmark for validating an individual's skills proficiency, allowing them to demonstrate their skills achievements to potential employers more easily.

The DSO's independent assessment framework stipulates that the assurance of skill at the identified proficiency level be assessed independent of training, which ensures that an individual's achievements are not limited by their learning outcomes. The framework makes provision for this to be conducted by the same training provider who delivered the training or by an independent provider.

This approach provides individuals with greater flexibility in how they demonstrate their skills proficiency and also enables them to pursue recognition of prior learning for skills standards-based qualifications, micro-credentials, or training programs. The individuals can demonstrate their skills proficiency through an assessment-only path based on their previous job and life experiences or by completing an independent assessment during or after training. If successful, they will be considered proficient at the skills standard level outlined for the skills cluster, providing them with evidence to apply for recognition of prior learning for skill sets or qualifications. This approach ensures that individuals can pursue recognition for their skills and achievements, regardless of their learning outcomes.

In summary decoupling assessments from learning outcomes can have a positive impact on workforce development. By providing individuals with greater opportunities to demonstrate their skills proficiency, employers are better able to assess the capabilities of their workforce, and individuals are more likely to achieve recognition for their skills achievements.

Micro-Credentials in VET

Stackable Micro-Credentials Supporting Learners

Micro-credentials are becoming increasingly popular as a quick and efficient way to develop skills for job readiness. They can be stacked to provide a comprehensive set of skills and knowledge required for a well-rounded technology professional. The Department of Employment and Workplace Relations (DEWR), has recognised the benefits of micro-credentials as shown by its aim to establish a National Platform for them that is outcome-based, industry-responsive, transparent, and accessible.

The use of the Digital Skills Standards, a component of the Digital Skills Development Model (DSDM) aligns with this aim by providing an effective way to develop training pathways using micro-credentials. This approach allows for designing specific micro-credentials to quickly upskill or re-skill workers in response to changing job requirements.

Digital skills standards-based micro-credentials can be aligned to an AQF level based on the required volume of learning for the job function, providing a fast track to developing and updating qualifications with changes identified by industry skill needs.

This will allow DSDM to bridge the delivery of non-accredited training and formal award qualifications. Using Digital Standard-based skills clusters in micro-credentials provides a robust attestation to acquired skills or learning in short, discrete formats.

The Digital Skills Standards associated with a common taxonomy facilitate the recognition, portability, and stackability of micro-credentials across industries and providers, as well as their accumulation into appropriate qualifications. Training providers can use micro-credentials based on the Digital Skills Standards outlined in the DSDM to offer learners a flexible and stackable way to recognise and demonstrate their digital skills.

Increasing Completion Rates

As already identified many VET students face challenges that impact their completion rates. NCVER VOCSTAT Data (Accessed Nov 2022) indicates that factors such as lack of time or a perceived lack of direct career benefits lead many to not complete their qualification. As such, it is important to find ways to make qualifications more relevant and beneficial to learners in terms of their career goals.

Micro-credentialing-based learning pathways have emerged as a potential solution to this problem. By offering shorter in duration, more focused learning opportunities that are directly applicable to specific career goals, micro-credentialing can help learners' complete learning in smaller, more manageable chunks. This can increase completion rates, as learners can see the immediate value of their efforts and build momentum toward achieving their long-term goals.

Supporting Adaptation to Changing Job Requirements

Furthermore, micro-credentialing can also help learners maintain relevance and competitiveness in a rapidly changing job market. As new technologies and industries emerge, learners can quickly upskill or reskill by pursuing relevant micro-credentials, rather than completing a full qualification. This agility can help learners adapt to changing job requirements and remain competitive in their industry.

Facilitating Multi-Directional Pathways into AQF

To make qualifications more relevant and beneficial for students in terms of their career goals, it is important to explore innovative solutions. Micro-credentialing-based learning pathways have emerged as a promising approach to address this issue, as it enables learners to focus on building specific skills and competencies relevant to their current or desired roles, whether that be upskilling in their current job or pursuing a full qualification. By doing so, learners can better see the immediate value of their learning efforts and build momentum towards achieving their long-term career aspirations.

The Australian Qualifications Framework (AQF) was created in 1995 to establish a common way of talking about different qualifications and how they relate to each other in Australia. However, in 2019 the Australian government reviewed the AQF and found that it needed to be updated to better recognise the different ways people can learn and apply their knowledge and skills. By updating the AQF, it can better support training programs that focus on developing the specific skills that employers are looking for. Additionally, it could help create flexible and adaptable training pathways in digital skills that are recognised by Vocational Education and Training (VET) providers.

A viable approach to achieve this objective is to map micro-credentials based on Digital Skills Standards to the appropriate levels of the Australian Qualifications Framework (AQF). This process will simplify the aggregation of accredited, non-accredited, industry certification, and higher education micro-certifications into comprehensive skilling pathways that culminate in job opportunities and qualifications. Moreover, credit weighting can be clearly specified, which enhances the credibility and reliability of the resulting qualifications. Ultimately, this strategy empowers learners to acquire the essential skills and competencies that enable them to excel in their chosen careers while enabling employers to identify candidates with the requisite skills for their organisation.

Digital Skills Standards as a Benchmark for Non-Accredited Training Programs

To establish a standardised approach to digital skilling, the DSO Digital Skills Standards have developed a comprehensive skills taxonomy for the digital skilling sector. This framework allows non-registered training providers, including platform providers and industry certification providers, to create non-accredited training programs that align with the skills standards, which can in turn be assessed at a predetermined proficiency level.

Non-accredited training programs cover a wide range of digital skills required for employment, making them a valuable supplement to traditional training packages that may not always reflect the rapidly changing digital landscape. Additionally, non-accredited training products can be developed faster than accredited qualifications, allowing for a more agile response to industry changes.

Employers seeking to engage in Work Integrated Digital Skilling may opt to procure digital skills training from providers offering non-accredited training programs. However, the selection of a training provider should be based on quality and relevance. If digital skills standards are acknowledged as an industry benchmark for quality, purchasers can make more informed decisions. Providers must exhibit how their product employs these standards, which act as a quality benchmark for non-accredited training.

Building Employer Confidence in VET

Unlocking the Potential of VET

The DSDM aims to unlock the potential of VET by establishing a skills-based approach to training design and learning that closely aligns with the workplace and offers practice-based work-integrated learning opportunities to skill individuals for the workplace rapidly. By creating connections between employers, training providers, and learners, the model enables all stakeholders to focus on particular jobs and enables employers to communicate their digital skill and performance requirements against the job roles required by the industry.

One of the key benefits of the DSDM is that it creates visible, stackable, portable, flexible, and relevant digital skills pathways for all learners and training providers. This approach enables businesses to confidently recruit candidates with job-related skills and clearly defined abilities. Moreover, it is expected that employers will also have greater recruitment choice as more prospective employees will be available. Aligning digital skills pathways to micro-credentials powered by skills standards also enables recognition within the current formal system, promoting lifelong learning.

In addition, the DSDM includes work-integrated digital skilling training, which helps align the skills learners acquire with the specific requirements of the workplace. This approach can potentially be anchored to the formal VET system and play an important role in expanding work-integrated digital skilling initiatives across the Australian workplace ecosystem.

Recognising the demand for short and targeted skills training that aligns with specific job functions, the DSDM's architecture enables employers to co-design training programs. This creates agile and customisable training programs that can meet both accredited and non-accredited digital skilling needs.

Overall, the DSDM aims to provide industry, employers, and learners with the means to construct pathways to digital jobs that are in demand from the industry, utilising DSO Skills clusters articulated through employer-endorsed standards. By doing so, the model aims to build employer confidence in the VET system, unlock its full potential, and prepare learners for the digital job market of the future.

Implementation of DSDM via Network of Digital Excellence (NoDE)

The Network of Digital Excellence (NoDE) is a carefully curated group of selected Registered Training Organisations (RTOs), certification providers, Higher Education providers, and non-RTOs that will collaborate to provide a comprehensive skills-based solution to identified digital career pathways. This network brings together diverse and complementary capabilities to create a unified approach to digital skilling solutions that match industry demands and skill shortages. By combining the strengths of various providers, NoDEs can offer a tailored and industry-aligned approach to training delivery that is flexible, agile, innovative and utilises expertise available within the network leading to high quality delivery.

The Digital Skills Development Model (DSDM) has the potential to address challenges within the vocational education and training (VET) sector in Australia. The Digital Skills Organisation (DSO) proposes utilising a Network of Digital Excellence (NoDEs) to implement the DSDM, providing a vital custodianship role in rolling out digital skilling solutions across the Australian landscape.

NoDEs would play a pivotal role in delivering industry-aligned, holistic digital skilling solutions that match industry demands and shortages. The NoDEs would work with employers to ensure that their needs are embedded within any training delivery, ensuring relevancy and transferability in the workplace. Additionally, NoDEs would accelerate the development of digital professionals and enhance employability opportunities to provide lifelong learning opportunities for existing workers.

NoDEs would also provide a micro-credentialing pathway to complete full qualifications if required, ensuring that each micro-credential is part of the Digital Skills Pathway to a specific job or cluster, contributing to achieving a full qualification. Non-accredited training programs and informal learning would complement formal training programs to address all skill requirements of a job role comprehensively. Overall, the NoDEs would set a quality benchmark for digital skilling in the industry, whether through formal qualification channels or on-the-job work-integrated means.

There are over 4000 Registered Training Organisations (RTOs) registered to deliver VET in Australia. The DSO contends that it is difficult to reach all these training providers with a skills-based approach to digital skilling and therefore has chosen to work with selected RTOs and other providers by establishing a limited number of NoDEs that can organically grow into a network of NoDEs across Australia. This approach ensures that the models developed in one NoDE are shared, and capability is distributed to meet skills needs all over the industry.

In summary, the DSDM offers a potential solution to the challenges facing Australia's VET system, and the NoDEs have the potential to create an epicentre for skills-based training, setting a quality benchmark for digital skilling in the industry. The DSO's proposed approach to implementing the DSDM through a network of NoDEs has the potential to reach a large audience and offer lifelong employability skilling for existing workers.

The Work-Integrated Digital Skilling (WIDS) Toolkit for NoDEs

The DSO WIDS is a digital skilling toolkit that has been developed to facilitate the delivery of a skills-based approach. The aim of this toolkit is to reduce the administrative and training burden on employers and supervisors by providing a comprehensive solution that enables quick upskilling of workers. The DSO WIDS includes onramp training to the workplace and practice-based projects that are aligned with digital skills standards, skills clusters, and micro-credentials.

The DSO WIDS is a highly effective method for rapidly equipping workers with the essential skills required for their job. By offering a structured onboarding process, it systematically prepares individuals to enter the workforce and immerses them in real-world work activities. The process includes a series of short, targeted projects that are delivered in specific skills clusters and recognised through micro-credentials. These projects are aligned with digital skills standards to ensure optimal results.

Ultimately, the DSO WIDS approach is designed to set learners up for success in their workplace. It provides a consistent and structured approach to training that is highly aligned with industry needs and requirements. By following this approach, learners can acquire the necessary skills and competencies to succeed in their jobs, while employers benefit from a highly skilled and capable workforce.

Summary

This section delved into the challenges that the current VET sector is facing, specifically:

- low completion rates of qualifications in comparison to the demand in the market

- difficulties in meeting the speed of qualification development demands

- complexities of providing skilling for entry into the workforce, upskilling those who need new skills to stay relevant, and reskilling those who need to find new forms of employment.

The section also proposed a solution in the form of the Digital Skills Development Model (DSDM), which includes the utilisation of micro-credentialing and Work-Integrated Digital Skilling (WIDS) initiatives.

By using micro-credentialing, learners are provided with flexible and relevant learning pathways that allow them to quickly upskill or reskill in response to changing job requirements. This approach also builds employer confidence in the VET system.

The DSDM and NoDE were presented as a solution to the need for a strategy to meet future digital skilling needs, bridging the existing VET ecosystem with the suggested skills-based approach.

Paper Four:

Sustainable and Scalable Implementation of DSDM in the VET Sector

DSO DIGITAL SKILLS ORGANISATION

The implementation of agile training models like the DSDM in the VET sector requires a sustainable and scalable approach to ensure learners, employers, and training providers can navigate the system with ease. In this section, we will explore how policy and reforms can support the VET sector's transition to a future state that meets the digital economy's expanding skill demands.

Key Points

✔ Funding models must be flexible, transparent, and targeted to support the delivery of agile industry co-designed training programs in the VET sector.

✔ Shifting funding models from being tied solely to full qualifications to also supporting part qualifications and micro-credentials that align with specific job roles will support the digital skilling at scale and velocity required.

✔ The regulatory frameworks must be outcome-focused to prioritise workplace-relevant skills and knowledge and support the alignment of training with job requirements.

✔ VET practitioners need skills and knowledge for designing and delivering agile training models that are adaptable to changing industry needs.

Funding Models to Support Agile Training in the VET Sector

To support the delivery of agile industry co-designed training programs in the VET sector, it is critical to have funding models that are flexible, transparent, and targeted.

Inconsistency and Inflexibility of Current Funding Models

Currently, each state and territory government is primarily responsible for funding VET. The Commonwealth government also contributes to VET funding through state funding mechanisms. However, the lack of consistency and flexibility in the funding models creates a significant challenge to implementing sustainable and scalable agile training models.

To improve the quality and efficiency of VET across the country, the Commonwealth government has used its funding leverage historically to impose conditions and performance expectations on the states and territories. As a result, funding models have been developed to align with key aspects such as competition, delivering skills for industry, leading to demand-driven funding models. While there are differences in the funding models and programs offered by each jurisdiction, the overarching goal is to provide high-quality vocational education and training that meets the needs of industry and employers.

To achieve this goal, each jurisdiction contributes towards the cost of training with a fixed student contribution allocated to each qualification. However, the amount and type of funding available for each qualification can vary significantly between jurisdictions, creating further inconsistencies in funding models.

As an example, below is a breakdown of how a Certificate IV in Cyber Security is funded in different jurisdictions.

- New South Wales, the government contributes up to $6,290, and students may pay $1,960 or more (further subsidies may be applicable), making the full fee $8,250.

- Victoria, the government contributes $6,450, and students must pay up to $4,150, making the full fee $10,600.

- Queensland, the government contribution can be up to $13,000 or $0, depending on the eligibility of the student and the type of funding, and students may pay $0, $50 or more.

- Australian Capital Territory, the government contributes $4,950, and students pay nothing if eligible for the Fee Free initiative, making the full fee $4,950.

Overall, there is a need to adjust the current funding models and make them equitable, simple, consistent, and flexible to support the implementation of agile training models that cater to the specific needs of industry. This will ensure that the VET sector can deliver agile, employer co-designed training programs effectively and efficiently.Top of Form

Marketised Environment Created by Demand-Driven Funding Models

The demand-driven funding model was implemented with the aim of enhancing the VET sector's responsiveness to the needs of industry and the labour market by allocating funding based on student enrolments. However, this model has had some unintended consequences, including the creation of a marketised environment that has impeded innovation and led to a greater emphasis on qualifications and compliance rather than industry needs.

With the availability of public funds to both public and private providers, there has been a need to regulate the use of these funds to ensure returns on investment. As a result, compliance requirements have become more stringent for all providers, which has resulted in providers becoming increasingly focused on justifying their funding eligibility above all else. This has undermined the flexibility and responsiveness of the VET system, making it more challenging for providers to deliver effective training programs.

As a consequence, there have been calls for a more coordinated approach to VET funding and policy across the country. Some stakeholders have criticised the impact of the demand-driven funding model on training quality and the financial sustainability of some VET providers. A more coordinated approach could help to address these concerns and ensure that the VET sector is better equipped to deliver effective training programs that meet the needs of industry and the labour market.Top of Form

Alternative Funding Models to Support Digital Skilling at Scale and Velocity

To support digital skilling at scale and velocity, alternative funding models are needed that prioritise employer needs along with regulatory compliance and qualification achievement. One such alternative is to shift funding - including traineeship funding for digital and technology qualifications - from being tied solely to full qualifications to also support part qualifications and micro-credentials that align with specific job roles. This approach would enable the VET sector to offer training that is directly aligned with the current and emerging skill needs of the industry and allow learners to gain job-specific skills more quickly and efficiently.

Another alternative funding model is to support work-integrated training that is directly aligned with job roles, even if it does not fully align with a higher-level qualification. This approach recognises the importance of experiential learning and on-the-job training in developing job-specific skills and providing learners with the necessary work experience to succeed in their chosen field.

As highlighted in Appendix 2, there are alternative funding models that have been successfully implemented in other countries, such as Singapore and London. These models include the 'Lifetime Skills Account' approach and joint financing of education and lifelong learning efforts between public and private sectors. Such approaches have proven effective in supporting rapid digital skilling at scale, and can provide useful insights for the Australian VET sector.

In addition, the VET sector could also explore joint financing of education and lifelong learning efforts between the governments and industry sectors. This would involve collaboration between industry and government to identify the digital skill needs of the industry, design training programs to meet those needs, and fund the training through a shared investment model.

Overall, alternative funding models that prioritise industry needs, support work-integrated training, and enable learners to gain job-specific skills through micro-credentials are needed. These have the potential to greatly improve the responsiveness and effectiveness of the VET sector in meeting the digital skilling needs of the industry.

Regulation and Compliance

In Australia, the primary regulatory body for VET is the Australian Skills Quality Authority (ASQA), which regulates and accredits VET courses and training providers.

Other regulations and bodies that may be relevant to the VET sector in Australia include:

- The Standards for Registered Training Organisations (RTOs) 2015, which set out the requirements that RTOs must meet to maintain their registration and accreditation.

- The National Vocational Education and Training Regulator Act 2011, which establishes ASQA as the national VET regulator.

- The Australian Qualifications Framework (AQF), which sets out the standards for qualifications across the country.

- State and territory funding bodies, which provide funding for VET courses and have additional regulations and guidelines that providers must follow (e.g.: Smart and Skills operating guidelines in NSW).

Industry bodies and professional associations, which may set standards and guidelines for VET courses in their respective fields. For example:

- **Financial Advisors:** The Financial Adviser Standards and Ethics Authority (FASEA) set education and training standards for financial advisers, which are delivered through VET courses by approved providers.

- **Real Estate:** The Real Estate Institute of Australia (REIA) provide training and accreditation for real estate agents and set standards and guidelines for real estate VET courses in areas such as property management, sales, and auctioneering.

- **Early Childhood Education:** The Australian Children's Education and Care Quality Authority (ACECQA) set national standards for early childhood education and care, including qualifications for early childhood educators. VET courses in early childhood education must meet the ACECQA standards to be recognised as appropriate training for early childhood educators.

To ensure compliance and quality outcomes, it is anticipated that all VET providers comply with all regulations and bodies relevant to their particular jurisdiction.

Challenges in the Regulatory Environment for VET Qualifications in Australia

The current regulatory environment for VET (vocational education and training) qualifications in Australia faces several challenges, including:

1. **Compliance Burden:** The compliance requirements for training providers are complex, time-consuming, and costly, leading to a compliance burden for providers. This can deter new providers from entering the market and can also be a barrier to innovation and agility in the development and delivery of VET qualifications.

2. **Limited Flexibility:** The current regulatory framework is prescriptive and lacks flexibility, making it difficult for training providers to adapt to changing industry needs and emerging skill requirements. This can result in a gap between the skills that employers need and the skills that students are equipped with upon graduation.

3. **Outdated Qualifications:** Some VET qualifications have become outdated and are no longer relevant to current industry needs. However, the process for updating qualifications is lengthy and complex, making it difficult for training providers
to respond quickly to changes in the labour market.

4. **Inconsistent Quality:** While the regulatory framework aims to ensure consistent quality in VET qualifications, there are inconsistencies in the application of standards across different states and territories. This can lead to variations in the quality of training and assessment, and in turn, can affect the employability of VET graduates.

5. **Lack of Recognition:** VET qualifications are often not given the same level of recognition as university degrees, despite being a valuable pathway to employment for many Australians. This can result in a lack of investment in the VET sector and a perception that VET qualifications are of lesser value.

Addressing these challenges will require a collaborative effort from government, training providers, and industry stakeholders to ensure that VET qualifications remain relevant, flexible, and responsive to changing demands.

Significance of Regulatory and Compliance Frameworks for Agile Digital Skill Development

Effective regulation and compliance frameworks are crucial in supporting agile digital skills development models. Currently, many training providers focus on delivering full qualifications while adhering to regulatory and compliance frameworks to maintain their RTO status and avoid non-compliance issues with ASQA. Unfortunately, this approach often results in a lack of alignment between training and industry requirements, as providers are hesitant to take risks and align their training programs to employer and industry needs.

This is where regulation and compliance frameworks that support agile training models are required. By emphasising employer and industry-aligned work outcomes rather than the training process, these frameworks could enable training providers to offer programs that are tailored to specific industry requirements without the need for a complicated number of qualifications. This not only benefits employers by ensuring that their workforce have the skills needed to succeed, but also helps training providers stay relevant and competitive in a rapidly evolving digital landscape.

In summary, effective regulation and compliance frameworks that support agile digital skills development models are essential for ensuring that training programs are aligned with employer and industry requirements. By encouraging training providers to focus on work outcomes rather than the training process, these frameworks enable them to offer tailored programs that meet the needs of the industries they serve. This, in turn, benefits both employers and training providers by ensuring that the skills and knowledge taught are relevant and up-to-date.

Outcome-Focussed Regulatory Frameworks

Traditional regulatory frameworks in VET teaching often prioritise process-based training and assessment, which can stifle innovation and limit the occupational and pedagogical expertise of teachers. To support agile digital skills development models, it is crucial for regulatory frameworks to shift towards outcome-focused models that prioritise workplace-relevant skills and knowledge.

By emphasising the outcomes of training rather than the process, regulatory frameworks can enable teachers to tailor their approaches to meet the specific needs of learners and industries. This can foster innovation in teaching and enable teachers to better prepare learners for real-world scenarios.

Importance of Demonstrating Industry-aligned Work Outcomes over Process-focused Training

To better serve the needs of learners and employers, VET teaching must prioritise industry-aligned work outcomes over process-focused training, while also shifting towards outcome-focused models. By emphasising the relevance and applicability of skills and knowledge in real-world settings, VET learners can develop the necessary skills and confidence to excel in their chosen fields. This approach can also benefit employers by ensuring that VET graduates possess the skills and knowledge required to make immediate contributions to their organisations.

To strike a balance between compliance and innovation, regulatory frameworks must prioritise outcome-focused models and industry-aligned work outcomes. This will enable VET learners to acquire the skills and knowledge they need to thrive in the digital economy while also supporting the pedagogical expertise of teachers. Ultimately, this approach can better support the needs of learners, employers, and the wider economy.

Building Agility in VET Sector Training

Leveraging Non-Accredited and Industry Certification Programs and Higher Education Subjects within Accredited VET Delivery

While VET sector accredited qualifications are important for providing learners with foundational skills and knowledge, they can sometimes struggle to keep up with rapidly changing industry skill needs. To address this, VET providers can leverage non-accredited, industry certification programs, and when appropriate higher education subjects to support their responsiveness.

By incorporating non-accredited programs, industry certification, and higher education subjects into accredited VET delivery, providers can better equip learners with the latest skills and knowledge needed to succeed in their chosen fields. This approach can also help learners stay competitive in a rapidly changing job market.

Ensuring Training is aligned to Job Requirements and Adds Value to Learners

To ensure that VET training remains relevant and adds value to learners, it is important to align training with job requirements. By focusing on the skills and knowledge needed to succeed in specific roles, VET providers can help learners develop the skills and confidence needed to thrive in their chosen fields. This approach can also benefit employers, who rely on VET graduates to possess the skills and knowledge needed to contribute to their organisations from day one. By prioritising training that is aligned with job requirements and adds value to learners, VET providers can be better placed to ensure they remain relevant into the future.

Streamlining Compliance Frameworks

The need to simplify compliance requirements and reduce duplication of effort

Streamlining compliance frameworks in the VET sector is crucial to reduce the duplication of effort and simplify compliance requirements. One approach to streamlining compliance frameworks is to improve coordination of regulatory and compliance activities across different levels of government and professional bodies. For instance, the use of sufficient and robust data collection mechanisms that all regulators have access to, can help them to identify effective triggers for risk-based reviews. This approach would reduce the need for duplication and amplification of compliance requirements.

The development of training packages and rules for qualification completion must incorporate the education and training standards demanded by various industry bodies and professional associations. This would lessen the strain on training providers who currently need to comply with all pertinent frameworks, some of which can be conflicting.

Another way to streamline compliance frameworks is to conduct external assessments by third parties with relevant occupational knowledge and expertise to assure the integrity of assessments and qualification. The New Zealand external evaluation review (EER)[2] approach is a good example of this approach, as it aims to help providers to develop their capacity for self-assessment. The trust between regulators and providers is also vital to minimise unnecessary regulatory burden on both parties and streamline the approach.

Moreover, outcomes-based measures of institutional performance can help individuals to make informed choices and governments to make policy and funding decisions. The usefulness of these measures depends on the robustness and accuracy of participation and outcomes data and the mechanisms for data collection. Therefore, it is essential to focus on the continuous improvement of data collection mechanisms to enhance the effectiveness of compliance frameworks in the VET sector.

Improving coordination of regulatory and compliance activities across different levels of government

The numerous compliance layers in the VET sector require preparation of compliance reports which draws valuable resources away from core teaching and learning tasks, hindering continuous improvement. Streamlining compliance frameworks can free up resources for educational institutions to focus on providing quality education and training to their students. Therefore, it is vital to address compliance issues in the VET sector to ensure its effectiveness and achieve better outcomes for all stakeholders.

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[2] https://www.nzqa.govt.nz/providers-partners/external-evaluation-and-review/

Adjusting Compulsory TAE Qualification & Other Professional Development

Importance of Skills and Knowledge for Designing and Delivering Agile Training Models

To ensure that VET teachers are equipped to deliver industry-relevant and job-focused training, they need to have the necessary skills and knowledge. This includes understanding the latest industry trends and skill requirements, as well as being able to design and deliver training programs that are agile and adaptable to changing needs. By investing in professional development programs for trainers and providing them with the necessary resources and tools, training providers can help ensure that their teachers have the skills and knowledge needed to deliver effective training programs.

Adjusting Compulsory TAE Qualification for VET teachers

The current compulsory Certificate IV TAE qualification for VET teachers may need to be adjusted to better reflect the skills and knowledge needed to deliver agile and industry-driven training programs. This could include incorporating new pedagogical approaches and strategies that are better suited to training in the workplace, as well as providing training in the use of new technologies and tools that are relevant to the industry. By adjusting this requirement, VET teachers can be better prepared to meet the evolving needs of industry and ensure that their training programs are effective and relevant.

Investing in Continuing Professional Development Programs

Continuing Professional development programs can help VET teachers to stay up to date with the latest industry trends and requirements, as well as enabling the development of new skills and knowledge. This can help assist in the design and delivery of training programs that are better aligned with industry needs and outcomes. Additionally, investing in professional development programs can help to foster a culture of innovation and continuous improvement within the training provider, which leads to better outcomes for both teachers and students.

Developing New Pedagogical Approaches

VET teachers need to be able to quickly adapt to changing industry needs and deliver training programs that are effective and relevant. This requires the development of new pedagogical approaches that are better suited to industry needs. This includes work-based training, simulations and role plays, as well as the use of new technologies such as virtual and augmented reality. By developing new pedagogical approaches, VET teachers can be better prepare students for the workforce.

Overall, adjusting the compulsory TAE qualification for VET teachers and investing in professional development programs and new pedagogical approaches can help to address the challenges faced by the VET sector and ensure that VET qualifications remain relevant.

Simplifying the VET System for Agile Training: Benefits and Strategies

Simplification through the use of digital technologies empowers training providers to adapt and update training programs quickly to meet the evolving needs of industry. This supports the implementation of agile training models like DSDM, which require training programs to be responsive to the changing demands of the digital economy.

Creating new resources and tools such as *"DSO Work-Integrated Digital Skilling Toolkit"* can play a crucial role in supporting the design and delivery of agile training models that are aligned with industry needs. By equipping them with the skills and knowledge they need to better prepare workers for the jobs of the future, new resources and toolkits that provide training providers with a guided framework can help address some of the significant issues affecting VET training providers' ability to deliver useful training in Australia.

A critical aspect of these toolkits is that they are built with extensive industry consultation, and are endorsed by employers. This approach ensures that training providers have access to tools created to reflect current employer demands.

This approach can also help to eliminate the compliance and administrative burden associated with creating training programs from scratch, making it easier for providers to create one-size-fits-one solutions that are will help learners be job-ready. Ultimately, by creating new resources and toolkits that are industry aligned, and equipping training providers with the necessary skills and knowledge to better prepare workers for the jobs of the future, VET qualifications can remain relevant and flexible.

In summary, the Australian vocational education and training (VET) sector faces challenges stemming from inflexible regulations and training providers' inability to offer adaptable solutions that meet industry needs. To address these challenges, a regulatory environment that is responsive, flexible, and encourages innovative development and delivery of VET qualifications must be established. Such an environment requires collaboration between the government, training providers, and industry stakeholders to ensure that VET qualifications remain relevant, flexible, and responsive to the changing needs of the industry. It is also crucial to invest in professional development programs for trainers and create new pedagogical approaches that align current workforce requirements.

The simplification of the VET system benefits learners, employers, and training providers, and supports the implementation of agile training models such as the DSDM. By adopting scalable and sustainable agile training development models, the VET sector can meet the growing demand for skills in the digital economy while ensuring easy navigation and management for all stakeholders. The creation of new resources and toolkits that support the design and delivery of agile training models can equip training providers with the necessary skills and knowledge to better prepare workers for the jobs of the future.

Overall, effective regulation and compliance frameworks are critical to the successful implementation of agile training models in the VET sector.

Industry Engagement in VET

Promoting Collaboration for Better Employment Outcomes

The VET sector faces the challenge of meeting the evolving skills needs of the digital economy. In this context, industry engagement is crucial to ensure that VET qualifications and delivery of training are relevant and responsive to the demands of the labour market. In this section, we will expand on how policy, funding, and regulation can be adapted to promote industry engagement and employer investment in the sector.

Barriers to Industry Engagement in VET

Current federal and state policy, funding, and regulation has created barriers to industry engagement in the design and delivery of VET programs. These barriers include:

- Funding models that do not support industry engagement.

- Regulatory frameworks that are inflexible.

- Compliance requirements that are burdensome.

- Tokenistic industry representation in governance structures.

Promoting Industry Engagement in VET

To promote industry engagement in VET, scalable industry engagement models and toolkits should be developed for utilisation by training providers across the sector. One potential solution is to create an ongoing collection of pre-prepared training models that providers can quickly utilise to build their industry-aligned programs and customise to suit the needs of local employers. This would help to reduce the administrative burden on training providers and make it easier for them to design and deliver training programs that meet the contextual needs of their industry.

Additionally, funding models and regulatory frameworks should be revised to support industry engagement and promote more flexible and responsive training programs. Funding models could be designed to incentivise industry engagement and reward training providers for delivering programs that meet the needs of local employers. Regulatory frameworks could be updated to provide greater flexibility for training providers to design and deliver programs that are aligned with the current and future needs of industry.

Industry Engagement Platforms

Industry engagement platforms are digital platforms that facilitate communication and collaboration between industry, training providers and VET students. These platforms can support industry engagement by:

- Providing a centralised hub for industry to communicate their requirements to training providers.

- Facilitating work-integrated learning opportunities for VET students.

- Enabling training providers to access industry insights and feedback on the relevance of their training programs.

The partnership between the DSO and Tech Council of Australia Digital Employer Forum to build the Industry Engagement Platform is an illustration of how to encourage increased awareness, involvement, and collaboration amongst companies, training providers, learners, and government. Development of this platform is currently being undertaken by LiveTiles.

In conclusion, promoting industry engagement in VET is crucial to ensuring that training programs are responsive to employer needs and that VET graduates are equipped with the skills they need to succeed in the workforce. By developing scalable industry engagement models and revising policy, funding, and regulatory frameworks, the VET sector can better align training programs with the needs of industry and promote better employment outcomes for VET graduates. The use of industry engagement platforms can further support this process by facilitating communication and collaboration between industry, training providers and VET students.

Summary

This section examined the application of agile training models, such as DSDM, within the vocational education and training (VET) sector, with the goal of establishing a sustainable and scalable approach to meet the expanding skill demands of the digital economy. To this end, several critical elements of the VET sector have been identified that require revision and restructuring to facilitate the agile and responsive delivery of VET programs. These elements include funding models, regulation and compliance, and industry engagement.

One necessary step towards improving the responsiveness and effectiveness of the VET sector is to adjust the current funding models to support agile training programs tailored to meet the specific needs of industry. Alternative funding models that prioritise industry demands, work-integrated training, and part qualifications can improve the VET sector's responsiveness and effectiveness.

Compliance with relevant regulations and governing bodies is also essential. Collaboration among government, training providers, and industry stakeholders is necessary to ensure that VET qualifications remain relevant, flexible, and responsive to changes in the digital ecosystem. Regulatory frameworks should balance compliance with innovation and prioritise outcome-focused models and industry-aligned work outcomes.

Incorporating non-accredited programs, industry certification, and higher education subjects into accredited VET delivery can equip learners with the latest skills and knowledge required to excel in their chosen fields. Building agility in the VET sector training involves leveraging non-accredited and industry certification programs, aligning training with job requirements, and making these programs more accessible and affordable. Simplification of the VET system with digital technologies and other strategies benefits learners, employers, and training providers and supports the implementation of agile training models.

Effective regulation and compliance frameworks are also critical to the successful implementation of agile training models in the VET sector. Industry engagement in VET is also vital to ensure that graduates are equipped with the skills required to succeed in the workforce. The development and use of scalable industry engagement models, as well as revising policy, funding, and regulatory frameworks can support this process.

Conclusion

In conclusion, this compendium of papers prose the DSO Digital Skills Development Model (DSDM) as a skills-based approach to address the challenges facing the vocational education and training (VET) sector, particularly in the digital economy. The DSDM provides a comprehensive model for identifying and developing digital skills needed for various job families, which will lead to improved job mobility, transferability of skills, and faster production of skilled workers.

The compendium of papers also suggests revising several essential elements of the VET sector, including funding models, regulation, compliance, and industry engagement, to support agile and responsive delivery of VET programs. Alternative funding models that prioritise industry skill needs, work-integrated training, and part qualifications, along with collaboration among government, training providers, and industry stakeholders, can improve the responsiveness and effectiveness of the VET sector. Incorporating non-accredited programs, industry certification, and higher education subjects into accredited VET delivery would also equip learners with the latest skills and knowledge needed to succeed in their chosen fields. Effective regulation and compliance frameworks, as well as industry engagement models, are critical to the successful implementation of agile training models in the VET sector.

Appendices

Appendix 1: Glossary of Key Terms and Concepts

Competency: The knowledge, skills, and abilities required to perform a particular job or task.

Competency-based education: An approach to education that focuses on developing specific competencies or skills required for a particular occupation.

Critical Core Skills: Interpersonal and communication skills, such as empathy, collaboration, and emotional intelligence.

Cybersecurity Skills: The ability to identify and protect against cyber-threats, such as malware, phishing, and hacking.

Digital Fluency: Also mapped to the ACSF, the DSO Digital Fluency skills level is broader than digital literacy. It includes the skills required to navigate digital technologies and to interact with the digital world. In other words, it is the ability to select and use the appropriate digital tools, systems, and technologies to achieve outcomes or a work-related task. A digitally fluent individual can analyse and apply digital skills with experience and proficiency to get things done easily with accuracy and precision.

Digital Skills: In keeping with the skills-based approach, DSO relies on the UNESCO definition of digital skills, which states:

"Digital skills are a range of abilities to use digital devices, communication applications, and networks to access and manage information. They enable people to create and share digital content, communicate, and collaborate, and solve problems for effective and creative self-fulfilment in life, learning, work, and social activities at large." UNESCO, 2018 (UNESCO, 2018)

Digital Skill Standards: A set of standards developed by industry experts that define the skills required to perform specific job roles within the industry.

Digital Skilling: Digital skilling is the ability to acquire skills that are transferable across jobs, occupations, and contexts. Skill acquisition is achieved through breaking down job tasks into identifiable skill sets to ensure that viable transition of horizontal skills across career pathways is attainable.

Digitally Skilled Workers: Workers whose duties require them to use digital tools & technologies to do their technology or non-technology jobs.

Digital Literacy: Mapped to the Australian Core Skills Framework (ACSF), the Digital Literacy skills level is defined as the physical operations of digital devices and the software operations in those devices (UNESCO, 2018). It incorporates the ability to search and navigate, create, communicate, and collaborate, think critically, analyse information, and address safety and wellbeing using a variety of digital technologies (DLSF).

Digital Professional: The Digital Professional skills level reflects the capability to perform a given skill and to independently apply that ability in one or more contexts, depending on their level of proficiency. In terms of the DSDM, there are five levels of proficiency, which will be explained in detail in Chapter Two. However, for the purposes of defining the composition of a digital professional, it is important to note that this descriptor applies to those clearly operating within levels three, four and five of the DSDM, whereby individual, autonomous responsibility underpins the type of work activities undertaken.

Information and Communication Technology (ICT) Skills: The ability to use hardware, software, and digital networks to perform tasks and solve problems.

Network of Digital Excellence (NoDE): The Network of Digital Excellence (NoDE) is a carefully curated group of selected Registered Training Organisations (RTOs), certification providers, Higher Education providers, and non-RTOs that collaborate to provide a comprehensive skills-based solution to identified digital career pathways.

Non-Technology Workers: People with the Digital Fluency and Digital Professional level skills may also work in jobs where their role is not in a traditional or primary technology field, for example a nurse working in ICU at a hospital who must be able to use multiple advanced pieces of technological equipment as part of their day-to-day role.

Recognition of Prior Learning (RPL): The process of evaluating an individual's existing skills and knowledge, often gained through work experience, to determine if they meet the requirements for a particular qualification.

Skills: Process that an individual performs consciously, actively, and wishfully, using his/her cognitive and physical resources. It is developed through active efforts of an individual and based on real practices.

Technical Skills: Specific technical or job-related skills, such as computer programming or accounting.

Training Package: Set of nationally recognised qualifications and associated resources, developed by industry experts in consultation with VET providers, that define the skills and knowledge required for particular occupations or industries.

Transferable skills: Skills that can be applied across different jobs or industries, such as communication, problem-solving, and teamwork.

Work-Based Learning: Learning that takes place in a real work environment, where students can apply their skills and knowledge in practice.

Technology Workers: Professionals in fields like software engineering and data science that require in-depth technology expertise either to develop new technological products, services, and applications or to connect technological products and services with end users and businesses (e.g., technology product managers).

Appendix 2: Mapping VET Sector Challenges

In realising the opportunity posed by having an Australian workforce skilled for digital transformation

The DSO has explored the VET sector challenges in realising the opportunities posed by having an Australian workforce skilled for digital transformation in key Australian papers. Key papers that informed this classification of challenges are the Honourable Stephen Joyce's 2019 *Strengthening Skills - Expert Review of Australia's Vocational Education and Training System* ((Department of the Prime Minister and Cabinet, 2019), The Joyce Report), Fowler's 2019 review of the Joyce report (Fowler, 2019), the Productivity Commission's 2017 report *Upskilling and Retraining, Shifting the Dial: 5 year Productivity Review* (Productivity Commission, 2017), and the Digital Transformation Expert Panel's 2021 paper *The Learning Country: Digital Transformation Skills Strategy* (Digital Transformation Expert Panel, 2021).

Figure 2 in the main report summarises these challenges under tiers inspired by Fowler's (2019) (Fowler, 2019) "three priority tiers rated by:

- long term impact on VET sector

- the need for First Ministers to get in and fix it; and

- expected degree of difficulty in gaining a workable consensus under 'cooperative federalism' governance" (28)

The tables presented in this Appendix map key challenges raised in these papers against the 12 challenge categories identified by the DSO, with a focus on the digital skills context.

	Simpler funding and skills matching			
	Challenge 1- Complicated funding system	Challenge 2- Decline in funding for VET sector	Challenge 3- Funding lifelong learning and short form education opportunities	Challenge 4- Regulatory compliance burden
Joyce 2019	- Identifies one of main issues in VET sector as 'A complicated and inconsistent funding system that is hard to understand and navigate, and which is not well matched to skills needs'	- Public funding decline 2008-2017 - Shift of funding from general support for public institutions to priority skills areas led to pressure on TAFEs - Not same increase as school and higher ed in same period	- Briefly mentions lifelong learning and short-form credentials proposal by BCA	- Concerns about number of audits and focus on minor issues by ASQA - Acknowledges support for robust national regulator
Fowler 2019		- Funding decline, especially compared to higher ed and schools - Issues with national skills needs marching and meeting regional needs - Complexities of federated system	- Concerns about lack of information behind life-long learning account BCA life-long learning account proposal in Joyce with not evidence behind assertion - Lack of advice in Joyce about funding the 51% of students who do short courses, micro-credentials and subjects	- Complexities of federated system - Disjoint between VET and university sector left to self-govern in a demand-driven system
DTEP 2021			- Little focus in Australia on digital skills for workforce as a whole (focus on specific industries) - Notes that demand for short-form credentials from business is far ahead of policy and evidence internationally	
PC 2017			- Costs of training adult workers including the financial cost of training, the opportunity cost of time out and the perceived return by employers. - Explores examples of lifelong learning accounts and incentives to businesses investing in training and development	

	Ensuring quality and relevance		
	Challenge 5 - Inconsistencies in quality across RTOs	Challenge 6 - Effective and transparent assessments	Challenge 7 - Barriers to engaging employers in VET
Joyce 2019	- Identifies one of main issues in VET sector as *'Continuing variations in quality between providers, and concerns about the relationship between the regulator and providers'* - Notes concerns of employers limited to a few rogue providers - Use of 'competency' to rush students through quals	- RTOs may deem students competent in order to receive funding - Some providers and trainers lack assessment capability, industry knowledge and/or time	- Lack of employer engagement with system: Complexity and lack of clear info, rate of development, confusion around pathways all barriers to employer engagement
Fowler 2019			
DTEP 2021			- Employers need support to help them identify the skills then need now and in the future and pathways for employees to obtain them
PC 2017		- Talks about the lack of graded assessments in VET to improve information in the labour market and enable more efficient recruitment and job matching, and incentives to excel. - Notes this may also reduce barriers to further education pathways wanting to upgrade VET qualifications to a university degree	

	Digital capability and capacity of RTOs		Speeding up qualification development
	Challenge 8- Limited digital infrastructure and resources	Challenge 9- Teacher capability not meeting current needs	Challenge 10- Qualifications fail to keep up with industry needs
Joyce 2019		- Concerns around TAE Cert IV - Increased universal standards pushing out industry experts	- Identifies one of main issues in VET sector as *'A cumbersome qualifications system that is slow to respond to changes in industry skills needs'*
Fowler 2019			- Wide untested remit of SOs, risk of adding more, deleting less, educators and funders having little input - Contrast to unis directly working with professional bodies and industry to update curriculum
DTEP 2021	- RTOs may not have digital infrastructure needed for digital learning platforms - Note that harnessing digital tech is expensive, requires internet, resourcing of assessments etc.	- Over a decade since last national VET PD program - Focus on digital capabilities needed in VET - Overview of how digital tech can enhance learning	- Note that digital skills typically embedded in units of competency with responsibility on individual VET to interpret in terms of current tech - Note also risks of overly specifying digital skills in units of competency leading to 'churn' in system and lack of adaptability to specific business needs
PC 2017		- Mentions evidence of teachers not being recruited from high-performing school leavers and incentives needed to overcome this. - Teachers 'teaching out of field', giving example of only about 20% of year 7-10 teachers in IT having ever studied the subject at tertiary level.	

	Clearer education pathways	Equity of access for all Australians
	Challenge 11- Confusion in pathway opportunities available through VET	**Challenge 12- Barriers to students accessing VET**
Joyce 2019	- Identifies two of main issues in VET sector as *'A lack of clear and useful information on vocational careers for prospective new entrants'* and *'Unclear secondary school pathways into the VET sector and a strong dominance of university pathways'* - Widespread confusion about PD courses, LN training, workplace licences, units of competency, full VET quals, higher ed - Transfer of credits btw VET and higher ed - Large number of private and public RTOs competing - Many websites	- VET viewed as 'lower status' - Uni loans for all courses, VET only some - VET in schools varies in quality and recognition - Low Learning, Language, Literacy, Numeracy and Digital (LLND) skills. Focus on first three - Identifies one of main issues in VET sector as *'Access issues for Aboriginal and Torres Strait Islander Peoples and second chance learners seeking skills that will help them obtain and stay in meaningful work'*
Fowler 2019	- VET as vocational and HE as otherwise doesn't hold	- VET students don't have access to fair and equitable access to public funding/financing
DTEP 2021		- Australia in bottom third of OECD countries in terms of flexibility of adult learning system - Australia not in line with international recognition of a right to access career development support to participate in learning and work
PC 2017		- Explores how ageism affects employers' and society's support of mature age workers learning and their subsequent exclusion from training

Appendix 3: DSDM Artefacts Developed by DSO

Pathways, located at https://digital-careers.azurewebsites.net/

- Digital Career Pathways

- Digital Skills Pathways to Jobs (Job Profiles)

- Digital Skills Learning Pathways

Examples: (See Appendix 4 for Project Details)

1. Canberra Cyber Hub – Cyber Security
2. Cremorne – Software Development
3. Department of Employment, Small Business and Training (DESBT) – Digital Fluency
4. Year 13 DigiSkills Academy
5. Northern Territory – Digital Literacy
6. National Apprentice Employment Network (NAEN) – Digital Fluency
7. Australian Army – Digital Literacy and Fluency
8. Services Australia – Cyber Security
9. Services Australia – Digital Fluency

Skills Standards, located at https://digitalskillsorg.com.au/

- Digital Skills Standards aligned to three job families and four transferable skills have been developed across 45 Skills Clustered developed.

  - Job Families

    - Cybersecurity

    - Software Development

    - Analytics

  - Transferable Across Job Roles

    - Digital Literacy

    - Digital Fluency

    - Digital Confidence Standards for Executive Leaders

    - Critical Core Skills Standards

- 1165 skills identified across the skills standards.

- 780 assessment guidance documents completed.

- Contextualised assessment guidance documentation developed for:

  - Salesforce

  - Manufacturing (IBSA)

Work Integrated Digital Skilling Toolkit, located at: https://8399895.hs-sites.com/wids

- Bootcamp – scenario based learning projects

- Microcredential – work integrated digital skilling projects aligned to digital skills standards required for job role

Evaluation

The Digital Skills Standards were reviewed and the following is a high level summary.

The Digital Skills Standards is clearly the product of extensive, valuable work and demonstrates an effective integration of various skills standards and industry feedback. The standards have utility in relation to addressing present and future workplace skilling requirements, adding to the body of knowledge around skills standards and upskilling. There is a need to standardise the process of creating a standard / cluster and agree protocols as to the structure and content, to avoid the challenges highlighted. Accessing the standards and supporting information, users may feel overwhelmed. The information currently will not optimise engagement of a new audience. The content assumes a significant baseline understanding of using standards and assessments.

Full Evaluation Report by Skills Schema Report 20 November 2022 is located at:
https://drive.google.com/drive/search?q=skills%20standards%20evaluation

Skills TX – SFIA Mapping to ANZSCO

Following the federal government purchasing a country-wide license for SFIA, DSO is creating digital skills pathways for a standardised set of Australian job roles in the digital and technology-based occupations using SFIA skills and skill descriptors. SkillsTX were engaged by DSO to describe the digital skills pathway to several selected ANZSCO occupational classifications using the SFIA skills and descriptors.

Generation Australia - Pilot Project Codification

The purpose was to:

- Codify DSO's methodology & process for pilot projects with training providers and employers

- Package the scope, purpose, activities, outputs, and learnings from a suite of DSO's projects

- Support DSO to prove the efficacy of its overall model and approach

Snapshot of Learnings:

- Conducting a Training/Workforce Needs Analysis is helpful for clarifying the specific skilling requirements of the project

- Assessing the capability of local training partners to implement pilots is important.

- Understanding the starting point of the learner cohort is important; this may be done through, e.g., a survey of learners, or interviewing those who currently work with learners.

- Additionally, balancing industry/employer expectations with the current competency of the learner group, and may require compromise if more complex learner profiles.

- To ensure the right people and perspectives are provided at the right time (e.g., those with decision-making/sign-off powers are available when needed), it is helpful to share role descriptions and explanations of upcoming activities for project stakeholders and workshop attendees

- DSO can share and celebrate the significant and measurable impact a pilot has had, to build buy-in for scale-up and future plans (e.g., in the Year13 DigiSkills pilot, the number of students who said they were likely to or would definitely consider a career in tech more than doubled after completing the program)

- Some partners are able to use DSO's Skill Standards independently to upgrade their own learning frameworks (e.g., in the Army pilot).

Appendix 4: Reports and Evaluations

Pilot Project Codification, Generation Australia

The full report located at https://docs.google.com/document/d/1G0w7Yhyeja_vRefhfbIzgFk2xGIaJJO9/edit#heading=h.1fob9te

The report is also included in the second paper of this series DSO Network of Digital Excellence.

Executive Summary

This document codifies DSO's pilot training programs, as best-practice training and assessment solutions following DSO's employer-led and skills-based approach (using the DSO Digital Skills Development Model). It 'packages' several example pilots, covering various employers, government organisations, training providers, and industry bodies, thus formalising the artifacts and training solutions developed therein. Moreover, this document codifies the process of designing and delivering these training programs, working with collaborators and stakeholders. By codifying the process, formalising the artifacts, and 'productising' the training solutions, future participants of DSO Networks of Excellence will be able to reuse, extend, and duplicate such programs as required.

The report introduces the process via a high-level process map, and then comprises three sections:

Section A. Pilot Project Design & Delivery Process: User Guide

This section sets out, step-by-step, the process to design and deliver a training program, which can be used to inform future programs – as a 'user guide'. The approach involves heavy collaboration with employers, training providers, and other stakeholders, and is centred around the skills learners need to learn for their jobs or contexts.

Section B. Process in Practice: End-To-End Implementation

This section gives examples of the process outlined in Section A, for the Canberra Cyber Hub and Cremorne pilots. It provides a thorough breakdown of activities undertaken to design and deliver this pilot.

Section C. Pilot Case Study Library

This section provides a summary of the rationale, processes, and key activities involved in designing and delivering 7 other pilot programs.

SkillSchema Evaluation of the DSO Digital Skills Standards

The full report is located at: https://drive.google.com/drive/search?q=skills%20standards%20evaluation

Executive Summary

The current project evaluated the content of DSO Digital Skill Standards (DSS) for Cyber Security, Software Development and Analytics. The content was assessed in terms of accuracy, quality and completeness with reference to SkillSchema's granular skills database. In addition, the user experience navigating skills standards on the DSO website was evaluated.

The content of the DSS was found to represent an effective integration of various skills standards and industry feedback, with broad potential to support workplace skilling requirements. The majority of content was effectively aligned to the associated standards and clusters, however material opportunities to enhance the content were identified.

The main finding was a requirement / opportunity to standardise and simplify the process of creating cluster content and to contextualise the associated assessments. Effective DSO pilot studies have created extensive standards content, which would now benefit from rationalisation and exposure to an agreed QA process.

Recommendations include designing and applying protocols when creating future standards and applying these retrospectively to the current standards. It is also recommended to simplify the standards while creating a digitised assessment tool to facilitate contextualisation, allowing detailed standards content to be captured and utilised by employers and training providers.

SFIA Mapping to ANZSCO, SkillsTX

The full report is located at: https://docs.google.com/document/d/1PXc0Ukk76OpHyN0GfbIzWScP2XUXvd-5/edit#

Mapping Approach to SFIA

The mapping could be used in a number of ways:

- By organisations as a starting-point template for them to amend in an adopt-and-adapt style and reflect the unique mix of skills and competencies required by jobs within their organisations

- By individuals to compare their current SFIA-based skills profile against a SFIA-based job description or role profile, in order to support career choices and development planning. Using SFIA as a common language allows the individuals to perform gap analysis, making it easier to identify which skills and competencies, and at which levels, need to be targeted for development actions.

- As a number of universities and training providers have mapped their courses to SFIA, this mapping can be used to select development actions which are directly aligned to identified skill gaps and development priorities.

- Recruitment Advisors, Learning and Development specialists, Human Resources personnel, and Line Managers, can use these definitions generally throughout the stages of the skills management cycle, including for benchmarking, recruitment and development activity.

Approach

The mapping approach used aims to highlight the most common skills for each occupation, and the levels at which these skills and competencies would typically be practiced during the performance of jobs and roles within these occupations. It cannot be thought of as a complete and exhaustive list of all the skills and competencies required, as the same job or role within different teams or organisations will undoubtedly vary and require a slightly different mix of skills – based on the operating model, industry context, underlying technologies and methodologies, as well as the size and structure of the organisation.

Responsibility Attributes and Professional Skills

ANZSCO provides a list of tasks for each unit group, and this list has been used to highlight relevant SFIA descriptions, both for the generic responsibility attributes (Autonomy, Influence, Complexity, Knowledge and Business skills) and the professional skills, and the level or levels of these elements.

The ANZSCO content has been used to confirm the range of generic responsibility attributes and levels applicable for each occupation, and also to identify SFIA professional skills and the range of levels applicable. Where a range of levels are shown, this demonstrates that the occupations may require those performing these tasks to practice at one or more of the listed levels. Some jobs in specific companies may require additional skills or the performance at high levels than indicated, so the list provide should be seen as a common starting point for consideration when defining role profiles or job descriptions for an organisation. Any skills and levels identified as 'required' are those which are likely to be absolutely required for the performance of these occupations at an acceptable professional level in a working environment. Skills and levels identified as 'desirable' should be viewed as optional, and are presented for consideration when using this document to help inform the construction of role profiles or job descriptions for an individual organization.

Skill Levels

ANZSCO contains a 5-level skill structure:

- **Skill Level 1**

    - Occupations at Skill Level 1 have a level of skill commensurate with a bachelor degree or higher qualification. At least five years of relevant experience may substitute for the formal qualification. In some instances, relevant experience and/or on-the-job training may be required in addition to the formal qualification.

- **Skill Level 2**

    - Occupations at Skill Level 2 have a level of skill commensurate with one of the following:

        - NZQF Diploma or
        - AQF Associate Degree, Advanced Diploma or Diploma.
        - At least three years of relevant experience may substitute for the formal qualifications listed above. In some instances, relevant experience and/or on-the-job training may be required in addition to the formal qualification.

- **Skill Level 3**

  - Occupations at Skill Level 3 have a level of skill commensurate with one of the following:

    - NZQF Level 4 qualification
    - AQF Certificate IV or
    - AQF Certificate III including at least two years of on-the-job training.

  - At least three years of relevant experience may substitute for the formal qualifications listed above. In some instances, relevant experience and/or on-the-job training may be required in addition to the formal qualification.

- **Skill Level 4**

  - Occupations at Skill Level 4 have a level of skill commensurate with one of the following:

    - NZQF Level 2 or 3 qualification or
    - AQF Certificate II or III.

  - At least one year of relevant experience may substitute for the formal qualifications listed above. In some instances, relevant experience may be required in addition to the formal qualification.

- **Skill Level 5**

  - Occupations at Skill Level 5 have a level of skill commensurate with one of the following:

    - NZQF Level 1 qualification
    - AQF Certificate I or
    - Compulsory secondary education.

  - For some occupations a short period of on-the-job training may be required in addition to or instead of the formal qualification.

  - In some instances, no formal qualification or on-the-job training may be required.

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