

Case for Change

ICT Information and Communications Technology Training Package

- Project 21A | In-demand Technologies
- Project 21B | Refresh Training in ICT

February 2021

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Administrative information

Name of Industry Reference Committee (IRC)

Information and Communications Technology IRC

Name of Skills Service Organisation (SSO)

PwC's Skills for Australia

Name of Training Package

ICT Information and Communications Technology Training Package

Name of Projects

21A) In-demand Technologies

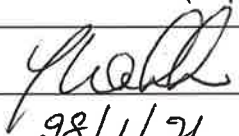
21B) Refresh Training in ICT

This Case for Change was agreed to by the IRC.

Name of Chair:

Yvonne Webb (Deputy Chair and acting Chair)

Signature of Chair:



Date:

28/1/21

This Case for Change was established as a result of initial research and consultation for the Information and Communications Technology (ICT) IRC.

The Case for Change

This Case for Change is proposed in response to the industry drivers for change outlined in Table 1 below.

Table 1 Industry drivers for projects included in Case for Change

Project	Industry drivers
21A) In-demand Technologies	<p>A. Advances in applied emerging technologies,¹ including in advanced data science, artificial intelligence, augmented and virtual reality, and blockchain are presenting significant opportunities for learners, businesses and the broader economy.² Since the onset of the Coronavirus (COVID-19) pandemic, Australian employers are increasingly seeking employees with skills in applied emerging technologies to fulfil the requirements of in-demand jobs like artificial intelligence specialists, blockchain solution architects and robotics software engineers – all of which were ranked in the top fifteen emerging jobs in LinkedIn's 2020 Emerging Jobs Report Australia.³ Research by the Australian Computer Society also supports this, finding that Australia will require 200,000 new technology workers by 2023, where nearly 20 per cent of these jobs will be in data science roles.⁴ This highlights the need for new training products that equip learners with skills and knowledge required to keep up with technological change in the ICT industries.</p> <p>The increased need for individuals with skills and knowledge in applied emerging technologies has also been reflected across other industries, such as through the use of artificial intelligence to diagnose skin cancer⁵ and the automation of motor vehicles by 2024.⁶ These skills are only expected to rise in demand as technology advances. Increased demand for ICT skills has also been reflected in research by the Australian Computer Society, where the top five most-requested ICT occupations were all related to applied emerging technologies, including cloud engineers, cyber security professionals, full stack developers, data science and machine learning professionals, and quantum computing professionals.⁷ This was further supported by research into job recruitment trends by Hays Plc,⁸ which indicated that ICT skills have particularly grown in demand since the onset of COVID-19 and subsequent use of additional virtual working models that require scalable, reliable and secure technologies. This conveys industry's need for new training product solutions to prepare learners for in-demand ICT skills and knowledge.</p> <p>B. High average employment growth is projected across many current and emerging ICT occupations, which are forecasted to increase by 20.2 per cent from May 2019 to May 2024.⁹ Research indicates that the top five ICT occupations with the greatest projected employment growth include: ICT support and test engineers (28.9 per cent), computer network professionals (26.2 per cent), ICT network and support professionals (24.5 per cent), software and applications programmers (23.4 per cent), and business and systems analysts and programmers (20.2 per cent),¹⁰ which are supported by the proposed new units of competency. Developments in applied emerging technologies and broader applications of ICT have also increased demand for employees with updated ICT skills and knowledge to be equipped for changing ICT job-roles. According to GradAustralia, rapid technological change has already created new career paths for</p>

¹ Note: Where there are references to "emerging" technologies in this Case for Change, PwC's Skills for Australia note that these technologies are "emerging" in the sense that they are approaching mass adoption in workplaces across the economy.

² Department of Industry, Science, Energy and Resources. 2018. "Australia's Tech Future: Delivering a Strong, Safe and Inclusive Digital Economy". <https://www.industry.gov.au/sites/default/files/2018-12/australias-tech-future.pdf>.

³ LinkedIn. 2020. "2020 Emerging Jobs Report". https://business.linkedin.com/content/dam/me/business/en-us/talent-solutions/emerging-jobs-report/AUS-TOP-EMERGING-JOBS_compressedRevised.pdf.

⁴ Australian Computer Society. 2018. "The Best ICT Jobs to Have In 2023". Information Age. <https://ia.acs.org.au/article/2018/the-best-ict-jobs-to-have-in-2023.html>.

⁵ "AI To Diagnose Skin Cancer". 2020. Information Age. <https://ia.acs.org.au/article/2020/ai-to-diagnose-skin-cancer.html>.

⁶ "Apple To Start Making Cars By 2024". 2020. Information Age. <https://ia.acs.org.au/article/2020/apple-to-start-making-cars-by-2024.html>.

⁷ "Top 5 IT Skills Employers Want In 2021". 2021. Information Age. <https://ia.acs.org.au/content/ia/article/2020/top-5-it-skills-employers-want-in-2021.html?ref=newsletter>.

⁸ "The Most In-Demand Skills For 2021". 2021. Hays.Com.Au. <https://www.hays.com.au/blog/insights/skills-in-demand-2021>.

⁹ "Employment Projections: Occupation Projections - Five Years To May 2024". 2019. Lmp.Gov.Au. <https://lmp.gov.au/default.aspx?LMIP/GainInsights/EmploymentProjections>.

¹⁰ Ibid

Project	Industry drivers
	<p>learners to consider that did not exist just ten years ago, including artificial intelligence specialists, blockchain engineers and data scientists.¹¹ It is expected that organisations will only continue to increase reliance on these technologies to conduct business, synthesise and share information, and enhance cybersecurity.¹²</p> <p>C. Small businesses are increasingly facing pressure to adopt digital and online solutions to remain competitive in the current economic environment. Many small businesses have been transitioning to hybrid business models, a shift fast-tracked by the impacts of COVID-19, to remain viable, adjust to changing expectations of retailing online and connect with broader potential customer bases. Increased working from home arrangements for professionals have also accelerated the adoption of digital technologies and processes, which has changed the ongoing structure of the labour market beyond small businesses.</p> <p>D. Consumers are displaying greater acceptance of electronic commerce as a viable and safe alternative to traditional brick-and-mortar retailing and are increasingly expecting online delivery options and solutions.¹³ This change in consumer behaviour, in combination with rapid growth in internet and broadband penetration, has prompted a 17.3 per cent growth in online shopping in Australia from 2015 to 2020¹⁴ and a 7.1 per cent (1,170 small businesses) growth in Australia's August 2020 quarter for non-store retailing.¹⁵ This amplifies the need for small business owners to adopt skills and knowledge needed to successfully operate in the current economic environment.</p> <p>E. Additional digital skills are required for small businesses to successfully operate in the continually changing economic environment, including applying emerging technologies and practices, developing e-commerce strategies, assessing cybersecurity risks and monitoring contract performance. These skills are needed in all small-business industries, including Construction, Professional, Scientific and Technical Services, and Accommodation and Food Services, and many others.</p>
21B) Refresh Training in ICT	<p>A. Given the rapid rate of technological development, many areas of ICT now require different skills and knowledge, such as in database technologies, game development, networking and other ICT sectors.¹⁶ Since the ICT industry is only going to continue advancing,¹⁷ it is critical that available training reflects current industry trends so that Australia's workforce is equipped with in-demand ICT skills. This is particularly essential in the ICT industry where 200,000 new technology jobs are expected by 2023,¹⁸ placing pressure on employers to quickly source work-ready ICT talent. This forecast is supported by the Department of Education, Skills and Employment's Jobs Hub portal, where ICT occupations, including software and applications programmers, computer network professionals, database and systems administrators, and ICT security specialists, are currently among the highest number of jobs advertised online across Australia.¹⁹ Large student organisations, such as GradAustralia, are also advertising the importance of up-to-date skills for graduates in ICT occupations, including knowledge of coding skills in more than one language, data analysis skills and transferable project</p>

¹¹ "10 Careers That Didn't Exist 10 Years Ago | Gradaustralia". 2021. Gradaustralia.Com.Au. <https://gradaustralia.com.au/career-planning/10-careers-that-didnt-exist-10-years-ago>.

¹² Ibid.

¹³ "Online Shopping in Australia". 2020. Ibisworld.com. <https://www.ibisworld.com/au/industry/online-shopping/1837/>.

¹⁴ Ibid.

¹⁵ 8160.0.55.005 - Quarterly Counts of Australian Businesses, Experimental Estimates, 2019 - 2020. 2020. abs.gov.au. <https://www.abs.gov.au/ausstats/abs@.nsf/Latestproducts/8160.0.55.005Main%20Features102019%20-%202020?opendocument&tabname=Summary&prodno=8160.0.55.005&issue=2019%20-%202020&num=&view=>.

¹⁶ "13 Types Of Graduate Jobs In The Tech Industry | Gradaustralia". 2021. Gradaustralia.Com.Au. <https://gradaustralia.com.au/career-planning/13-types-of-graduate-jobs-in-the-tech-industry>.

¹⁷ Australian Computer Society. 2018. "The Best ICT Jobs to have in 2023". Information Age. <https://ia.acs.org.au/article/2018/the-best-ict-jobs-to-have-in-2023.html>.

¹⁸ Ibid.

¹⁹ "Jobs Hub | Jobs in your Location". 2020. api.dynamic.reports.employment.gov.au. https://api.dynamic.reports.employment.gov.au/anonap/extensions/Regional_Opportunities/Regional_Opportunities.html.

Project	Industry drivers
	<p>management skills.²⁰ This illustrates the need for industry-ready training solutions within the ICT industry.</p> <p>B. There is an increase in demand for short, accessible training solutions that enable learners to rapidly upskill and reskill for industry relevance. According to the Organisation for Economic Co-operation and Development (OECD),²¹ training such as micro-credentials, digital badges and industry-recognised certificates have considerably expanded and are being used to bridge learning gaps between traditional higher and vocational education programmes, and occupational requirements. For example, Telstra Australia partnered with the University of Technology Sydney (UTS) in 2020 to address post-COVID-19 ICT skills gaps by delivering micro-credentials in applied emerging technologies.²² UTS assisted Telstra Australia in developing training solutions to equip staff with skills and knowledge in data analysis, artificial intelligence and machine learning – all of which are in-demand ICT skills. Despite this clear industry skills need, the current ICT Training Package does not provide clear, stackable pathways for learners to rapidly upskill or reskill in essential cross-sectoral digital skills. This means that learners often rely on vendors, such as Amazon Web Services, Cisco, Google and Microsoft Australia to complete vendor certifications to rapidly and flexibly acquire new ICT skills and knowledge.²³ However, such external vendor training products do not explicitly align with nationally endorsed ICT training products and therefore, cannot provide credit towards qualifications.</p>

²⁰ "10 Essential Skills For Graduates In Tech | Gradaustralia". 2021. Gradaustralia.Com.Au. <https://gradaustralia.com.au/career-planning/10-essential-skills-for-graduates-in-tech>.

²¹ Organisation for Economic Co-operation and Development. 2020. "The Emergence Of Alternative Credentials | OECD Education Working Paper No. 216". [https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=EDU/WKP\(2020\)4&docLanguage=En](https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=EDU/WKP(2020)4&docLanguage=En).

²² "Teaming Up With Telstra To Address Post-COVID Skills Gap". 2020. Uts.Edu.Au. <https://www.uts.edu.au/news/tech-design/teaming-telstra-address-post-covid-skills-gap>.

²³ "Certification and Continuing Education Programs | LinkedIn Learning Solutions". 2020. learning.linkedin.com. <https://learning.linkedin.com/certification-and-continuing-education-programs>.

Recommended changes

The changes outlined in Table 2 and 3 are recommended in response to the industry drivers and feedback received from stakeholders. Please see *Appendix A – Training Package components to change* and *Appendix B – Information on proposed new training products* for further detail on the recommended changes.

Table 2 Recommended changes to ICT Training Package by project

Project	Recommended changes
21A) In-demand Technologies	<p>1. Create 36 new units of competency related to applied emerging technologies</p> <p>The current ICT Training Package does not include native units of competency related to some in-demand technologies, such as artificial intelligence, blockchain and advanced data science. These new units of competency will address the need to provide skills and knowledge required for learners to enter jobs incorporating applied emerging technologies. (<i>Driver A, B, Issue I</i>).</p> <p>2. Package the 36 newly proposed units of competency above to create 14 new skill sets that provide a pathway to in-demand roles across in-demand technologies</p> <p>New skill sets related to in-demand technologies, such as advanced data analytics, artificial intelligence and blockchain, will address the need for current and future skills and knowledge requirements for in-demand ICT jobs. This will make the ICT Training Package more fit-for-purpose and able to support learners and industry stakeholders in preparation for the increase in new technology workers by 2023 as noted in Table 1. (<i>Driver A, Issue I</i>).</p> <p>3. Create one new skill set that builds on the units of competency in the existing ICTSS00108 Digital Skills for Small Business Skill Set</p> <p>The development of an <i>Intermediate Digital Skills for Small Business Skill Set</i> is proposed to build on the skills and knowledge in the <i>ICTSS00108 Digital Skills for Small Business Skill Set</i>, which was released on training.gov.au in October 2020. The <i>ICTSS00108 Digital Skills for Small Business Skill Set</i> was approved by the Australian Industry and Skills Committee (AISC) Emergency Response Sub-Committee to support small businesses to securely manage online information, build simple web pages, provide online customer service and develop a social media presence. Industry stakeholders have emphasised that additional digital skills are needed to viably operate in the current economic environment, including evaluating emerging technologies and practices, developing e-commerce strategies, assessing cybersecurity risks and monitoring contract performance. Stakeholders note that these skills are needed across many small-business industries, including Construction, Professional, Scientific and Technical Services, and Accommodation and Food Services. The skill set is expected to comprise existing units of competency. (<i>Drivers C, D, E, Issue II</i>).</p>
21B) Refresh training in ICT	<p>1. Revise 41 units of competency for industry relevance</p> <p>Given the rapid technological change in the ICT industry over the past five years, units of competency that were last revised in 2015 will be reviewed to align skills needs and available nationally-recognised training. The units of competency suggested for revision have been selected from the following unit streams, in line with the industry drivers for change in Table 1:</p> <ul style="list-style-type: none"> • Game development; • General ICT; • Networking; • Programming and software development; • Systems analysis and design; • Systems administration and support; and • Web. <p>(<i>Driver A, Issue I</i>).</p> <p>2. Revise 30 current skill sets for superseded units of competency</p> <p>Review all skill sets that were last revised in 2016 or earlier for superseded units of competency and update as required. This will ensure potentially outdated ICT skill sets are</p>

Project	Recommended changes
	<p>updated to reflect the most up-to-date industry technology and practices in light of recent ICT Training Package updates. (<i>Driver A, Issue II</i>).</p> <p>3. Create 34 skill sets that build towards current ICT qualifications</p> <p>In response to learner needs for stackable training products to adapt to changing skills needs of employers, it is proposed that the following qualifications are analysed to create skill sets that can be 'stacked' upon each other towards attaining a qualification:</p> <ul style="list-style-type: none"> • <i>ICT40120 Certificate IV in Information Technology</i>; • <i>ICT50220 Diploma of Information Technology</i>; and • <i>ICT60220 Advanced Diploma of Information Technology</i>. <p>(<i>Driver B, Issue III</i>).</p>

Table 3 Summary of total proposed changes to training products

Proposed changes to training products	Number of training products
Existing qualifications to be revised	-
Existing qualifications to be deleted	-
New qualifications to be created	-
Existing units of competency to be revised	41
Existing units of competency to be deleted	-
New units of competency to be created	36
Existing skill sets to be revised	30
Existing skill sets to be deleted	-
New skill sets to be created	49

Industry support for change

The change proposed in projects 21A) In-demand Technologies and 21C) Refresh Training in ICT were approved by the IRC and recommended in response to industry feedback obtained through consultation. Support for these proposed changes was confirmed through consultation with subject matter experts, employers, peak bodies, industry associations and training providers across all states and territories.

The consultation approach to determine industry views and support for change included targeted stakeholder interviews, focus groups and IRC meetings. The method and scale of stakeholder consultation undertaken in building the Case for Change is outlined in *Appendix C – Stakeholder consultation method and scale*. Dissenting views raised by stakeholders are outlined in *Appendix D – Additional information regarding issues identified*. Table 4 below summarises the issues identified by stakeholders during consultation.

Table 4 Stakeholder issues

Project	Issues identified by stakeholders
21A) In-demand Technologies	<p>I) Skills and knowledge related to applied emerging technologies are in-demand but are not accurately reflected in the existing ICT Training Package.</p> <p>II) The ICT Training Package does not offer intermediate skills to help small business owners acquire the skills and knowledge required for longer-term online business models and operations.</p>
21B) Refresh Training in ICT	<p>I) Units of competency that were last revised in 2015 or earlier have not been updated to reflect the skills and knowledge required in current ICT occupations</p> <p>II) Skill sets that have not been recently revised contain superseded units of competency and therefore may not be fit-for-purpose.</p> <p>III) The ICT Training Package does not have a clear pathway for learners to stack skill sets towards attaining a qualification, causing increased reliance on external vendors for rapid upskilling and reskilling.</p>

Impact of change

Throughout the Case for Change process we have sought to gather multiple perspectives on the impacts of the proposed changes to the Training Package. Table 5 provides a description of expected impacts relative to stakeholders given the proposed changes.

Table 5 Impacts of change relative to stakeholders

Project	Stakeholder	Impact
21A) In-demand Technologies	Industry/Employers	<ul style="list-style-type: none"> Improved alignment of training products to the needs of industry and applied emerging technologies (e.g. advanced data analytics) Increased efficiency in business operations by increasing worker capability through upskilling Increased access to workers with current, relevant and in-demand skills Increased capacity for businesses to expand or transition into working with new and applied emerging technologies by upskilling workers Enhanced ability for small businesses to smoothly transition to online service delivery solutions Opportunity to reduce overheads through lesser reliance on bricks-and-mortar business models
	Registered Training Organisations	<ul style="list-style-type: none"> Enabled to deliver training that is up to date with applied emerging technologies Enabled to deliver training that is up to date with technologies used to conduct business online
	Learners	<ul style="list-style-type: none"> Increased relevancy of skills and knowledge to industry outcomes Improved employment outcomes in new and emerging ICT careers Increased opportunities for career progression by completing skill sets in applied emerging technologies Enhanced skills and knowledge to implement online service delivery solutions Increased ability to stay employed and reduce staff redundancies by establishing a stronger online presence
21B) Refresh Training in ICT	Industry/Employers	<ul style="list-style-type: none"> Increased relevancy of skills and knowledge to align with occupational requirements in the ICT industry Increased access to workers with relevant, up-to-date skills
	Registered Training Organisations	<ul style="list-style-type: none"> Enabled to deliver training that is up to date with evolving information and communications technologies
	Learners	<ul style="list-style-type: none"> Improved alignment of skill sets to qualifications Alternative pathways to attaining qualifications by completing stackable skill sets Increased access to alternative learning pathways to in-demand ICT occupations

Implications of not implementing proposed changes

The base case (the 'do nothing') option must be considered as an alternative to the proposed changes in order to enable effective comparison. This option negates the need for investment in training products, however it does not address the current state issues identified. Likely impacts of this option are outlined in Table 6.

Table 6 Implications of not implementing proposed changes

Project	Existing issue	Likely impact(s) if not addressed
21A) In-demand Technologies	<p>I) Skills and knowledge related to applied emerging technologies are in-demand but are not accurately reflected in the existing ICT Training Package.</p> <p>II) The ICT Training Package does not offer intermediate skills to help</p>	<ul style="list-style-type: none"> Increased gap between skills and knowledge acquired through ICT Training Package and industry needs (e.g. the increased need for data scientists). This may prevent the workforce from remaining industry-relevant and globally competitive.

Project	Existing issue	Likely impact(s) if not addressed
	small business owners acquire the skills and knowledge required for longer-term online business models and operations.	<ul style="list-style-type: none"> Increased risk of growing demand for technology workers not being met. A limited skills pool would place pressure on in-demand ICT skills to be sought internationally Small business owners may continue to disproportionately experience heightened uncertainty and struggle to establish an online presence. Small business owners may be exposed to avoidable cybersecurity and phishing risks due to lack of important digital skills. Redundancies among small businesses may continue to increase if business owners cannot diversify operations. Consumers may be unable to purchase required goods and services from small businesses if they cannot operate in an online environment.
21B) Refresh Training in ICT	<p>I) Units of competency that were last revised in 2015 or earlier have not been updated to reflect the skills and knowledge required in current ICT occupations</p> <p>II) Some skill sets that have not been recently revised contain superseded units of competency and therefore may not be fit-for-purpose.</p> <p>III) The ICT Training Package does not adequately support rapid upskilling and reskilling, causing increased reliance on external vendors to provide training.</p>	<ul style="list-style-type: none"> Learner employment outcomes may be negatively impacted if the skills and knowledge demanded by employers are not reflected in training. Learners may be unable to meet industry requirements, which is likely to lead to increased reliance on non-accredited learning. This may lead to the monopolisation of ICT training by large technology corporations that are not regulated by national training standards.

Timeframes

PwC's Skills for Australia anticipates that the Case for Endorsement for this project will be submitted to the AISC secretariat by October 2021.

Implementing the Council of Australian Governments (COAG) Industry and Skills Council (ISC) reforms

The table below outlines how the changes recommended in this Case for Change support the COAG ISC reforms for Training Packages.

Table 7 Alignment with the COAG ISC reforms to Training Packages

Principle	Evidence of reform being addressed
1. Ensure obsolete and superfluous qualifications are removed from the system	No project in this Case for Change includes the deletion of qualifications in the ICT Training Package. However, all current ICT Training Package qualifications were either updated or created in the last two years (2019-2020).
2. Ensure that more information about industry's expectations of training delivery is available to training providers to improve their delivery and to consumers to enable more informed course choices	A Companion Volume Implementation Guide will be released with the updated ICT Training Package, containing information about industry expectations for training delivery.
3. Ensure that the training system better supports individuals to move easily from one related occupation to another	The proposed new training products in all projects will create new training pathways, providing learners with increased opportunities to build upon their skills to attain desired occupational outcomes. Further, the proposed training product in <i>Project 21A) In-demand Technologies</i> (i.e. the <i>Intermediate Digital Skills for Small Business Skill Set</i>) is applicable to many small business industries outside the ICT industry, including in construction, professional,

Implementing the Council of Australian Governments (COAG) Industry and Skills Council (ISC) reforms

Principle	Evidence of reform being addressed
	scientific and technical services, accommodation and food services, retail trade and other small business industries. The proposed training products will also create less reliance on vendor training, which is often very specific to the requirements of third-party organisations (e.g. Cisco, Microsoft and Salesforce).
4. Improve the efficiency of the training system by creating units that can be owned and used by multiple industry sectors	Newly created ICT units of competency will be written to ensure relevancy and deliverability across multiple sectors, where applicable.
5. Foster greater recognition of skill sets	All proposed projects include the creation of skill sets that either help address industry's need for learners with skills and knowledge related to applied emerging technologies, help small businesses transition to online service delivery solutions, or build towards qualifications. The proposed creation of these training products fosters a greater recognition of skill sets and helps build alternative pathways to in-demand ICT occupations.

Appendices

Appendix A Training Package components to change

Table 8 Proposed changes to Training Package components

Training Package Code	ICT	
Training Package Title	Information and Communications Technology	
Project	21A) In-demand Technologies	21B) Refresh Training in ICT
Number of existing qualifications to be updated as part of the project	Nil NOTE: The following qualifications will see minor releases to accommodate new units of competency: ICT40120 Certificate IV in Information Technology (last major update: 2020) ICT50220 Diploma of Information Technology (last major update: 2020) ICT60220 Advanced Diploma of Information Technology (last major update: 2020). No qualifications are proposed to be subject to any major changes.	Nil
Number of existing qualifications to be deleted	Nil	Nil
Number of new qualifications to be created	Nil	Nil
Number of existing native units to be updated as part of the project	Nil	41 existing native units to be updated: ICTDMT501 Incorporate and edit digital video* ICTGAM301 Apply simple modelling techniques* ICTGAM302 Design and apply simple textures to digital art* ICTGAM303 Review and apply the principles of animation* ICTGAM419 Build a database to support a computer game* ICTICT206 Install software applications* ICTICT207 Integrate commercial computing packages* ICTICT208 Operate accounting applications* ICTICT210 Operate database applications* ICTICT302 Install and optimise operating system software* ICTICT303 Connect internal hardware components* ICTICT304 Implement system software changes* ICTICT306 Migrate to new technology* ICTICT503 Validate quality and completeness of system design specifications* ICTICT505 Determine acceptable developers for projects* ICTICT506 Implement process re-engineering strategies* ICTNWK416 Build security into virtual private networks* ICTNWK515 Develop configuration management protocols* ICTNWK531 Configure an internet gateway* ICTNWK603 Plan, configure and test advanced internetwork routing solutions*

Training Package Code	ICT	
Training Package Title	Information and Communications Technology	
Project	21A) In-demand Technologies	21B) Refresh Training in ICT
		ICTNWK604 Plan and configure advanced internetwork switching solutions* ICTNWK605 Design and configure secure integrated wireless systems* ICTNWK606 Implement voice applications over secure wireless networks* ICTNWK610 Design and build integrated VoIP networks* ICTNWK611 Configure call processing network elements for secure VoIP networks* ICTNWK612 Plan and manage troubleshooting advanced integrated IP networks* ICTNWK613 Develop plans to manage structured troubleshooting process of enterprise networks* ICTNWK615 Design and configure desktop virtualisation* ICTNWK617 Configure and manage a storage area network** ICTPRG509 Build using rapid application development* ICTSAD502 Model data processes* ICTSAD503 Minimise risk of new technologies to business solutions* ICTSAD602 Conduct knowledge audits* ICTSAD605 Elicit ICT requirements* ICTSAS203 Connect hardware peripherals* ICTSAS303 Care for computer hardware* ICTSAS304 Provide basic system administration* ICTSAS422 Scope implementation requirements* ICTSAS517 Use network tools* ICTSAS518 Install and upgrade operating systems* ICTWEB423 Ensure dynamic website security* * Last major update: 2015 ** Last major update: 2016
Number of native units to be deleted	Nil	Nil
Number of new native units to be created	36 new native units to be created: ICTAI5XX Apply blockchain to support artificial intelligence ICTAI5XX Develop artificial intelligence strategies ICTAI5XX Use machine learning, deep learning, neural networks and algorithms ICTAI5XX Use programming to support artificial intelligence strategies ICTBLC6XX Apply smart contracts to blockchain technologies ICTBLC6XX Assess cryptoassets and blockchain transactions ICTBLC6XX Develop blockchain business models ICTBLC6XX Test blockchain solutions ICTBPA5XX Automate businesses processes ICTBPA5XX Automate routine business tasks ICTBPA5XX Develop automation test strategies, plans and estimates	Nil

Training Package Code	ICT	
Training Package Title	Information and Communications Technology	
Project	21A) In-demand Technologies	21B) Refresh Training in ICT
	ICTBPA5XX Use application programming interfaces and workflow tooling ICTCLD6XX Build a machine learning model ICTCLD6XX Design hybrid network architectures ICTCLD6XX Implement best practices for cloud security ICTCLD6XX Manage big data in a cloud environment ICTDAT6XX Analyse advanced big data ICTDAT6XX Capture and store advanced big data ICTDAT6XX Present advanced big data insights ICTDAT6XX Test complex big data samples ICTDSN5XX Assess design thinking solutions ICTDSN5XX Ideate and prototype design solutions ICTDSN5XX Iterate and pitch design solutions ICTDSN5XX Test design thinking solutions ICTGAM4XX Apply gamification design processes ICTGAM4XX Assess gamification designs ICTGAM4XX Develop human-centred gamification solutions ICTGAM4XX Identify opportunities for gamification ICTIAU5XX Automate batch manufacturing industrial processes ICTIAU5XX Automate industrial processes ICTIAU5XX Develop technical change management ICTIAU5XX Use programmable logic controllers ICTXRE5XX Design and build high-performance cloud XR solutions ICTXRE5XX Develop augmented reality solutions ICTXRE5XX Develop virtual reality solutions ICTXRE5XX Monitor progress and implementation of XR initiatives	
Total number of NATIVE units of competency (X new plus Y existing) that are likely to attract training package development work costs	36	41
Number of existing skill sets to be updated as part of the project	Nil	30 existing skill sets to be updated: ICTSS00031 Application Development Specialist Skill Set ICTSS00032 Basic Application Development Programmer Skill Set ICTSS00034 Basic Web Development Specialist Skill Set ICTSS00035 Certified IT Network Enterprise, Security or Server Administrator Skill Set ICTSS00036 Certified Network Associate Technology Specialist Skill Set

Training Package Code	ICT	
Training Package Title	Information and Communications Technology	
Project	21A) In-demand Technologies	21B) Refresh Training in ICT
		ICTSS00037 Certified Network Professional Specialist - Voice and Wireless Skill Set ICTSS00038 Certified Network Professional Specialist Skill Set ICTSS00039 Certified Networking Technician Skill Set ICTSS00040 Certified Security and Architect Specialist Skill Set ICTSS00041 Certified Technician or Technology Specialist - Infrastructure Configuration Skill Set ICTSS00042 Certified Technology Specialist - Graphical User Interfaces Skill Set ICTSS00043 Certified Web Design Specialist Skill Set ICTSS00048 Hardware Technician Skill Set ICTSS00049 Internetworking Systems Coordinator - Administrator Skill Set ICTSS00050 Rich Interactive Content Specialist Skill Set ICTSS00051 System and Hardware Plus Technician Skill Set ICTSS00052 System and Network Plus Technician Skill Set ICTSS00053 Virtualisation Specialist Skill Set ICTSS00054 Visual Communications Specialist Skill Set ICTSS00055 Website Administration Specialist Skill Set ICTSS00056 Enterprise Desktop Virtualisation Specialist Skill Set ICTSS00057 Enterprise Server Virtualisation Specialist Skill Set ICTSS00059 Advanced ICT Sustainability Skill Set ICTSS00061 Basic ICT Sustainability Skill Set ICTSS00065 Civil Works – Installation of Pit and Pipe and FDH Skill Set ICTSS00066 Commercial Digital Television Antenna Systems Installation Skill Set ICTSS00068 Designer Skill Set ICTSS00069 Domestic Digital Television Antenna Installation Skill Set ICTSS00071 IP Convergence Installations for Home and SME Skill Set ICTSS00076 Wireless LAN and IP Network Installation Skill Set
Number of existing skill sets to be deleted	Nil	Nil
Number of new skill sets to be created	15 new skill sets to be created: ICTSS00117 Design Thinking Skill Set ICTSS00118 Advanced Data Analytics ICTSS00119 Artificial Intelligence Skill Set ICTSS00120 XR Skill Set ICTSS00121 Industrial Automation Skill Set ICTSS00122 Business Process Automation Skill Set ICTSS00123 Blockchain Skill Set ICTSS00124 Gamification Skill Set	34 new skill sets to be created: ICTSS00132 Entry into Technical Information Technology Roles ICTSS00133 Entry into Transferable Information Technology Roles ICTSS00134 Entry into Database Development Roles ICTSS00135 Entry into Specialised Database Maintenance Roles ICTSS00136 Entry into Gaming Development Roles ICTSS00137 Entry into Networking Roles ICTSS00138 Entry into Programming Roles

Training Package Code	ICT	
Training Package Title	Information and Communications Technology	
Project	21A) In-demand Technologies	21B) Refresh Training in ICT
	ICTSS00125 Cloud Developer Skill Set ICTSS00126 Advanced Cyber Incident Threat Detection and Prevention Skill Set ICTSS00127 Cyber Security Architecture Design Skill Set ICTSS00128 Network Security and System Protection Skill Set ICTSS00129 Cyber Crimes and Forensics Skill Set ICTSS00130 DevOps System Administration Skill Set ICTSS00131 Intermediate Digital Skills for Small Business Skill Set	ICTSS00139 Entry into Systems Administration Support Roles ICTSS00140 Entry into Web Development Roles ICTSS00141 Intermediate Technical Information Technology Roles ICTSS00142 Intermediate Transferable Information Technology Roles ICTSS00143 Intermediate Networking Roles ICTSS00144 Intermediate Programming Roles ICTSS00145 Intermediate Back End Web Development Roles ICTSS00146 Intermediate Business Analysis Roles ICTSS00147 Intermediate Cloud Architect Roles ICTSS00148 Intermediate Cloud Engineer Roles ICTSS00148 Intermediate Cyber Security Roles ICTSS00150 Intermediate Database and Data Management Roles ICTSS00151 Intermediate Front End Web Development Roles ICTSS00152 Intermediate Game Art and Design Roles ICTSS00153 Intermediate Game Programming Roles ICTSS00154 Intermediate Systems Administration Roles ICTSS00155 Intermediate Systems Analysis Roles ICTSS00156 Intermediate Telecommunications Network Engineering Roles ICTSS00157 Advanced Technical Information Technology Roles ICTSS00158 Advanced Transferable Information Technology Roles ICTSS00159 Advanced Data Management Information Roles ICTSS00160 Advanced Cyber Security Roles ICTSS00161 Advanced Full Stack Web Development Roles ICTSS00162 Advanced Further Programming Roles ICTSS00163 Advanced IT Strategy and Organisational Development Roles ICTSS00164 Advanced Systems Development and Analysis Roles ICTSS00165 Advanced Telecommunications Network Engineering Roles

Appendix B Information on proposed new training products

Table 9 Planned placement of proposed new units of competency

Project	Proposed unit of competency	Qualifications to include new unit of competency		
		New qualification	Existing qualification (Major release)	Existing qualification (Minor release)
21A) In-demand Technologies	ICTGAM4XX Apply gamification design processes ICTGAM4XX Assess gamification designs ICTGAM4XX Develop human-centred gamification solutions ICTGAM4XX Identify opportunities for gamification	N/A	N/A	ICT40120 Certificate IV in Information Technology *
	ICTAI5XX Apply blockchain to support artificial intelligence ICTAI5XX Develop artificial intelligence strategies ICTAI5XX Use machine learning, deep learning, neural networks and algorithms ICTAI5XX Use programming to support artificial intelligence strategies ICTBLC6XX Apply smart contracts to blockchain technologies ICTBLC6XX Assess cryptoassets and blockchain transactions ICTBLC6XX Develop blockchain business models ICTBLC6XX Test blockchain solutions ICTBPA5XX Automate businesses processes ICTBPA5XX Automate routine business tasks ICTBPA5XX Develop automation test strategies, plans and estimates ICTBPA5XX Use application programming interfaces and workflow tooling ICTIAU5XX Automate batch manufacturing industrial processes ICTIAU5XX Automate industrial processes ICTIAU5XX Develop technical change management ICTIAU5XX Use programmable logic controllers ICTXRE5XX Design and build high-performance cloud XR solutions ICTXRE5XX Develop augmented reality solutions ICTXRE5XX Develop virtual reality solutions ICTXRE5XX Monitor progress and implementation of XR initiatives	N/A	N/A	ICT50220 Diploma of Information Technology *
	ICTCLD6XX Build a machine learning model ICTCLD6XX Design hybrid network architectures ICTCLD6XX Implement best practices for cloud security ICTCLD6XX Manage big data in a cloud environment ICTDAT6XX Analyse advanced big data	N/A	N/A	ICT60220 Advanced Diploma of Information Technology *

Project	Proposed unit of competency	Qualifications to include new unit of competency		
		New qualification	Existing qualification (Major release)	Existing qualification (Minor release)
	ICTDAT6XX Capture and store advanced big data ICTDAT6XX Present advanced big data insight ICTDAT6XX Test complex big data samples ICTDSN5XX Assess design thinking solutions ICTDSN5XX Ideate and prototype design solutions ICTDSN5XX Iterate and pitch design solutions ICTDSN5XX Test design thinking solutions			
21B) Refresh Training in ICT	N/A	N/A	N/A	N/A

* PwC's Skills for Australia consulted with the AISC Secretariat and confirmed that adding the proposed new units of competency to *ICT40120 Certificate IV in Information Technology*, *ICT50220 Diploma of Information Technology* or *ICT60220 Advanced Diploma of Information Technology* will constitute a minor change only. This is in light of *Section 6.1 Endorsement Process* and *Section 6.2 Minor Changes* of the *Training Package Development and Endorsement Process Policy (TPDEPP)*.

Appendix D Additional information regarding issues identified

The table below outlines any dissenting views received on projects included in this Case for Change.

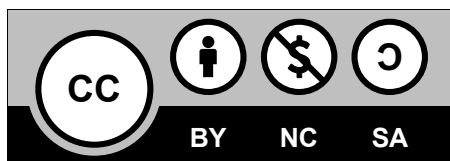
Table 12 Outstanding or dissenting views

Project	Outstanding or dissenting view
21A) In-demand Technologies	<p>While most industry stakeholders agreed with the proposed skill sets in in-demand technologies, some stakeholders questioned the industry relevance of the following:</p> <p><i>Advanced Data Analytics Skill Set:</i> Some stakeholders noted that it would be more appropriate to propose a <i>Big Data Skill Set</i>, including units of competency relating to advanced big data analysis, instead of the proposed <i>Advanced Data Analytics Skill Set</i>. However, other stakeholders noted that suitable skill sets related to big data already exist within the Business Services (BSB) Training Package, including <i>BSBSS00091 Capture and Present Big Data Skill Set</i> and <i>BSBSS00092 Manage Big Data Skill Set</i>. PwC's Skills for Australia consulted over the industry need for each skill set and concluded that a skill set in advanced data analytics would provide a more flexible training option which could be contextualised to advanced big data analysis. Comparatively, a big data skill set would offer a more specialised and less flexible training product.</p> <p><i>Blockchain Skill Set:</i> Some stakeholders noted that a skill set in blockchain technologies is required by industry, whereas others disagreed and indicated that there was no need for this skill set. PwC's Skills for Australia consulted over this in three focus groups and in one-to-one consultations, where industry stakeholders confirmed that skills and knowledge related to blockchain are highly sought after by industry stakeholders, including applying smart contracts to blockchain technologies and developing blockchain business models. Subsequently, this Case for Change includes a proposed <i>Blockchain Skill Set</i> as well as four related new units of competency.</p> <p><i>Industrial Automation Skill Set and Business Process Automation Skill Set:</i> Some stakeholders noted that automation is one of the most significant risks to the ICT industry and that therefore, skill sets related to building skills and knowledge of automated processes should be created in the ICT Training Package. However, other stakeholders noted that automation is the integration between software and hardware electronics, rather than a learned skill. PwC's Skills for Australia consulted on this and found that automated processes are typically broken into two main areas, industrial automation and business process automation. Subsequently, two skill sets have been proposed for creation in these areas, which can be further consulted over during a Case for Endorsement.</p> <p><i>Intermediate Digital Skills for Small Business Skill Set:</i> Some industry stakeholders expressed that this skill set should be housed in the BSB Training Package because the training product consists of skills and knowledge intended to support business-related stakeholders. However, other stakeholders noted that it would be more appropriate to house the proposed skill set in the ICT Training Package because it relates to ICT related skills and knowledge. PwC's Skills for Australia noted that the proposed <i>Intermediate Digital Skills for Small Business Skill Set</i> should sit in the ICT Training Package, given that the skill-development pathway on which it builds (i.e. <i>ICTSS00108 Digital Skills for Small Business Skill Set</i>) also sits in the ICT Training Package.</p> <p><i>Adding general elective units of competency to qualifications:</i> The VIC STA asserted that the addition of newly created units of competency to existing ICT qualifications ought to constitute a 'major' change to that qualification, and thus require endorsement. In line with <i>Section 6.2 Minor Changes</i> of the TPDEPP, PwC's Skills for Australia</p>

Project	Outstanding or dissenting view
	<p>consulted with the AISC Secretariat and determined that this would only consist a minor change.</p>
21B) Refresh Training in ICT	<p>Most industry stakeholders agreed that analysing specialisations-based ICT qualifications (e.g. <i>ICT40120 Certificate IV in Information Technology</i>) to create skill sets would address industry's need for shorter, stackable training products and alternative learning pathways.</p> <p>However, some stakeholders expressed concerns that this may undermine existing qualifications as a base level requirement to enter existing ICT occupations.</p> <p>PwC's Skills for Australia consulted over this issue, considering that learners frequently rely on non-accredited vendor micro credentials and qualifications to upskill and meet ICT job requirements. However, this is still noted as an outstanding issue and therefore, additional stakeholders will be consulted with to determine whether the stackable skill set model is appropriate.</p> <p>Conflicting perspectives were also noted regarding whether to create a skill set exclusively made up of core units of competency (e.g. all seven core units within the <i>ICT40120 Certificate IV in Information Technology</i>) or selected units of competency from various qualification elective groups. Most stakeholders supported the latter, noting that a skill set needs to provide vocational outcomes, which may not necessarily be met by clustering core units of competency in one skill set.</p> <p>PwC's Skills for Australia note this as an outstanding view requiring further consultation.</p> <p>The final outstanding view relates to the appropriateness of analysing lower Australian Qualifications Framework (AQF) level qualifications without a specialisation (i.e. the <i>ICT30120 Certificate III in Information Technology</i>) to create stackable skill sets. Some stakeholders raised that only specialisations-based qualifications from AQF level 4 or above require a stackable skill set model, noting that the <i>ICT40120 Certificate IV in Information Technology</i> is the lowest AQF level ICT qualification still providing entry into specialised ICT jobs.</p> <p>Other stakeholders noted that a stackable skill set model for AQF level 3 qualifications would prepare learners who decide to go on and complete an AQF level 4 qualification. While PwC's Skills for Australia note this as an outstanding view, the majority of stakeholders agreed that the stackable skill set model would be most appropriate for AQF level 4 qualifications or higher as reflected in the proposed training products in this Case for Change.</p>

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