

Administrative information

Name of IRC: Information and Communications Technology (ICT) IRC

Name of SSO: PwC's Skills for Australia

Name of Training Package: Information and Communications Technology (ICT) Training Package

Case for Change: Getting a job in Information Technology (IT)

This Case for Change was agreed to by the ICT IRC.

James Wyatt

9/05/2018



Name of chair

Date

Signature of Chair

Case for change

This case for change is proposed in response to the following industry drivers established through research.

**It is noted that the 2018 Cyber Security and Big Data Cross Sector Projects have been commissioned to produce units for generalists/ non-IT professionals, providing a holistic and industry-wide curriculum. Conversely, the cyber security and data analytics IT units proposed above will be technically specific, as needed by industry, and will not cause duplication. While the risk of overlap is acknowledged and will be proactively managed, the ICT IRC and PwC's SFA are clear on the important distinction between the requirements for the cross sector work and that of the ICT specific work.*

Industry drivers

- A. **Employment of ICT professionals is projected to increase by 12.3%** over the next five years¹. It is necessary to address skills gaps in the current VET qualifications to ensure adequate opportunities exist for students in VET pathways to support a skilled workforce in these areas.
- B. **ICT employers are demanding higher-level qualifications** in a number of ICT sub-sectors and low familiarity with VET is compounded by confusion as a result of the wide offering of VET ICT qualifications.
- C. **Skills shortages across industry are reaching critical-levels in cyber security and data analytics.**
 - Businesses increasingly operate online, triggering rapid growth in the volume of data captured, stored, analysed, and targeted. Industry has cited a critical shortage in cyber security and data analytics skills to meet their needs.
 - While the recent Cyber Security and Big Data Cross Sector projects both recommended the creation of new units – which will help to satiate demand in others sectors - those units describe general skills needed across sectors rather than the specialised skills required by ICT professionals.
- D. **Employers are seeking to develop skills internally and consider apprenticeship and traineeship pathways** as potential avenues to do this - to increase retention.
 - Apprenticeships are a useful career pathway, ensuring that learning is contextualised, relevant to employers, and linked to an occupational outcome. Even so, since 2013 apprenticeships have fallen by 52.6 percent, and as at September last year, there had been a drop of 5.6 percent to 261,925 in the preceding 12 months (NCVER).
 - Ensuring that the ICT Training Package is 'apprenticeship-delivery friendly' will help to enable the Federal Government to meet its target of 300,000 new apprenticeships, pre-apprenticeships, and traineeships under the Skilling Australians Fund. Consultation has indicated that ICT qualifications do not support apprenticeships and traineeships as well as they could, primarily due to unit structures and requirements that limit delivery options.
- E. **Growing need for IT graduates to have transferable 'enterprise' skills** due to new ways of working, such as persuasive communication, creativity, problem-solving, critical thinking and teamwork.
 - This change is driven by a number of factors: the rise of geographically dispersed teams, a growth in outsourcing, the very high rate of contract-based work in ICT, and the importance of functions like troubleshooting, co-development of IT outputs, and increasingly, direct work with other organisations.
 - At the end of 2014 for example, the number of ICT contract roles exceeded the number of permanent roles in every jurisdiction except the ACT.² Industry consultations continually emphasised the importance of a portfolio of work for ICT VET learners in this context.
 - This changing nature of work has had other impacts too. While entry-level ICT workers are unlikely to lead a 'huddle' or 'scrum', they are increasingly likely to participate in one.
- F. **Rapid and transformative technological advancements** in the following areas of IT: Platform as a service (PaaS), Infrastructure as a service (IaaS), Software as a service (SaaS), blockchain, IoT, AI, cloud computing:
 - The ICT industry is continually and rapidly advancing. Existing and complex software frameworks, IT platforms and technologies are relied upon to undertake their roles. Methodologies like DevOps (Development operations combined practices) and Agile have achieved broad industry adoption, and employers are increasingly leveraging libraries in software development, design thinking and customer experience tools, and application programming interfaces (APIs).
 - Contributing to this disruption is a suite of new technologies; blockchain, rapid growth in mobile applications, cloud and virtual computing to AR/VR/MR, AI, IoT and services (SaaS, IaaS, PaaS). This technological change requires the ICT VET Training Package to adapt.
- G. Changes to the **school curricula are equipping students with a higher-level of base IT knowledge** than in the past.

¹ Department of Jobs and Small Business, 2017 Occupational Projections - five years to May 2022, <http://lmip.gov.au/default.aspx?LMIP/EmploymentProjections>

² ICTRA (November 2014), *Job Market Analysis: ICT*, https://www.eitr.com.au/downloads/1411ICT_Job_Market_Analysis_September_October_2014.pdf

- Driven by changes to primary and secondary school curricula – particularly though the Australian Curriculum - students are gaining a basic IT knowledge-set earlier than in the past. By Year 9, 'Digital Technologies' requirements mean that students will likely have designed a user interface (such as a website or game) and modified programs involving branching, iteration and functions in a general-purpose programming language.
- The inclusion of concepts such as computational, scientific, systems and design thinking – as well as concepts like IoT – will begin to reshape the competency demands of lower-level VET ICT qualifications (particularly the Certificate I, Certificate II and Certificate III in Information, Digital Media and Technology). For example, the 'Technology Mandatory' for Year 7-8 in NSW requires student to evaluate suitability of digital devices, collect and access data, evaluate for authenticity and interpret data, as well as understanding basic coding.

Recommended changes

The recommended changes are in response to the industry drivers and the key issues identified by stakeholders . Where applicable, specific links between the recommended changes, key drivers and issues identified are indicated in brackets.

Recommended changes and rationale

Update Units of Competency

1. **Update the packaging rules and Units of Competency (UoCs) in three qualifications** - Certificate I, Certificate II, and Certificate III in Information, Digital Media and Technology - **to ensure technological relevance and limit duplication:**
 - These qualifications are often considered to be a 'gateway' into more advanced ICT VET study, and ensuring that they are adaptive and relevant is important for this purpose. **(Driver B)**
 - An update would ensure that the qualifications and underlying units of competency are technologically relevant, and that there is suitable consideration of core primary and secondary school curricula learning **(Driver C and G)**. For example, one survey response has suggested introducing a basic programming unit at Certificate II level – as well as design thinking/ presentation skills. **(Driver C)**
 - Where relevant and appropriate, the update will consider whether BSB, Big Data, Cyber Security and Teamwork and Communication Cross Sector units should be imported. **(Driver B and E)**
2. **Update 155 UoCs:**
 - A forensic refresh of these units is required to ensure that industry-standard technologies and methodologies are being accommodated within the ICT Training Package, and to ensure sufficient flexibility to accommodate emerging technologies – and that units are sufficiently focused **(Driver C and F)**. For example, UoCs should be capable of incorporating smart devices/mobile apps (industry identified that a number of existing units are designed for desktop environment only), trends in programming (industry identified that UoCs can be restrictive).
 - This is particularly relevant where syntax, knowledge or performance criteria require the use of a specific vendor product to the exclusive of other industry-accepted alternatives. **(Driver C and F)**
 - There is a need to ensure that UoCs – including assessment criteria – are 'apprenticeship' or 'traineeship-friendly' (that training providers have the flexibility to deliver units in a manner that meet employer needs) **(Driver D)**
 - Feedback consistently highlights that the enterprise and transferable skills of learner on completion are not meeting expectations. This need to be addressed in the Training Package, particularly in core UoCs. **(Driver E)**

Update or delete Qualifications and Units of Competency

3. **Update or delete 7 qualifications** (see Attachment A), with the intention of removing these qualifications or incorporating relevant units as a specialist stream in the Certificate IV in Information Technology for simplification, flexibility for learners during their qualification, and increased enrolments.
 - There is a strong tendency for learners and employers to favour vendor certifications, with employers expressing uncertainty about the differences between current vocational qualifications. **(Driver B)**
 - Four of these qualifications have low enrolments (fewer than 500 enrolments in 2016), and three have between 1255 and 2914. As the minimum qualification level of ICT employers has increased, there is opportunity to consider whether all seven qualifications serve a clear and distinct purpose.
 - Changes would increase flexibility, but retain the specialisations that exist within the current qualification split. Noting the impact of any change on delivery, this would be the subject of significant and focused consultation.
4. **Update or delete 18 UoCs** (see Attachment A), with the intention of removing or combining units where there is significant duplication, or no longer meet industry demand. **(Driver B)**
 - Potentially superfluous UoCs have been identified as those with zero to very low enrolments, and/or units that are now technically redundant. These UoCs had either less than ten enrolments in 2016, or less than an average of ten enrolments in 2014-16.

Develop new Units of Competency

5. Develop **1 new UoC for new technology** at nominal AQF 4 level **(Driver B, F and G)**
 - Industry and RTO consultations elicited strong support for units such as *ICTICT211 - Identify and use basic current industry specific technologies*, which enable flexibility and integration with new technologies (e.g. robotics, IoT devices, blockchain).
 - A potential new unit at nominal AQF 4 level would be similar in nature – though vary in level of complexity – and enable training providers to deliver new and emerging technologies to cover technology gaps in-between reviews of the ICT Training Package.
6. Develop a **new elective UoC** at a nominal AQF 4 level for portfolio work. **(Driver B and E)**
 - Industry has identified the importance of presenting finished works as evidence of an ICT VET graduate's capabilities for employment. This is particularly relevant in web-design, programming, gaming and digital media.
 - Such a unit would improve employability and include presentation of the work – such as how to publish to a

- website, upload to a remote server, and present this.
7. Develop **8 UoCs in cyber security and 1 new cyber security skill set**, with a **new ICTCYS unit sector** and specialisation within Certificate IV in Information Technology³ (**Driver B and C**)
 - A critical skills gap has been identified within the sector and the ICT Training Package. These units would form a new unit sector and specialisation, enabling ICT VET learners to specialise in cyber security.
 - These units (and subsequence skill set) would be designed to complement the 6 Cyber Security Cross Sector units currently being created, but would be focused towards prospective ICT professionals rather than generalists.
 - Noting the impact of any change on delivery, this would be the subject of significant and focused consultation.
 8. Develop **4 new UoCs in data analytics** (**Driver B and C**)
 - A critical skills gap has been identified within the sector and the ICT Training Package. They would complement the existing 8 units of competency at nominal AQF 4 or below that deal loosely with data, and the 9 Big Data Cross Sector units being created, but would be focused to prospective ICT professionals rather than generalists.
 9. Develop **1 new UoC for contemporary software development processes** (**Driver B, C and F**)
 - In software development programming training products currently, entire aspects of work are overlooked – including DevOps and methodologies.
 10. Develop **1 new UoC for cloud computing** (**Driver B and F**)
 11. Develop **1 new UoC for IT project management** and **1 new UoC for working in a virtual team** (**Driver B and E**)

Total proposed changes

See separate attachments for specific Units of Competency and Qualifications identified for the following updates (See Attachment A for more detail).

Total proposed changes to training products	Number of training products
Existing Qualifications to be updated	3
Existing Units of competency to be updated	155
Units of competency to be created	18
Qualifications to be considered for deletion	7
Units of competency to be deleted	18

Industry support for change

Industry views were captured via targeted stakeholder interviews, group teleconferences and through a public online survey. The method and scale of stakeholder consultation undertaken in building the case for change, and stakeholders' outstanding issues and dissenting views are outlined in Attachment B – *Stakeholder consultation method and scale*.

Issues identified by stakeholders

- I. The ICT industry has low VET uptake compared with other industry sectors with consultation feedback emphasising **confusion over how the large volumes of qualifications** actually differ. In fact, 53 percent of non-RTO survey respondents cited the minimum level of education attainment required for a general ICT role was between a Certificate I to Certificate IV. However, this is drastically smaller when looking at specific sub-sectors, for example just 6.25 percent of non-RTO survey respondents in the Database field said they would hire at this level, compared to 6.25 percent in Game Development, 29.4 percent in Networking, 0 percent in Programming, and 17.5 percent in Systems Administration and Support (relating to Driver B).
- II. **Cyber security and data analytics** are two areas increasingly in high demand for industry, with a high proportion of industry agreeing that there is lack of skilled IT graduates in these areas. 78 percent and 80 percent of survey respondents 'somewhat agree' or 'strongly agree' that there is a skills gap in cyber security and data analytics among ICT VET graduates. One RTO consulted even suggested the skill shortage is so pronounced they have difficulty even recruiting teachers to deliver IT courses (relating to Driver C).
- III. There is **limited coverage of cyber security and data analytics** skills in the existing Training Package – with approx. 9 units at AQF 4 or below loosely relate to security, and this lack of coverage prompted the creation of a nationally accredited 22334VIC - Certificate IV in Cyber Security (relating to Driver C).
- IV. A significant point of feedback during consultation has been that **many qualifications and units of competency are too inflexible for on-the-job delivery**, or suboptimal for an apprenticeship model. Employers are seeking to use apprenticeship- and traineeship-pathways to meet their skills gaps. This is particularly promising given that in ICT, just 48 percent of total VET learners are employed within six months of completing their training⁴ (relating to Driver D). In addition, as many as 12 distinct respondents⁵ said more flexibility and adaptability is required in the ICT training package in order "to make ICT VET graduates more 'job-ready'". As many as 83 percent of survey respondents⁶ stated that ICT VET graduates are "not job ready" or "somewhat job ready", indicating the alternate pathways or changes needed to be made to the training package.

³Please note that a Certificate IV in Cyber Security 22334VIC, was recently developed in Victoria. If the Certificate IV in Information Technology (Cyber Security) - proposed as a specialisation in this Case for Change - is ultimately endorsed, the qualifications would co-exist up until such time as the 22334VIC course faces re-accreditation (2022). At this time, considerations including a clearly identified industry need and any training product duplication would be assessed. These are implementation issues and relevant stakeholders will be engaged early to ensure that the impacts of training product changes are identified and discussed prior to the drafting process being completed.

⁴NCVER. 2017. National Student Outcomes Survey 2017. VET student outcomes: data slicer.

⁵PwC's Skills for Australia, (2018), ICT Project 2 and 3 Case for Change Survey.

⁶PwC's Skills for Australia, (2018), ICT Project 2 and 3 Case for Change Survey.

V. ICT VET learners have a variety of technical skills, but **industry has indicated that, increasingly, it also seeks employees with non-technical/ enterprise skills**. These are transferable skills like persuasive communication, problem-solving, teamwork and creativity. This is particularly pronounced in the ICT sector with 83 percent of survey respondents responding that ICT VET graduates are “not job ready” or “somewhat job ready” (relating to Driver E). Similarly, 77 percent of survey respondents ‘somewhat agree’ or ‘strongly agree’ that there is a skills gap in Agile project management among ICT VET graduates.

Impact of change

Throughout the Case for Change process we have sought to gather multiple perspectives on impacts of the proposed changes to training products. Expected impacts relative to stakeholders for this project are outlined below.

Stakeholder	Impact
Industry / Employers	<ul style="list-style-type: none"> Improved alignment of training products to the needs of industry Greater access to workers with current technical skills and broad enterprise skills Easier navigation of a simplified ICT Training Package with streamlined qualifications coupled with clear specialisations Increased efficiency in business operations and relevant skills to organisations Increased staff retention and reduced skills shortage
Registered Training Organisations	<ul style="list-style-type: none"> Removal of qualifications from training for RTOs with the qualifications on scope Increased scope to teach new technologies and methodologies to ICT Learners Clearer links between training and specific occupations
Learners	<ul style="list-style-type: none"> Less confusion when deciding on qualifications and electives due to more flexibility once started, and clearer navigation of the system due to “streams” Skills and knowledge relevant to industry demands Greater employability, job readiness and familiarity with the latest technological trends

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 between the two scenarios. This option negates the need for investment in training products, however does not address the current state issues identified. Likely impacts of this option are outlined below:

Issue	Likely impact(s) if not addressed
Lack of industry support and learner demand for ICT Training Package qualifications.	<ul style="list-style-type: none"> Continued low enrolment and completion rates for ICT qualifications, coupled with a high take-up of unaccredited training such as vendor certifications. Protracted national skills gaps and an inability to develop a locally skills workforce to meet this demand. Continued confusion over the most appropriate professional development pathway for existing workers. Heightened stress on and productivity shortfalls for employers unable to fill needed IT roles, with more resources needed to support “on the job” training

Timeframes

PwC's Skills for Australia anticipates that a Case for Endorsement will be submitted to the AISC by June 2019.

Implementing the COAG Industry and Skills Council reforms for Training Packages

The table below outlines how the changes recommended support the reforms for Training Packages:

Reform	Evidence of reform being addressed
Removing obsolete and superfluous qualifications from the training system	This project would delete a number of superfluous qualifications to streamline the ICT Training Package
Making more information available about industry's expectations of training delivery	Training package components will be written so they align with industry expectations for training delivery.
Ensuring the training system better supports individuals to move easily from one related occupation to another	Training package components will be amended to ensure they provide learners with skills transferable across industries and workplaces, as well as provide ongoing opportunities to upskill into new or different occupations. By streamlining qualifications, it is expected that industry will better recognise ICT VET qualifications.
Improving the efficiency of the training system by creating units that can be owned and used by multiple industry sectors and housing these units in a work and participation bank	ICT units will be amended to ensure they provide training which is relevant across multiple industries. Units from other training packages, such as the BSB Training Package, will be considered for inclusion in training relevant to the ICT Training Package, especially around teamwork and communication.
Fostering greater recognition of skill sets	Future training product development work will consider opportunities to develop skill sets.