



/// The digital revolution of tertiary education

a case for Micro-credentials in tertiary education

Foreword

This white paper was prepared by Audit Express, a leading internal audit and consulting firm specialises in the tertiary education sector. Audit Express works with education providers across Australia. The team at Audit Express strive to set the bar of best practice and are passionate about the role that tertiary education plays both in the Australian and global context.

This paper serves to explore the history, current context and future role that micro-credentials are set to play in tertiary education both domestically within Australia, and also on a global scale. We put forward a series of recommendations to be considered by government and policy makers.

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1. Executive Summary

Industry is facing the next digital revolution, which is anticipated to bring with it the greatest amount of change seen since the Industrial Revolution. Australian industry and employers are looking to the tertiary education system to educate the leaders and workforce of tomorrow.

There is also a need to ensure that the Australian tertiary education system is responsive to the change in how students prefer to learn in 2018. A generational rise in the use of mobile phones and social media, has led to courses needing to be delivered in smaller chunks, and with more effective use of technology to ensure learner engagement.

With the rise of blockchain and automation it is anticipated that the tertiary education sector will face an Uber/taxi level of disruption on a global scale in the next 3-5 years.

To maintain Australia's position and reputation as a global leader in tertiary education, it is imperative that the architecture, standards and funding models of our tertiary education system are relevant and responsive to the changing needs of the modern world.

This white paper serves to present the history and a current overview of micro-credentials, along with a snapshot of the current environment and landscape of the Australian tertiary education system, while also putting forward a case for the recognition of micro-credentials in the Australian tertiary education system.

The Australian Tertiary Education System

The Australian tertiary education system, in a broad sense, is a two level system, comprising Higher Education and Vocational Education and Training (VET). Higher Education is regulated by the Tertiary Education Quality and Standards Agency (TEQSA), whereas VET is regulated by a number of registering bodies including the Australian Skills Quality Authority (ASQA), The Victorian Registration and Qualifications Authority (VRQA) (note: VRQA only regulates providers that are located in, and operate only within Victoria) and the Training Accreditation Council Western Australia (TAC) (note: TAC only regulates providers that are located in, and operate only within Western Australia).

At the time of publication, government databases indicated that there were a total of 168x Higher Education Providers (HEPs), 33x TAFE / Dual Sector Providers and 4183 Registered Training Organisations (RTOs) in the Australian Tertiary Education System.

Both Higher Education and VET Providers currently offer accredited courses that are aligned with the Australian Qualifications Framework (AQF), which are spread across 10 levels ranging from a Certification 1, which is at a level 1, right through to a Doctoral Degree, which is at a level 10. VET Providers are also required to meet the requirements of Training Packages, competency standards and registration standards (VQF or AQTF).

Tertiary Education is funded by a range of sources, including:

- Federal Government loan schemes
 - Fee HELP (HEPs) and
 - VET Student Loans / VSL (VET)
- State Government funding initiatives:
 - VIC (Skills First) - NSW (Smart & Skilled)
 - ACT (Skilled Capital) - QLD (Certificate III Guarantee) - NT (Training Entitlement)
 - WA (Future Skills) - SA (WorkReady)
 - TAS (Skills Tasmania)
- Fee for Service, funded and paid directly by the student or employer.

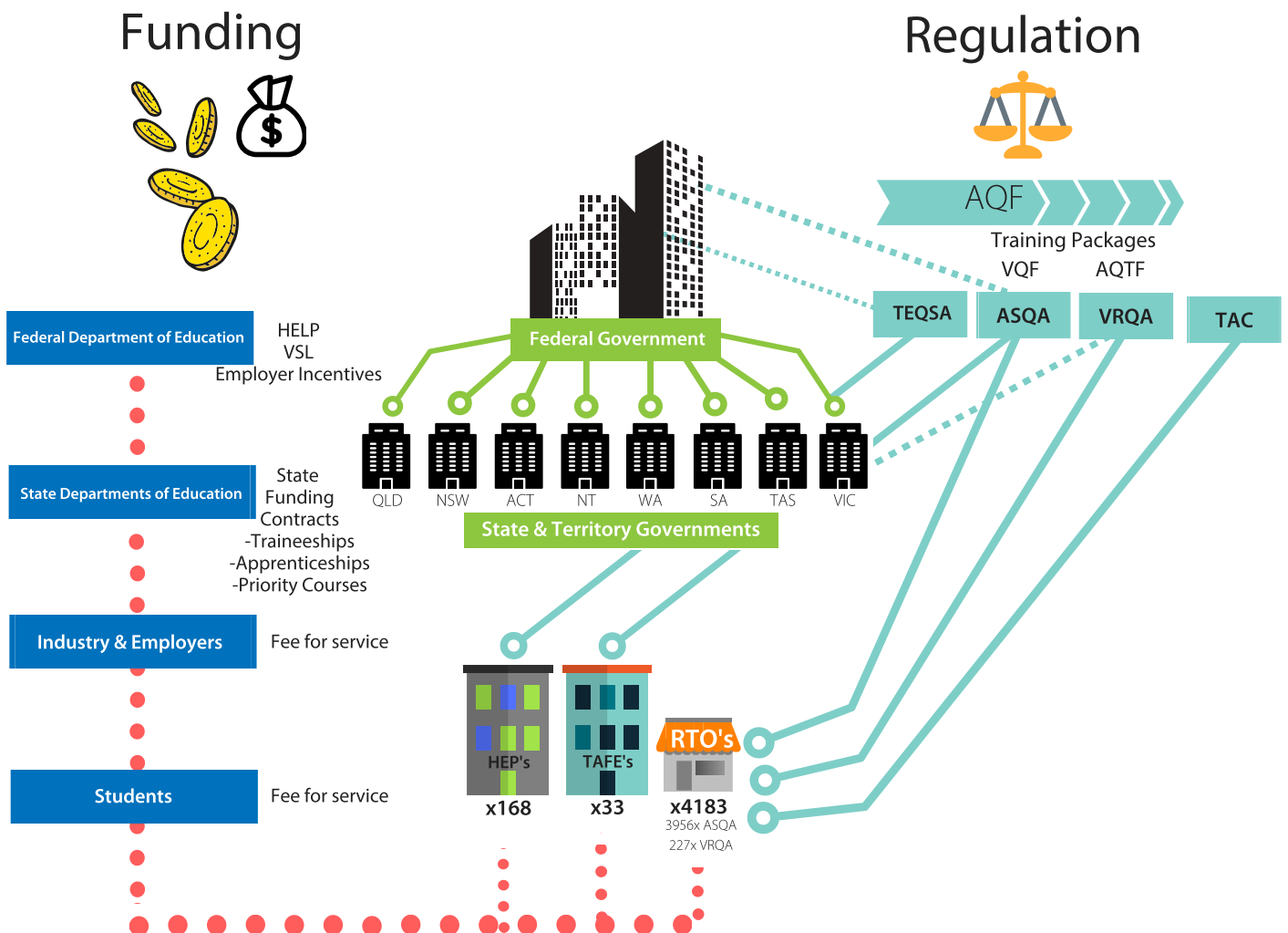


Figure 1.0 - Simplified Australian Tertiary Education Infograph © Audit Express 2018

2. History of Credentials, Badges and Micro-Credentials

Badges and various types of credentials are key features of a lifelong approach to learning. The origin of using badges and awards to recognise achievement is understood to date right back to Ancient Greece, where athletes were awarded with silver tokens and ribbons, often tied to their head, arms or legs. This is portrayed as artwork on pottery from circa 500-475 BC.

/// Credentials ///

The medical and health industries have used the method of credentialing as a way of up-skilling and re-skilling its workforce for a number of years. One of the most noteworthy and significant contributors in this space was by Dr Margretta (Gretta) Madden Styles, (1930 – 2005). Dr Styles spoke about credentialing as being a process to verify that an individual (or organisation) has met certain defined standards established by a group charged with styling and implementing these standards [1].

Dr Styles was an American nurse, author, educator and nursing school dean. She conceived and helped to establish the national standards for certifying nurses in paediatrics, cardiology and other medical specialties.



Figure 2.0 - Dr Margretta (Gretta) Madden Styles

Dr Styles' notable work includes her position as the president of the American Nurses Association from (1986-88), along with the five books and many articles that she published in medical journals.

The work of Dr Styles has been influential in the advancement of credential systems in both industry and tertiary education, with her work cited in many research and policy papers.

As innovation and technology in tertiary education has evolved and changed over the past 20 years, so has the space of non-accredited training and credentialing. This has led to a number of new and innovative approaches being taken, including the use of digital badges and micro-credentials.

/// Badges ///

Badges are also an important feature of lifelong learning, in that they are a useful tool for providing recognition of achievement, while also providing the learner with a tangible badge to validate their achievements.

Physical badges have been used for hundreds of years to symbolise alignment, attainment and achievement. Many organisations and groups around the world use badges, including the military, police force and scouting groups.

The use of digital badges is becoming more common in all levels of education, ranging from early childhood, right through to adult learners. The use of badges increases student engagement, which encourages learners to take pride in their achievements. Badges also promote teamwork and public displays of achievements. Many learning organisations such as **Khan Academy** use digital badges to recognise the learning achievements of its learners [2].

According to Shields & Chugh (2017), "digital badges are quickly becoming an appropriate, easy and efficient way for educators, community groups and other professional organisations to exhibit and reward participants for skills obtained in professional development or formal and informal learning" [3].

Digital badges have many uses. Their initial application was as a key feature of modern gaming platforms and also in the gamification of learning. The first known example digital badges was the Xbox 360 Gamerscore system, which was introduced by Microsoft in 2005. This is understood to be the first formal use of badges as an achievement system [4].

Digital badges were initially championed by Open Badges which was owned and hosted by Mozilla, which is a free software community that was founded in 1998. Open Badges were then transitioned in 2016 to IMS Global who have now released the updated standards 'Open Badges 2.0 (OBv2)' [5]. Users that were hosting their badges on the old Mozilla Backpack platform have had their badges transferred across to the Badgr Platform, which is a free, open source platform and is widely recognised as a leading platform for issuing and verifying Digital Badges [6].

Many large tech companies such as Microsoft and Adobe now use the digital badge platform Acclaim to host their badge programs and respective exams for badges to be awarded. This is likely to be the way of skills verification in the future and could very much become like the Trip Advisor of verifying a job candidates skills on their resume.

/// Micro-credentials ///

As innovation and technology in tertiary education have evolved and changed over the past 20 years, so has the space of non-accredited training and micro-credentialing.

It is understood that the term 'micro-credential' emerged post 2010/11, following the launch of the Mozilla Backpack platform. Fast forward to 2018 and the approach of micro-credentialing has become a recognised term in tertiary education across the globe and micro-credentials are now used by tertiary education providers and large employers around the world. There is a lack of definition and set parameters as to what does or does not constitute a micro-credential.

It is not uncommon in the VET sector for assumptions to be made about micro-credentials simply being a new word for Skill Sets. This misperception poses an issue for policy makers and Government.

/// Aren't Micro-credentials simply another name for Skill Sets? ///

Skill sets and micro-credentials are vastly different. Skill sets are defined in the NCVER paper titled 'Workforce skills development and engagement in training through skill sets', as:

"A grouping of one or more competencies below the level of a full qualification that meet a clients' skills need, such as a licensing or compliance requirement or specific knowledge in an emerging area. They are contained in training packages, which are the mechanism by which learning outcomes are defined in Australia's Vocational Education and Training (VET) system." [7] .

Although micro-credentials lack definition in the Australian tertiary education context, it is understood that micro-credentials are not linked or tied to training packages, nor do they exist within either the VET or Higher Education Sector. Micro-credentials are currently not accredited or formally recognised within the AQF, however are increasingly being used as an effective method of teaching by some tertiary education providers and private enterprises across the globe.

Essentially, the difference between micro-credentials and Skill Sets are that Skill Sets are contained and exist only within a training package, whereas micro-credentials are currently not accredited or recognised in the AQF, nor are they necessarily linked to an existing training package.

///Slow and outdated///

One of the arguments against Skill Sets, and a key reason for a lack of uptake up and enrolments into Skill Sets, is the rigidity and limitations of Skill Sets existing within the current framework of training packages. Training Packages themselves are widely viewed as being outdated, archaic and difficult to work with. In her article titled 'Saving TAFE: what will it take? Professor Leesa Wheelahan said that "Training packages are now 20 years old – it is time we recognised that they are bad qualifications based on bad models of

curriculum that result in rigid, one size fits all qualifications for all Australia. We have had review after review that tinkers at the edges of training packages in vain efforts to fix their many deficiencies. We need a new model of qualifications, one that places the development of the student in the context of their broad intended occupation at the centre of curriculum and pedagogy" [8]

The timeframes outlined in the Australian Industry and Skills Committee 'Training Package Development and Endorsement Process Policy' would suggest that to develop a new qualification or Skill Set, under the existing framework of training packages, it could take between 4-5 years for the entire process to take place. The process of accrediting the qualification and the time it takes, from beginning to end, is archaic and is not keeping up to date with the changes taking place in industry and the broader community.

///No funding or support for students or employers///

Another reason for the lack of interest and uptake of Skill Sets to date is that there is no funding available for the delivery of Skill Sets at a national level, nor is funding available for the delivery of Skill Sets in most states and territories. This is one key consideration that policy makers and government will need to take into account in determining a suitable framework for micro-credentials.

Any standards or framework that might be developed for micro-credentials should be flexible enough to allow the system of micro-credentials to remain agile, flexible and responsive, while at the same time embedding quality assurance and consistency, which will give the government and general public a level of confidence in the quality and consistency of micro-credentials being offered in both industry and also in tertiary education.

3. Current Environment

The Australian tertiary education system is underpinned by the **Australian Qualifications Framework (AQF)**, which is the policy for regulated qualifications in the Australian education and training system. The AQF was first introduced in 1995 and encompasses higher education, vocational education and training (VET) and the Senior Secondary Certificate of Education. A second and improved edition of the AQF was released in 2013. Prior to the release of the AQF in 1995, qualifications were underpinned by the **Register of Australian Tertiary Education (RATE)** from 1991-1994. Before the 1995 version of the AQF, there were the **Guidelines for the National Registration of Awards in Advanced Education** from 1983-1991, and prior to this by the **Nomenclature and Guidelines for Awards in Advanced Education, Australian Council on Awards in Advanced Education**. These were the first set of guidelines and existed from 1972 - 1983. [9]

Since the last review of the AQF between 2009–2011, there has been an increase of technological advances in education delivery, along with an increase in the uptake of non-accredited training, such as micro-credentials and changes to standard international practice related to qualification frameworks.

In June of 2018, the Federal Minister for Education and Training, Senator Simon Birmingham, and the Assistant Minister for Vocational Education

and Skills, The Hon Karen Andrews MP, announced a full review of the AQF. The review was timely and welcomed by key stakeholders in the Tertiary Education Sector. The intent of this review is to ensure that the AQF continues to meet the needs of students, education providers and employers.

In a joint release, the Ministers stated that “The review will also look at the changing qualification and course offerings of institutions, such as the rise of micro-credentials”. The AQF review is being chaired by Professor Peter Noonan from the Mitchell Institute. As part of this review, an expert panel has examined other qualification frameworks from around the world, along with changes in the nature of work and developments in the Australian Tertiary Education Sector. [10]

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The announcement of the AQF review has led to a number of key tertiary education stakeholders publishing their own research and papers outlining their own policy position on the future of tertiary education, and the importance of recognising micro-credentials in the Australian

tertiary education system including, the **Victorian TAFE Association (VTA)**, **Price Waterhouse Cooper (PwC)** and the **Australian Technology Network of Universities** and the **Business Council of Australia (BCA)** and the **Australian Industry Group (AIG)**.

///Other papers that speak of the need for, and in support of recognising micro-credentials in the Australian Tertiary Education System///

In a paper released by **KPMG** titled 'The importance of TAFE to Victoria's prosperity', a fourth industrial revolution is described, and is said to bring with it "collision of related technologies such as automation, artificial intelligence, machine learning, Blockchain, the internet of things, brain enhancement, additive manufacturing, synthetic biology and data analysis — will fundamentally change the nature of jobs". They cited the research of **McCrindle (2014)** who said that: "Employees entering the workforce today might have as many as five different careers, and make up to 17 changes in employer across their working lives". [12]

The **Victoria TAFE Association (VTA)** has also released its own policy platform, which focusses in on micro-credentials, and makes a number of specific recommendations including [13]:

Recommendation 3 - Boosting innovation and productivity in Victorian businesses Keeping Victorian workers productive and competitive

3.1 That the Victorian Government work with the TAFE Network to pilot self accrediting authority for approved TAFE institutes to develop niche courses and micro-qualifications for employers in priority industries, with scope for further development and more extensive roll-out into the future.

3.2 That Victoria's VET funding framework is expanded to fund niche courses and micro-qualifications for lifelong learning in priority industries and industries in transition requiring reskilling support.

We support a number of the VTA Policy Platform recommendations, however we believe that the recommendations should not be limited to TAFE organisations, and that these recommendations should be accepted and implemented sector wide.

The **Business Council of Australia (BCA)** have released a paper titled: 'FUTURE PROOF - protecting Australians through education and skills'. This paper is solid and makes a number of detailed recommendations, including the need to create a lifelong learning culture along with a proposal for the government to establish a single funding model that is sector-neutral, while also calling on government to develop a methodology to determine subsidy rates for funding the delivery of training [14].

The recommendations made by the BCA are measurable, achievable and sound. If implemented, these recommendations would set up the necessary framework and structures to recognise micro-credentials within the AQF.

In the paper 'Lifelong Skills - equipping Australians for the future of work', the authors, **Price Waterhouse Cooper (PwC)** and the **Australian Technology Network of Universities** [15], outline a strong focus on the need for both reskilling and upskilling. The current funding systems around Australian jurisdictions only support upskilling, and are limiting as funding is only linked to the completion of a full AQF qualification.

The PwC paper also talks about the fact that Australia needs educational pathways that are flexible and modular, before going on to highlight that:

- Micro-credentials are a popular example of low cost, short courses that are certified, but do not lead to a formal qualification.
- Many universities already deliver these as a pathway to formal courses and their popularity has exploded in recent years.
- Austrade have identified that capturing a share of this expanding market is priority and that this is a key pillar of its strategy for Australia to cater to 10 per cent of the global online education market.

Other publications, such as that of Professor Stephen Parker from KPMG, said that: "the possibilities for micro-credentialing are that students might take many more small modules, perhaps a badge or certificate which would be validated by blockchain technology, which might then be validated by employers. This could be a disruptive trend, so the 3-4 year bachelor degree might give way to micro courses" [16].

/// Micro-credentials transforming tertiary education ///

Micro-credentials are already causing disruption and transformation to traditional models of tertiary education. Across the globe we have seen an emergence of large multi-national universities establishing entire faculties that are dedicated to developing and scaling micro-credentials. Universities appear to be using micro-credentials to offer both non-accredited taster courses, and also to deliver accredited courses in 'blocks' or 'chunks', which can be used or counted towards a degree, an example of this is the micro-credential faculty of Deakin University [17].

This is a key reason that the government must address micro-credentials within the AQF. For the sake of maintaining and assuring the ongoing quality of the Australian tertiary education sector, it is crucial that a definition and some parameters are set with regard to the offering of micro-credentials within the Higher Education and VET context.

/// Might Blockchain be the solution? ///

With a rise in the global and virtual workforces, issues of authentication, security and verification arise. In its 2030 report, HolonIQ unpack the solutions that will be provided in this space by distributed ledger technology such as blockchain [18].

Governments will need to look closely at emerging technologies, such as blockchain to provide solutions to the issues raised in this paper.



4. Decline of confidence in Tertiary Education

Over the past few years both VET and Higher Education have faced a number of scandals, rorts and reports of poor quality, leading to an overall decline in confidence in the Tertiary Education System. In many cases both VET and Higher Education are seen as not responsive to the needs of industry, and are far too slow to respond to innovation and changes being faced by industry. This presents a big challenge for the sector, and micro-credentials are tipped to be a big part of the solution.

The VET Sector has been plagued by the scandals of VET Fee Help (VFH) and VET Student Loans (VSL). The poorly managed VFH scheme saw loans rise from just \$26 million in 2009 to \$2.9 billion in 2015. Recent reports indicate that Australia's student loans Ombudsman has been swamped by more than 5000 complaints in just nine months from people who claim they were enrolled without any knowledge of doing so, or of substandard VET courses with the training providers that they were enrolled with [19].

The VET sector has also faced a range of other issues over the past few years, including the collapse of a number of large privately owned and publicly listed training providers including Vocation, Careers Australia and the Australian Careers Network (ACN), which combined left

more than 40,000 students displaced and hundreds of employees without a job when they shut their doors [20] [21] [22].

However it is not only privately owned and publicly listed training providers that have had scandals and allegations of wide-spread rorting. There have also been several examples of public providers being brought into disrepute, including TAFE South Australia [23] and a two Victorian TAFEs which were subject to an Independent Broad-based Anti-corruption Commission (IBAC) inquiry titled 'Operation Lansdowne' [24].

The Higher Education sector has also had its fair share of drama with concerns raised about the relevance and value of university degrees, with high rates of graduates unable to gain employment after completing their studies [25]. There are also reports of students dropping out of their courses in record numbers [26].

Several reports have also raised serious concerns about university students being exploited by professional pathway programs offered by universities and employers, whereby students pay a fee to gain on-the-job experience as an intern. This work experience is often unpaid and not meaningful or relevant to the course of study undertaken by the student [27].

The root cause of many concerns that are raised in this paper in many cases relates to the appropriateness of the courses that students have been enrolled into. This is particularly the case in the VET Sector where the Federal and State governments fund students to enrol into priority courses, traineeships and apprenticeships. Far too often students may only need to undertake a few focussed units of study, however students are either forced or given no other choice other than to enrol into a full qualification. This is often because the training provider does not offer the option of customising its training programs, or because the full qualification is eligible for funding, whereas the handful of units if delivered as stand-alone units, would not be eligible for funding. This is also often the case with both traineeship and apprenticeship enrolments.

One reason that industry has such a lack of confidence with the current model is that in many cases, the employer doesn't need its employee (the student) to undertake a full VET qualification in order to have the required skills and knowledge to perform their job role. An example of this would be the job role of a Barista, whose primary job role is to make coffee, serve customers, perform financial transactions using a point of sale device and also to perform cleaning duties.

Training a student in the skills for the defined job role of a Barista would certainly not require a full qualification, such as the (SIT20316) Certificate II or (SIT30616) III in Hospitality, and with the exception of teaching licensed and regulated skills such as food handling and food safety, many from the hospitality industry would argue that accredited units of competency are not necessary for teaching the skills required for a job role such as a Barista.

In the instance of developing a course to teach barista skills, a micro-credential would enable a more customised and more appropriate level of learning than an accredited qualification,

skill set or stand-alone accredited units of competency.

In its Servicing Our Growth paper, the Tasmanian Tourism and Hospitality Taskforce recommend that the annual Tourism and Hospitality Workforce Development Plan should "establish, in conjunction with Government, KPIs for non-accredited training to measure its success and value" [28].

Employers and the general public have also developed a lack of confidence in the assurance of quality in both Higher Education and VET following many reports of qualification fraud, including a number of instances whereby the VET regulator ASQA has issued rogue employees of VET providers with infringements of more than \$75,000 for falsely issuing qualifications [29]. There are also reports of the existence of an entire black market where buyers can purchase fake qualifications and degrees online. One business was alleged to offer qualifications and degrees from 42 universities and 53 TAFEs around Australia [30]. Blockchain technology and digital certification offer a real solution to both issuing and verifying qualifications.

The Australian Federal and State Governments have a wonderful opportunity to work together with a joint focus on taking the Higher Education and VET sectors to another level. Government and policy makers should explore the prospect of using Blockchain technology and digital certification for the issuance and verification of Australian qualifications and degrees. Government and policy makers should also work towards recognising micro-credentials within the Australian Tertiary Education System, and also by developing a suitable framework and model for funding the delivery of micro-credentials in the Australian VET and Higher Education Sector.



5. What is the rest of the world doing?

Across the globe it is reported that there is a massive shift towards responsive, on-demand, innovative, non-accredited models of training and assessment, such as micro-credentials [31].

A number of countries have already recognised micro-credentials and embedded this into their respective qualification frameworks. Examples of this include nations such as Norway, Mexico and New Zealand, which legislated micro-credentials into its qualifications framework (NZQF) in July 2018. Other nations such as Malaysia have also identified the need to adapt its current tertiary education model to include new approaches to learning and assessment, including micro-credentials.

///New Zealand///

The New Zealand government ran a consultation and pilot program of micro-credentials in March of 2018. Following the consultation and pilot, the NZ Minister for Education signed off on an amendment to the Training Scheme rules in July of 2018. This relatively short and simply worded update made provision for "applications for, and approvals of, training schemes that are to be known as micro-credentials".

The New Zealand Department of Education has defined micro-credentials as meaning a kind of training scheme, which:

- (a) certifies the achievement of a specific set of skills and knowledge,
- (b) has a statement of purpose and clear learning outcomes,
- (c) has demonstrable support from the relevant industries, employers, or communities,
- (d) has a credit value that is from 5 to 40 credits (inclusive),
- (e) would typically not duplicate current quality assured learning approved by NZQA.

(NZQA means New Zealand Qualifications Authority).

It is understood that New Zealand is the first government to take such a formal approach to establishing a set definition of micro-credentials, and also to develop a framework for authorising, and funding the delivery of micro-credentials to its citizens [32].

Other nations that have formal frameworks for lifelong learning, including non-accredited training, such as micro-credentials include:

///**Norway**///

The Norwegian National Qualifications Framework for Lifelong Learning (NKR) was adopted by the Ministry of Education and Research in 2011 and updated in 2014. This framework consists of 7 levels covering general, vocational and higher education. There are laws and regulations on validation of non-formal and informal learning for each of the NKR levels [33].

///**Mexico**///

The Mexican Qualifications Framework (MMC) places a lot of value on the importance of lifelong learning, and recognises learning outcomes from formal, non-formal and informal learning [34].

///**Singapore**///

As a nation, Singapore takes lifelong learning so seriously that it has funded its SkillsFuture Initiative to ensure that it allows for all citizens over the age of 25 to receive \$500SGD towards lifelong learning in the form of approved courses [35].

PwC have suggested that the Singaporean model could be used in Australia to target at-risk industries or demographic groups, and that the Government should consider funding potential initiatives similar to that of Singapore's SkillsFuture Initiative which would offer individuals one-off payments toward lifelong learning courses [36].

The Australian Government is encouraged to take a deeper look at those nations who have taken a serious approach to embedding lifelong learning into their respective qualification frameworks. In particular, the approaches taken by New Zealand and Singapore may provide insight and a potential solution for Australia.

Another factor to be considered is the transferability and recognition of credentials, qualifications and awards completed both in Australian and in other jurisdictions. One approach worth considering is to align the Australian AQF with the European Credit Transfer and Accumulation System (ECTS). The ECTS is a credit system designed to make it easier for students to move between different countries within the European Union and have their credentials recognised. The European credit point approach has also been adopted by other countries outside the European Union who have referenced their qualification frameworks to the ECTS [37].

When it comes to micro-credentials, it is also important to look at what is happening in the technology space and also with large multi-national employers.

Tech companies such as Adobe have completely bypassed traditional accredited training models, rather opting for a micro-credential approach to learning, complimented by the clever use of badges as a means of recognising the skills attained by the users of its platform. More information can be found on the Adobe Acclaim Platform [38].

Microsoft also allows its users to verify their skills and to earn badges by undertaking an examination on the Microsoft Acclaim Platform [39]. By using this technology, recruiters can now instantly and with an increased level of confidence, verify the level of skills that a candidate has in a piece of software, such as Microsoft Excel [40].

Many other large tech companies are also using the Acclaim platform to enable their users to verify their skills, and to earn badges as a way of demonstrating their skills, capability and achievements. Users are also able to share the badges that they have earned on various social media platforms such as LinkedIn.

/// Accounting Software providers adopt a micro-credentials and badges ///

Providers of small business accounting software are introducing functionality at a faster pace. Previously, software developers released desktop models, where these software providers worked in year long development cycles to release new versions of their programs for release to market via physical media like Compact Disc.

In the move to online SaaS (Software as a Service) models, delivering features into online products allows for making small incremental changes to software, and for user feedback and software fixes to be implemented in much shorter cycles, sometimes immediately. Accredited training providers, often with in-house training development teams, struggle to keep up with the shorter launch cycles to create training and certification programs which meet the needs of users and industry. For software providers, maintaining their own certification programs allows them to side step existing accredited education models in order to provide skills based education on new features as they're being launched.

Many accounting software provider's training programs adopt features of digital badging with the ability to have certificates/badges displayed publicly. These micro-credentials enable accounting software organisations to educate bookkeepers and accountants in the use of their software, building a support network for end users (small businesses) who purchase the software directly. The certification programs are usually structured in several levels of ability, for example beginner, intermediate, advanced or specialist areas. These levels typically certify on smaller block of skills, depending on the level of complexity and ability. The certified users now have the ability to attract more clients or are able to demonstrate they have the skills and ability to use the software to current or future employers.



6. Recommendations

The world is changing and we are rapidly approaching the digital revolution, which is expected to disrupt most industries. Many employees will need to be upskilled, reskilled and in some cases re-deployed into new and emerging industries where new job roles are created.

Australia needs a tertiary education system that will educate and skill its workforce for the next decade. Our tertiary education system is underpinned by a qualifications framework, which is in desperate need of an upgrade to reflect the requirements and expectations of a new generation.

Our recommendations for building a qualifications framework that will meet the requirements and expectations of a skilled and capable workforce are:

1. Review the Australian Qualifications Framework, with the addition of the recognition of micro-credentials, and clearly articulate the role that they will play with addressing the skills gap of a modern and technologically advanced Australia.
2. Establish a single Commonwealth funding model for tertiary education, which encompasses Higher Education, the VET Sector, and other adult education. This model must include funding of micro-credentials and recognise their importance in quickly and effectively increasing the skills of a modern workforce.
3. Establish a recognised framework to measure the volume or weight of micro-credentials to allow for transferability and consistency in recognition of skills.
4. Include the provision of micro-credentials in the training and assessment qualifications to allow for the creation of micro-credentialing course to be developed and assessed with recognised pedagogical theories.
5. Invest in upskilling the Higher Education and VET workforces to be able to work with micro-credentials.
6. Adopting and using Blockchain technology and Digital Certification for the issuance and verification of Australian Qualifications and Degrees.



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