



Making micro-credentials work *for learners, employers and providers*

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August 2019



CRICOS Provider Code 00113B

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ISBN: 978-0-7300-0152-2 [print]

ISBN: 978-0-7300-0151-5 [digital]

Acknowledgements

Thanks to colleagues for their input and feedback:

Contributors: Associate Professors Margaret Bearman, Marcus O'Donnell and Phillip Dawson, Deakin University.

From Deakin University: Professor Elizabeth Johnson, Ms Siobhan Lenihan, Alfred Deakin Professor David Boud; Mr Matthew Brett; Mr Grant Kennett; Dr Trina Jorre de St Jorre; Professor Malcolm Campbell; Ms Wendy Palmer, Dr Asheley Jones. Also, Dr Beatrice Tucker, Curtin University; Mr James Keevy, JET Education Services, South Africa; Dr Borhene Chakroun, UNESCO.

Thanks to Ms Kim Jackman, DeakinCo., for preparation for publication.

Download a digital copy of the full report or executive summary at <http://dteach.deakin.edu.au/microcredentials/>.

Table of contents

Executive summary	i
What the world needs now: More granular certified learning	1
The trends shaping education and work	1
Engagement with formal and non-formal learning	2
The major stakeholders in formal qualification systems	2
Mapping highest educational attainment and employment	4
The challenges of formal qualifications and the future of work	8
Moving to a 21C view of learning and working	8
What's happening with micro-credentials	10
More MOOCs, more types of micro-credentials, more brand names	10
MOOC-based degrees on global platforms	12
Stronger calls for industry integration – and employers providing their own micro-credentials	13
Chaos, confusion and calls for quality assurance and governance	14
Digitised transcripts, blockchain, and calls for lifelong learning accounts	15
Calls for more systematic data collection and robust research	16
In brief: Micro-credentials now	17
Making micro-credentials work: Next steps	18
Building trust	18
Define micro-credentials	18
Clarify the standards expected in credit-bearing micro-credentials	19
Align credit-bearing micro-credentials to qualification levels	21
Consider standards that might be required in credit-bearing micro-credentials	21
Ensure robust assessment, feedback, academic integrity and governance	22
Provide a critical information summary that communicates key quality markers	24
Adding value	25
Offer micro-credentials that are strongly related to work, and lead to work opportunities	25
Price micro-credentials commensurate with time required and benefits realised	26
More precise recognition of prior learning, more learner-centred design	26
Use micro-credentials to test innovations or trigger changes to academic culture	27
Achieving sustainability	27
Manage costs by licensing, co-creating or re-using learning assets, more assessors	28
Let learners progress at their pace – and at their place	28
Ensure discoverability and machine readability	29
Future steps towards interoperable certification systems	31
Create a national credit framework	31
Create catalysts for the recognition of prior learning for mature learners	32
Implement lifelong learning accounts	33
Conclusion	35
Appendix A: Degrees on global platforms as at August 2019	36
Appendix B: Defining micro-credentials within the ISCED taxonomy of learning	38
Appendix C: Standards that might pertain to credit-bearing micro-credentials	39
Appendix D: Examples of micro-credential critical information summaries	42
References	45

Index of tables

Table 1: Educational attainment of 25–64-year-olds (2017) Percentage of adults with highest level attained	4
Table 2: Alignment of degree levels across various jurisdictions	21
Table 3: Information that could be included in a critical information summary	25

Index of figures

Figure 1: In an ideal qualifications system, policy makers manage levers to incentivise equitable benefits for the major stakeholders	3
Figure 2: Heatmap of Australian census data (2016) showing concentration of responses to highest qualification by industry, age group (20–69) for selected occupations – Part A	6
Figure 3: Heatmap of Australian census data (2016) showing concentration of responses to highest qualification by industry, age group (20–69) for selected occupations – Part B	7
Figure 4: Headline figures from a recent summary of MOOC growth; Shah (2018)	11
Figure 5: Today’s evolving micro-credential ecosystem – with major employers and more private providers offering micro-credentials	14

Glossary of terms and acronyms

Credit-bearing micro-credential	A micro-credential that earns admission or credit towards a formal qualification
Global platform	A digital platform offering access to micro-credentials and sometimes full degrees accessible by anyone in the world with an internet connection
Identity-verification	The act of verifying the identity of an assessment candidate using at least one form of evidence (one factor)
ISCED	International Standard Classification of Education managed by UNESCO
Micro-credential	A certification of assessed learning that is additional, alternate, complementary to or a formal component of a formal qualification
MOOC	Massive Open Online Course
Non-formal learning	Education that is institutionalised, intentional and planned by an education provider. The defining characteristic of non-formal education is that it is an addition, alternative and/or complement to formal education within the process of lifelong learning of individuals (ISCED).
OECD	Organisation for Economic Co-operation and Development
Post-Bachelor	Learners who have achieved a Bachelor degree
Pre-Bachelor	Learners who are on the way to achieving their first Bachelor degree
Qualifications framework	A formalised structure in which learning level descriptors and qualifications are used in order to understand learning outcomes. Qualifications frameworks are typically found at the national, regional, and international level.
Supervision	Invigilation of assessment tasks, usually examinations
Unit	A semester-length experience of learning in a degree program. Also called a module, subject or course.

Executive summary

Short courses are not new. For decades, extension courses have enabled further education, community engagement and lifelong learning. Since 2012, online short courses – often called massive open online courses (MOOCs) – have been offered by hundreds of providers, mostly universities. Employers have offered their own in-house training programs for years, and industry bodies have managed certifications and licences to practice. These various forms of non-formal learning have enabled learners – working or not, and across the lifespan – to stay engaged with intellectual challenges, and to remain current in their working lives.

The disruption coming to the world of work is well documented. Micro-credentials and other forms of non-formal learning are emerging as potential solutions to the rapid upskilling that will be required. The formal qualification system is unlikely to cope, burdened with ever-increasing cost. The very people who could use micro-credentials most – mature learners already in the labour force – are engaging less in certified learning just when certification of skills will be required more. But micro-credentials alone will not meet any nation’s future educational needs: the key opportunity is to enable formal qualification systems to evolve to include short form credentials, some of which might be credit-bearing. This report focuses on higher education qualifications, but the recommendations might equally apply to vocational education.

Micro-credentials have evolved in recent years and are lauded by many as a great idea. While many do work economically, they are also causing confusion. Rapid innovation can be exhilarating, but it can also confuse the very people who might benefit most. Stakeholders are asking:

- What is a micro-credential – and what is not?
- What do they all mean when they are all shapes, sizes, prices and brands?
- Which should **learners choose**, which should **employers trust**, and how might **providers judge** which should earn recognition of prior learning? How do **policy makers** manage quality and standards, and tap their potential to supplement formal qualification systems?

This report recommends immediate next steps to make micro-credentials work – or work better – by **building trust, adding value and achieving sustainability**.

Agree a clear definition of micro-credentials that maps to the internationally agreed ISCED definition of non-formal learning. This report proposes that:

a micro-credential is a certification of assessed learning that is additional, alternate, complementary to or a formal component of a formal qualification.

Clarify the standards expected in micro-credentials that earn admission or credit towards a formal qualification. This report proposes that:

credit-bearing micro-credentials include assessment aligned to a formal qualification level. Achievement of the learning outcomes leads to an offer of admission to or credit towards at least one formal qualification, regardless of whether or not the offer is taken up by the learner. Credit-bearing micro-credentials mirror and contribute to the academic standards required in the target qualification(s). The duration and effort required by the learner are in keeping with amount of credit earned in the target qualification(s).

To assist busy employers and learners, **concise critical information** summaries might signal key quality markers: the level of the skills certified, how they were assessed, academic integrity safeguards, academic credit earned. An appendix includes examples of what such a summary might look like.

To **add value**, micro-credentials need to provide robust evidence that they enable skills education that is strongly related to work and results in work opportunities; deliver benefits commensurate with the investment of time and money required, and lead to more precise recognition of prior learning, particularly for mature learners with extensive experience. To **achieve sustainability**, traditional and emerging providers might focus resources on assessment, and consider licensing, co-creating or re-using learning assets, training more adjunct assessors, particularly industry experts, use online or blended provision with a mix of synchronous and asynchronous experiences that enable mature learners to combine learning with work and caring responsibilities.

But micro-credentials alone will not create a future fit 21C education system. Strategic national conversations are required. Public engagement and consultation are required to ensure learners are prepared for forthcoming changes to the world of work, and why and how education will need to adapt.

To enable the current system to evolve, policy makers could engage with employers and providers to:

- Create a **national credit framework for formal qualifications**: in England, an opt-in credit framework, respecting providers' autonomy and academic judgement, clarifies that effort related to a single credit point is about ten hours of endeavour, and that a qualification is comprised of an agreed quantum of such points. Clearly mapped to the European system, this enables not just clarity of expectations but portability across borders. It also makes credit pathways easier to navigate, including those comprised of credit-bearing micro-credentials.
- **Create catalysts to recognise prior learning for mature learners** to lower the barriers to participation such as lack of time and financial constraints. Micro-credentials that validate and certify mature learners' experience have a particular role to play in this regard: credit granted for learning already achieved not only decreases learner costs but makes retention more likely. National strategies are in place to manage this issue at scale in Sweden, France and the United States.
- **Implement lifelong learning accounts**: not a new idea, but perhaps an idea whose time has arrived. Korea, China, Singapore and Europe have instigated digital systems so that their citizens can log their credentials, bank their credit, and find new opportunities for formal and non-formal learning to find or create meaningful work, or advance in their careers. With all due regard for privacy, policy makers can use such system to adjust the levers and incentivise education that meets the needs of learners, employers and providers.

National systems of this scale require strategic leadership, long term planning, policy development, good governance and substantial ongoing resources. Security and privacy issues will be of paramount concern and crucial to winning learners' confidence. Planning would need to take account of the barriers to success, and the incentives required to encourage buy in by individuals, educational providers and employers, and the lessons to be learned from implementations elsewhere.

Our 20C higher education systems have generally served us well.



Generic and professionally-oriented Bachelor and Master graduates have been prepared for engaged citizenship and professional practice.

Many more would like to participate, but the barriers include time spent working and caring for family, and money.

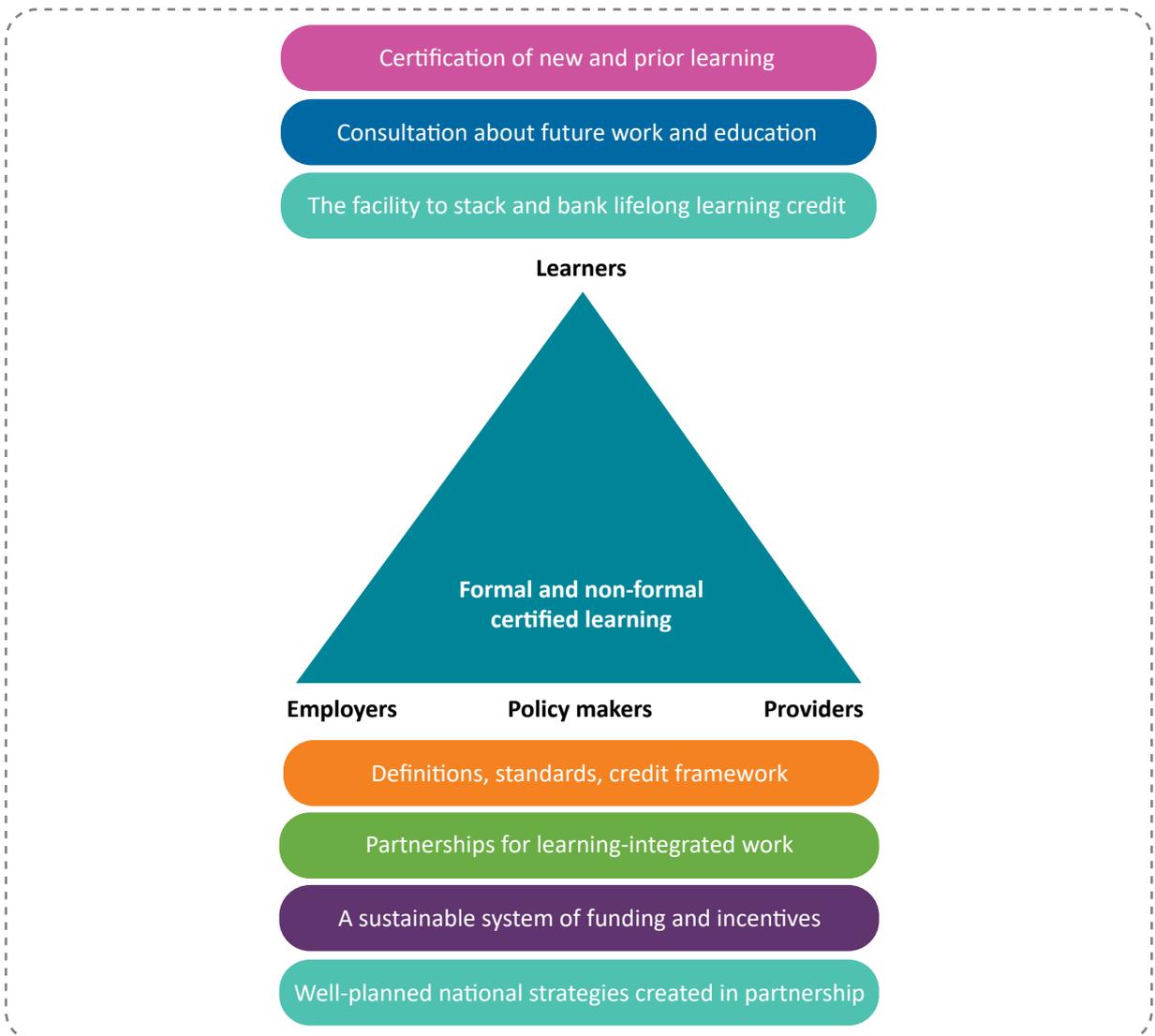


Rapid development of automation means our working and cultural worlds are on the cusp of change.

Formal qualifications will still be needed, but that system is already under stress. Micro-credentials are a tantalising opportunity, but they alone will not meet new needs.



An evolved 21C education system will include interoperability between formal and non-formal learning so that new and prior knowledge and skills can be certified – rapidly, repeatedly, accessibly.



What the world needs now: More granular certified learning

The trends shaping education and work

The OECD's *Trends Shaping Education* series explores the global megatrends affecting the future of education. In 2019, the authors focus on how to promote a culture of lifelong, as well as *lifewide* learning – equipping people with the skills, knowledge and attitudes to thrive amid the changing patterns of life and work as the digital economy unfolds (OECD 2019). Automation technologies such as artificial intelligence and robotics are predicted to change jobs, displace workers and create new occupations: by 2030, up to 14 per cent of the global workforce will need to switch occupational categories (Manyika, Lund et al. 2017).

More and better education will be required to redeploy displaced workers, and train workers in new skills. Demand for higher cognitive skills (creativity, critical thinking, complex information processing) is predicted to increase while advanced literacy and writing, and quantitative and statistical skills may plateau or even decline as technologies become more sophisticated (Bughin, Hazan et al. 2018). Changes flowing from developments in artificial intelligence will require capabilities that span the humanities, arts and social sciences and science, technology, engineering and mathematics (Walsh, Levy et al. 2019).

The education gap cannot be met by access to Bachelor or Master level degrees alone: while many professions absorb high quality and satisfied graduates, there is significant commentary about the appropriateness, effectiveness and affordability of Bachelor's and Master's degree as the only solution to upskilling. The OECD's most recent benchmarking of higher education from member countries reports concerns related to:

- **Employment:** despite growth in higher education attainment, the employment premium enjoyed by graduates has remained steady.
- **Capabilities:** around 30 per cent of graduates do not reach the literacy and numeracy proficiency skill level required to carry out moderately complex information processing tasks.
- **Costs:** in 2005–15, students increased by around 10 per cent, and total expenditure grew by more than 30 per cent; households contribute about one-fifth of the cost of higher education.
- **Completion:** on average, 40 per cent of new Bachelor enrollees complete within the expected duration and over one-fifth never complete.
- **Measures:** many national governments are working to improve performance through standardised assessment of student outcomes, for example, or large-scale surveys of student satisfaction and more granular labour market outcome information on graduates (OECD 2019).

Such findings have been echoed elsewhere: questions about the value of degrees seems to have become more strident in recent years (Gallagher 2016, Productivity Commission 2017, Productivity Commission 2017, Business Council of Australia 2018, Caplan 2018, Craig 2018, Gallagher 2018) with many predicting that future work will be very different, and today's higher educational systems are not designed to prepare graduates or validate their skills adequately for work (OECD 2018, AlphaBeta 2019, Fuerte 2019, Sigelman, Bittle et al. 2019) or for better, longer lives (Rogers, Smirl et al. 2018).

Many have raised the possibility that micro-credentials – non-formal signals of educational achievement – present an alternative solution to preparing for the future of work (Centre for New Economy and Society Insight 2019, deLaski 2019, Deloitte Access Economics 2019, Fuerte 2019, Strada Education Network 2019).

Engagement with formal and non-formal learning

However, the evidence related to voluntary engagement with non-formal education is not encouraging. Participation rates in selected OECD countries (mostly from 2012)¹ shows that on average:

- just less than 5 per cent participated in formal education only
- about 42 per cent in non-formal education only
- 9 per cent participated in both formal and non-formal
- 45 per cent participated in neither (9 per cent wanted to participate but had not)
- of those who did participate, about 21 per cent wanted to participate more, but 34 per cent had not wanted to participate.

The most frequently cited reasons for not participating were too busy at work, too expensive, childcare or family responsibilities, or the course was offered at an inconvenient time or place. More recent data from Australia paints a similar picture (between 2005 and 2016–17):

- participation in **non-formal education decreased** (from 37.9% to 25.5%)
- participation in **work-related training decreased** (from 35.9% to 21.5%)
- participation in **personal interest learning decreased** (from 8.4% in 2013 to 6.1%).²

With regard to **non-formal learning**, in 2016–17, people younger than 25 years were less likely to participate (20 per cent) in comparison to about 30 per cent for those up to 55 years. About one in five Australians reported that they wanted to participate more (particularly women). The main reasons for **not participating** were similar to OECD results:

- too much work or no time (44.7%), for those over 25, particularly men;
- financial reasons (26.1%), particularly for those unemployed;
- personal reasons (10.9%), particularly women who were more likely to cite ill health or a lack of childcare as the main barrier (14.5% compared with 5.9% for men); and
- course not available (5.7%).

The opportunity worth exploring, based on these data, is the appetite of over 25s for micro-credentials that are reasonably priced, and convenient to access (possibly asynchronously online to allow women, in particular, to juggle family responsibilities). If such micro-credentials are aligned to formal qualification levels, and robustly assessed, then they may be a mechanism to enable working learners to continue to build or validate their professional skills, and build towards a qualification if they so wish.

The major stakeholders in formal qualification systems

A formal higher education qualifications system generally has four major stakeholders:

- **Learners** – domestic and international students (from younger to mature adults) who study full-time or part-time, on-campus (with access to digital resources) or online. In this report, learners are segmented into two groups:
 - **Pre-Bachelor learners (generally less than 25 years):** those on their way to acquiring their first degree, usually to commence a graduate career (many are school leavers, many are not);
 - **Post-Bachelor learners (generally more than 25 years):** a vast and growing pool of graduates of working age across a population. While some acquire postgraduate qualifications, most do not, but they all continue to acquire experience of work, or life, or both.

1 Data are drawn from the Survey of Adult Skills, a product of the OECD Program for the International Assessment of Adult Competencies (PIAAC) available at [OECD.Stat](https://www.oecd.org/dataoecd/1/2/42340.pdf).

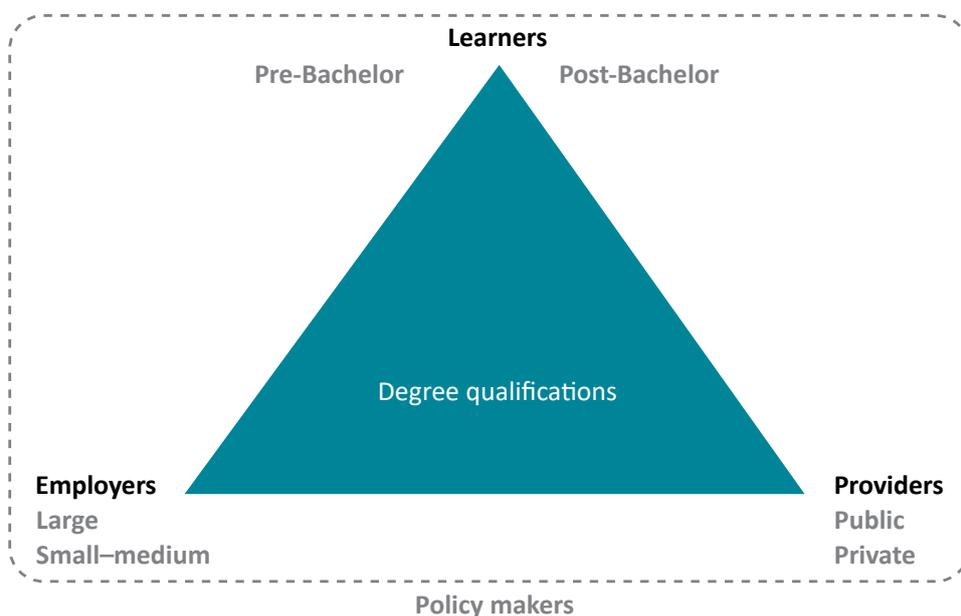
2 See 4234.0 – Work-Related Training and Adult Learning, Australia, 2016–17 [Key findings](#).

- **Employers** – a wide and varied group including large corporations, industry bodies, major public services, and small-to-medium enterprises. A small proportion of graduates are self-employed at some time during their working lives.
- **Providers** – traditional providers such as universities receive public funding to educate a nation’s citizens, predominantly in Bachelor degrees and beyond. Newer providers, including private providers, are growing in number and in the size of their student intakes. Some larger employers provide their own educational offerings, although these are not usually formal qualifications, as yet.
- **Policy makers** – provide funds to public providers and regulate quality; they influence employer and learner behaviour through laws and mechanisms such as the taxation system.

In an **ideal system**, learners, employers and providers have mutual agency and equitable benefits, as illustrated in Figure 1, by an equilateral triangle. The figure shows that, ideally:

- **Learners (pre- and post-Bachelor)** have access to affordable qualifications that prepare them to achieve life and career goals.
- **Employers** use trustworthy qualifications to filter a plentiful supply of graduates who perform as reasonably expected.
- **Providers** have the resources to provide a quality experience for a plentiful supply of learners; close collaboration with industry ensures the curriculum is fit for purpose.
- **Policy makers** ensure that policy levers are finely tuned, and can be adjusted to meet new challenges and incentivise appropriate behaviour by all parties.

Figure 1: In an ideal qualifications system, policy makers manage levers to incentivise equitable benefits for the major stakeholders



Harking back to the evidence provided by the OECD, the state of higher education globally seems not to mirror an equilateral triangle depicted in Figure 1: learners face significant barriers to engagement, and many take too long or never complete; graduate learning outcomes sometimes do not meet employer expectations; providers are under increasing pressure for domestic and international students; and policy makers face increasing costs, and quality measures and indicators are challenging to fine tune.

Mapping highest educational attainment and employment

Economists collect data related to formal qualifications, and this enables nations to benchmark and compare, and possibly match qualifications to labour needs, although lack of granularity makes analysis challenging. Table 1 shows such information for 25–64-year-olds in selected OECD countries.³ The table shows that countries such as Denmark, France, Finland, Germany and the United States have high proportions of the population with Upper Secondary as their highest level of educational attainment. Finland, France and Germany have lower proportions of Bachelor graduates. However, at Master’s level, Australia and New Zealand have much lower levels of attainment. These fairly crude data tell us little about the preparedness of the labour force for future challenges, even though wildly varying levels of attainment signal potential areas for concern.

Table 1: Educational attainment of 25–64-year-olds (2017) Percentage of adults with highest level attained

	Lower secondary	Upper secondary	Short-cycle tertiary ⁴	Bachelor’s or equivalent	Master’s or equivalent
Australia	14	30	12	26	7
Belgium	15	35	0	22	17
Denmark	16	42	5	21	13
Finland	9	43	12	17	15
France	14	43	14	10	10
Germany	10	46	1	15	12
Iceland	23	27	3	21	17
Ireland	12	22	10	25	10
Israel	7	36	14	23	12
New Zealand	21	27	4	28	5
United Kingdom	17	19	10	23	12
United States	6	44	11	23	11
Key:	0–9%	10–19%	20–29%	30–39%	40%+

While these comparative views are interesting, national data can show a more fine-grained view: the 2016 Australian census data, for example, show a point in time snapshot of the self-reported highest qualifications of the working population⁵ on census night. Figure 3 shows a heatmap based on the volume of responses in relation to:

- the highest educational qualification from postgraduate to secondary school for selected occupations (horizontal axis) mapped to
- eighteen industries (nine in Figure 2 and nine in Figure 3) and age group (vertical axis).

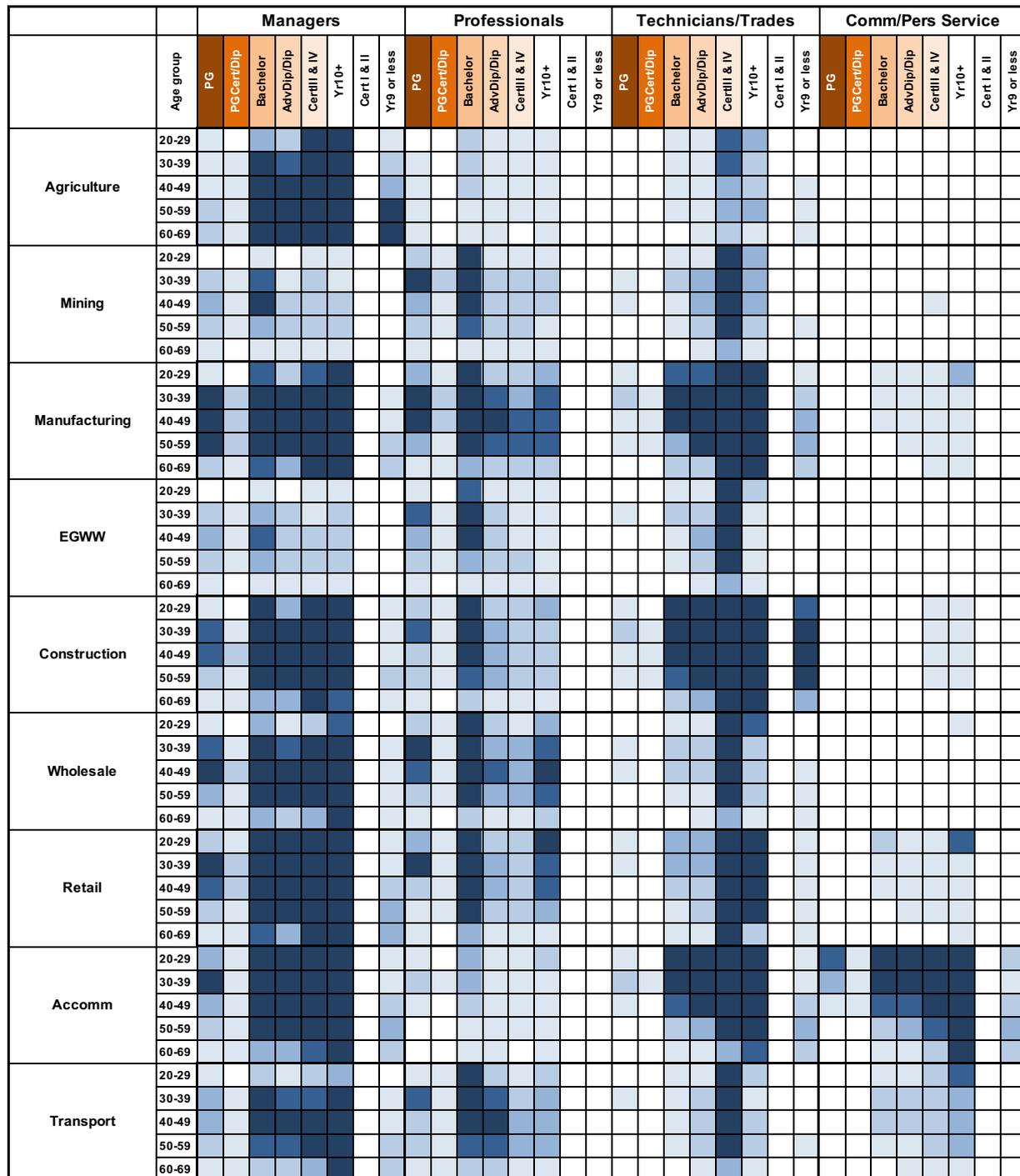
³ Data selected from Table A1.1. Educational attainment of 25–64 year-olds (2017) Percentage of adults with a given level of education as the highest level attained OECD (2018). Education at a Glance 2018: OECD Indicators Paris, OECD Publishing.

⁴ Programs at short-cycle tertiary education are typically practically based, occupationally specific and prepare students to enter the labour market. However, these programs may also provide a pathway to other tertiary education programs such as bachelor degree programs.

⁵ Data are derived from the TableBuilder for the 2016 Census, available at <https://www.abs.gov.au>

The heatmap shows where there is a concentration of respondents by industry with more or fewer qualifications. Cells with fewer responses may have smaller populations to begin with: for example, there are more labourers in Construction, and many fewer in Health and Social Care. On the other hand, cells with lower responses may highlight scope for advancement using either formal qualifications or micro-credentials. Figure 3 shows, for example, that Professionals and Managers in public administration, education and health have high saturation of qualifications at Bachelor level and beyond. However, postgraduate qualifications for Managers in several fields are less common (e.g. Mining; Electricity, Gas, Water and Waste; Transport, Postal and Warehousing). Cells showing older workers with lower qualifications might indicate an opportunity for micro-credentials that validate experience through portfolios of evidence: Figure 2, for example, shows fewer managers in their fifties in the construction industry have postgraduate qualifications than managers in their thirties and forties. It might be more enticing if those micro-credentials were credit-bearing towards a formal qualification.

Figure 2: Heatmap of Australian census data (2016) showing concentration of responses to highest qualification by industry, age group (20–69) for selected occupations – Part A

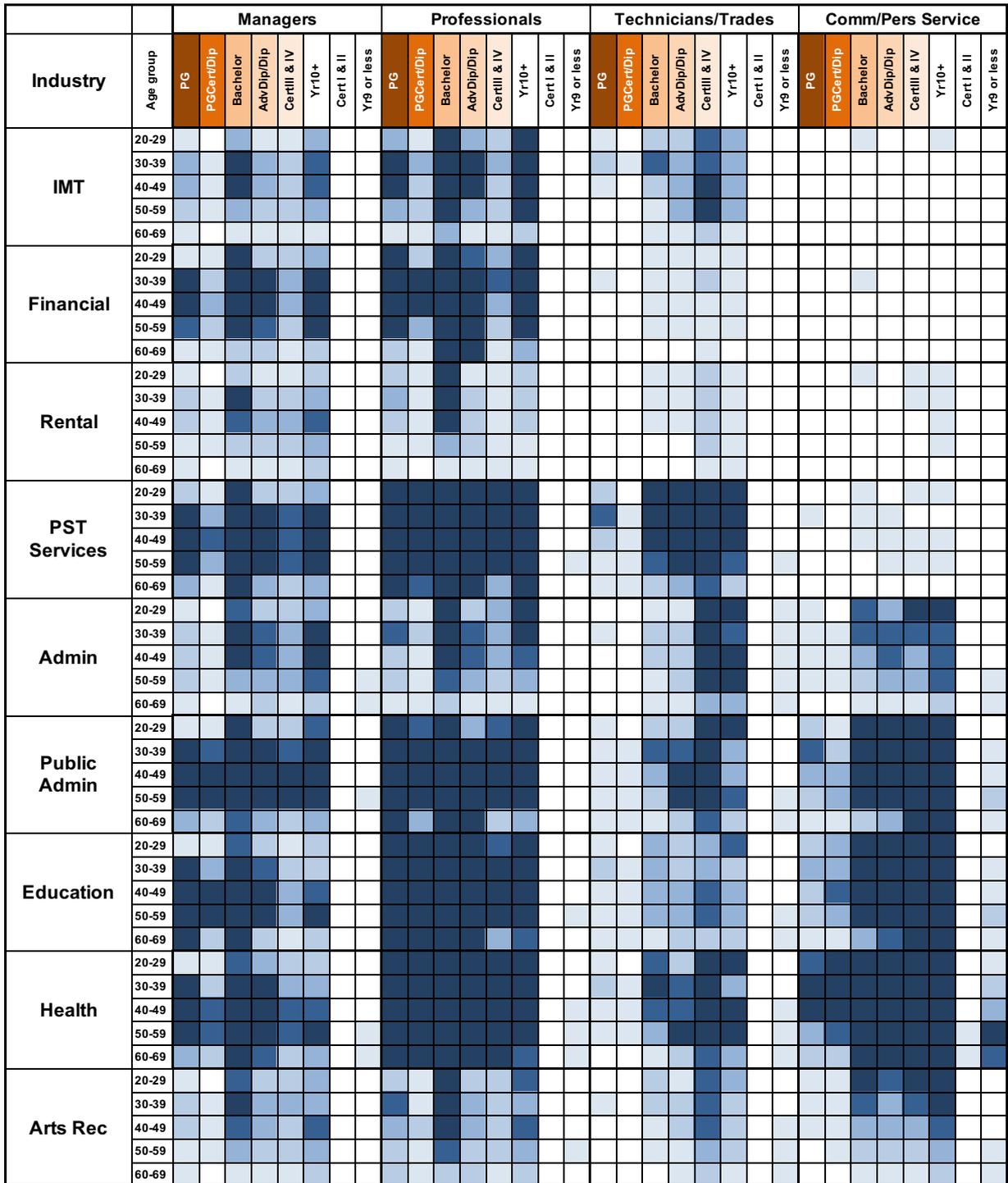


Industry	
Abbreviated	Full
Agriculture	Agriculture, Forestry and Fishing
Mining	Mining
Manufacturing	Manufacturing
EGWW	Electricity, Gas, Water, Waste Services
Construction	Construction
Wholesale	Wholesale Trade
Retail	Retail Trade
Accomm	Accommodation and Food Services
Transport	Transport, Postal and Warehousing
Occupations	
Technicians/Trades.	Technicians and Trades Workers
Comm/Pers Service.	Community and Personal Service Workers

Level of Highest Educational Attainment	
Abbreviated	Full
PG	Postgraduate Degree (Masters/Doctorate)
PG Cert/Dip	Graduate Diploma/Graduate Certificate Level
Bachelor	Bachelor Degree
AdvDip/Dip	Advanced Diploma/Diploma
CertIII/IV	Certificate III & IV
Yr10+	Secondary Education – Years 10 and above
CertI&II	Certificate I & II
Yr9 Or less	Secondary Education – Years 9 and below



Figure 3: Heatmap of Australian census data (2016) showing concentration of responses to highest qualification by industry, age group (20–69) for selected occupations – Part B



Industry	Abbreviated	Full
IMT	Information Media Telecommunications	Information Media Telecommunications
Financial	Financial and Insurance Services	Financial and Insurance Services
Rental	Rental, Hiring and Real Estate Services	Rental, Hiring and Real Estate Services
PST Services	Professional, Scientific, Technical Services	Professional, Scientific, Technical Services
Admin	Administrative and Support Services	Administrative and Support Services
Public Admin	Public Administration and Safety	Public Administration and Safety
Education	Education and Training	Education and Training
Health	Health Care and Social Assistance	Health Care and Social Assistance
Arts Rec	Arts and Recreation Services	Arts and Recreation Services

Level of Highest Educational Attainment	
Abbreviated	Full
PG	Postgraduate Degree (Masters/Doctorate)
PG Cert/Dip	Graduate Diploma/Graduate Certificate Level
Bachelor	Bachelor Degree
AdvDip/Dip	Advanced Diploma/Diploma
CertIII/IV	Certificate III & IV
Yr10+	Secondary Education – Years 10 and above
CertI&II	Certificate I & II
Yr9 Or less	Secondary Education – Years 9 and below

Occupations	
Technicians/Trades	Technicians and Trades Workers
Comm/Pers Service	Community and Personal Service Workers



The challenges of formal qualifications and the future of work

Qualifications are regulated for everyone's protection, and formal qualifications such as degrees have robust quality assurance. Nevertheless, some of their enduring characteristics may be disadvantages in an evolving economy. These might include:

- **Time to completion:** acquiring a degree is not a short-term project – degree programs usually take at least a year of full-time study to complete, and few mature learners can afford to study their first or subsequent qualification full-time.
- **Partial completion of a formal qualification is expressed as credit:** if not completed, learning achievement is expressed as 'credit towards a degree' which often goes unacknowledged (and can possibly be read as a sign of lack of resilience). Credit given by one institution may not be accepted by another. After a set period, credit usually expires.
- **Recognition of prior learning sometimes earns a limited amount of credit:** institutional policies in some jurisdictions limit the amount of prior learning that can be recognised, regardless of where and when the learning took place. While this may be wise for younger, less experienced learners, policy could be attenuated for mature learners. Several nations have implemented strategies to make validation for credit more accessible for their citizens. Sweden, for example, has a specific focus on providing more access to higher education credit through its National Delegation for Validation strategy (Swedish Government 2019).
- **Difficulty reading quality and value signals:** it may be difficult for learners to judge whether a degree from a more exclusive (and possibly more expensive) provider means a better learning experience or better employability over the lifespan.
- **It is not always easy to understand what learners achieve in a degree program:** learning outcomes are almost a universal movement; however, they are not always clear, and the assessment tasks that lead to their validation are not necessarily available for public scrutiny. Economic indicators do not necessarily provide granular evidence of skills at the micro level.
- **Qualifications documentation is sometimes opaque:** completion of formal study is certified by a transcript that is codified as unit titles rather than outcomes or skills. If it is not machine readable, this limits searchability by employers.

Moving to a 21C view of learning and working

The data in this chapter represent a twentieth-century view of formal learning and its employing industries. It is currently not possible to see a highly granular view of skills beyond the labels of degrees in narrow fields of education.

A twenty-first century helicopter view will include data about qualifications as well as micro certifications matched to new and emerging occupations and modes of working. To achieve this, non-formal learning such as micro-credentials need to be defined, and data collected in accessible repositories. Well-designed systems could enable individuals to see their own skills achievements, to discern the opportunities for their own employment, as well as the new courses available to enable them to upskill.

This report explores how micro-credentials might play a central role in re-forming pre- and particularly post-Bachelor education: many micro-credentials are already well-respected and robust stand-alone signals of achievement. With careful thought, however, micro-credentials that emulate the standards expected in formal qualifications might bridge the current gap between the existing robust system of qualifications and the fledgling yet rather chaotic world of emerging micro-credentials. Interoperability between the two systems would be to the advantage of learners, employers, providers and policy makers. Whether in a formal qualification or in a micro-credential, the certification is the proof point of skills achieved and knowledge acquired. As the future of work unfolds, working citizens are likely to

need more and better granular certified learning – micro and macro – to evidence their educational currency amid rapid change. Micro-credentials are one way to enable certification of new skills, as well as validate the skills already acquired through experience. More credit-bearing experiences will open up a system of certification well beyond the fairly closed higher education and vocational qualification system currently in place in many nations – where access is not always as easy for those from low socio-economic status, or those who involuntarily no longer live and work in their native countries (Villalba-Garcia & Chakroun 2019).

What's happening with micro-credentials

In January 2016, the report *Better 21C Credentials: Evaluating the promise, perils and disruptive potential of digital credentials* was an output from a nationally-funded project that explored whether digital badges, micro-credentials and massive open online courses (MOOCs) were leading to 'better' 21st century credentials (Oliver 2016). The report included case studies of new shorter (micro) credentials, chiefly: **short online courses** (MOOCs, free or for fee short courses on global platforms, usually requiring payment for certification); **assessment services**⁶ that certify learners' achievements; and **digital badges**. The report concluded that:

it is way too early to dismiss [these types of] 21C credentials . . . In a time when higher education credentials are highly sought after, but very expensive, it is difficult to see how 21C credentials, done well, will not eventually have a disruptive influence on higher education as we now know it.

Three years later, there are clear signs that micro-credentials have not just taken hold but, to paraphrase Christensen in his earlier commentary about disruptive innovations, are beginning to redefine the industry, making products and services more accessible and affordable to a broader population (Christensen 2013). The clearest example of this is where credit-bearing micro-credentials are a less expensive pathway into fully online courses offered at compelling price points. In the meantime, assessment services – more properly known as prior learning and assessment – have seen a growing demand for and diversification of the recognition of non-formal education (Harris & Wihak 2018).

Convincing learners and particularly employers of the benefits of micro-credentials, whether validating new or previously acquired skills, and delivering clear value to them, will be key to success for traditional and emerging providers. Offering micro-credentials as a credit pathway into formal qualifications may signal to learners and employers that providers trust their own micro-credentials, and that they are prepared to use them as a discounting mechanism to reduce the time required to complete a formal qualification.

More MOOCs, more types of micro-credentials, more brand names

The rapid proliferation of massive open online courses, starting in about 2012, drew attention to the role these short courses might play, particularly when they were made available on global online platforms. In the early days of MOOCs, enrolments were truly massive, admission was open and the fee was negligible. Some MOOCs still have these characteristics but in the main MOOCs do not necessarily attract massive cohorts (though they still can be very large), admission is still generally open, and any assessment or certification is rarely free (Oliver 2016). They have continued to proliferate even though poor completion rates persist (Jung & Lee 2018). Some estimate that there are between 500,000 and 750,000 micro-credential programs in the United States alone (Fain 2018). Three major MOOC platforms – Coursera, edX and FutureLearn – have become professionalised, sometimes supported by venture capital and investment. Notably, SEEK, a careers portal, has recently acquired a 50 per cent share in FutureLearn (FutureLearn 2019) as well as simultaneously investing in Coursera, and closer pairing of higher education with employment.

However, there are numerous analyses of MOOC enrolments on the larger platforms: Class Central reported in late 2018 that MOOC student enrolments had reached 101 million. Figure 4 shows the headline numbers presented in one such report (Shah 2018).

6 Commonly referred to in the United States as competency-based assessment.

Figure 4: Headline figures from a recent summary of MOOC growth; Shah (2018)



Shah goes on to say:

In 2018, 20 million new learners signed up for at least one MOOC, down from 23 million the year before. Despite the slowdown, the number of paying users may have increased. MOOC providers' constant tweaking of the model seems to be paying off, given providers such as Coursera are hitting record revenues (\$140 million in 2018 for Coursera). Here is a list of the top five MOOC providers by registered users:

1. Coursera – 37 million
2. edX – 18 million
3. XuetangX – 14 million
4. Udacity – 10 million
5. FutureLearn – 8.7 million.

By the end of 2018, over 900 universities around the world had announced or launched 11.4k MOOCs. That includes around 2,000 new courses that were added to the list this year (down from 2,500 courses in 2017). The number of available MOOCs has grown dramatically in the last few years due to scheduling policy changes, but since user growth hasn't kept up, each course is getting fewer users (Shah 2018).

Underneath these staggering numbers, it is important to note that micro-credentials currently operate in a 'data desert': commentators have suggested that the massive numbers reported by providers of micro-credentials require scrutiny (Adelman 2017). The number of registrants usually far exceeds the number of commencers, who far exceed the completers (Almeda, Zuech et al. 2018, Sujatha & Kavitha 2018, Yuan & Baker 2018, Reich & Ruipérez-Valiente 2019). Research on learner outcomes and perceptions of value with regard to MOOC micro-credentials is in its infancy (Hollands & Kazi 2019). It is also important to acknowledge that platforms in languages other than English have launched, developed and grown. Examples include Swayam (India), FUN (France), MiriadaX (Spanish language), and XuetangX (China).

Business models of MOOCs have been described as a blue ocean strategy that never materialised – early on they largely drew their learners from affluent countries, and socio-economic status was correlated with greater persistence and certification. Research suggests that MOOCs are primarily a complementary asset for learners already within existing systems (Reich & Ruipérez-Valiente 2019). In related developments, higher education providers are partnering with online program managers (OPMs) such as 2U, Keypath and Online Education Services, providing online course development for micro-credentials and degree courses, on a global platform, or the institution's own platform.

Since 2016, **micro-credentials have expanded to encompass many types of short courses** such as:

- Short courses on-site or online (often called MOOCs) or both,
- Boot camps – short intensive learning experiences, often associated with information technology or entrepreneurship opportunities,
- Digital badges earned for achievement or participation in short learning events, and
- Licences and certifications.

Micro-credentials in all of the above categories have the potential to be signals of achievement that **stand alone, or interact with formal qualifications** as:

- alternative entry mechanisms to degree programs at all levels, or as credit pathways;
- value-add programs during degrees, enabling learners of all ages and stages to distinguish themselves by acquiring digital badges, portfolios and experiential transcripts;
- ‘last-mile’ services that connect ready-to-graduate learners to work experience and employment (Dibble 2018). These types of micro-credentials have spawned a raft of new businesses and services, particularly in the United States (Craig 2018). An example is Parker Dewey which allows employers to easily post short-term, digital projects for interested applicants who are undergraduates or recent graduates from partner colleges. Payments for projects range from US\$200–\$800 or about \$20–\$30 per hour. The site currently features more than 100 micro-internships (Fain 2018).

MOOC-based degrees on global platforms

From 2017, MOOCs with struggling business models evolved to be part of an academic credit offer. Known generally as **MOOC-based degrees**, these are seen as ‘the second wave’ of the MOOC narrative (Shah 2018). Paying attention to the importance of recognition of prior learning (Chakroun & Keevy 2018), providers were starting to act on the potential of MOOC micro-credentials as ‘off ramps’ to traditional university degrees. The global platforms involved to date (edX, Coursera and FutureLearn) are pivoting by offering micro-credentials as admission and/or credit mechanisms to mostly postgraduate degrees available at the same platform, at compelling price points (Shah 2018). Participation by high-ranking universities who are not traditional online providers has brought more acceptance of the legitimacy of online degrees in jurisdictions such as the United States (Fain 2018). Nevertheless, the path to MOOC-based degrees is not simple: new challenges include offering degrees into uncharted markets (learners can apply from anywhere with an internet connection) and where values and cultures and ways of learning vary. Pricing for a global market brings its own challenges: the same digital technologies that are increasing pressure on non-educational institutions to lower prices are also opening up new ways of teaching and capturing and certifying learning (deLaski 2019). For reference, a list of MOOC-based degrees by provider and platform, and comparative length, price and admission criteria is provided in Appendix A.

While information on the success of these degrees is scant, a recent development suggests that at least one such degree has been a success: the University of Illinois, Urbana-Champaign announced in May 2019 that it would be ending its on-campus residential MBA program (US\$80,000) in favour of its MOOC-based iMBA (US\$22,000), delivered in partnership with Coursera. Since 2015 the program has enjoyed growing popularity, with applications up from 1,100 to a projected 3,200 (Pickard 2019). It should be noted, however, that MOOC-based degrees are only one type of fully online program, and many more universities around the globe are moving to offer full online degrees on their own platforms (Clinefelter, Aslanian et al. 2019), possibly front-ended with credit-attracting micro-credentials.

Stronger calls for industry integration – and employers providing their own micro-credentials

Micro-credentials are a key opportunity for providers to achieve better integration with employers. A recent Australian survey report found that workers, regardless of education background, income level, industry or age, prefer learning on the job as the best way to prepare to work in digital environments (Gallagher 2019). Findings from other surveys concur with this theme: employees really value work-integrated learning and curriculum that is industry-aligned and employer-validated quality. It may be the case that employees are in fact starting to value employer provision more than traditional providers with human resource leaders formally de-emphasising degrees and prioritising skills. When asked what higher education providers should focus on, US employers recently recommended the following priorities, in this order:

- real-world projects and engagements with employers and the world of work
- providing academic credit for experience and on-the-job learning
- more industry and employer validation of curriculum, for example, with certifications
- better assistance to verify and validate credentials' authenticity
- more rigorous forms of quality assurance and accreditation (Gallagher 2018).

A growing number of employers and professional associations are designing their own competency-based offerings, many of which include a credit-bearing degree pathway with a traditional provider. Unlike traditional education providers, corporations can deploy micro-credentials for their own employee base and attach internal recognition and incentive schemes (deLaski 2019).

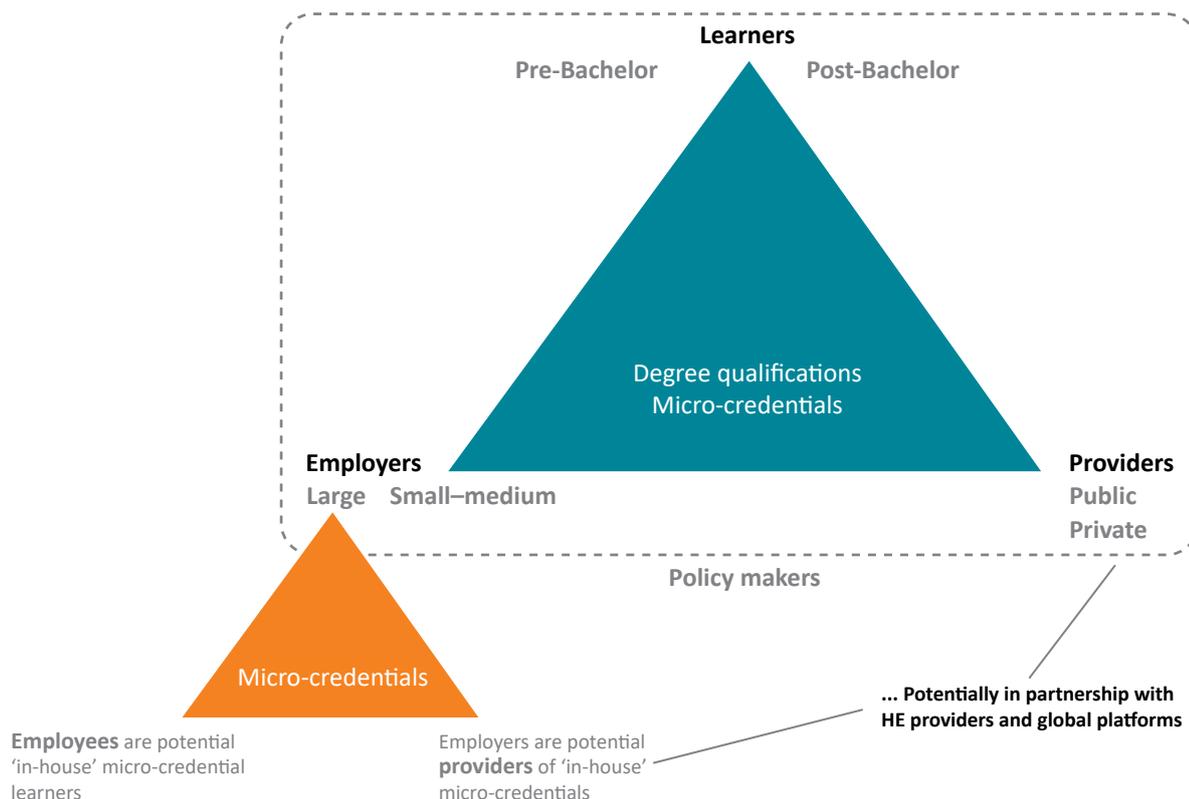
- IBM, for example, offers a range of open badges to the public (and a few restricted to employees only) in Knowledge, Skill and Proficiency and promotes its program as a way for professionals to display and share their accomplishments. IBM has a partnership with Northeastern University whereby certain IBM badges can be used towards the professional master's degree programs (Jackson 2018). In addition, IBM now relies on 'new collar' skills⁷ development at community colleges, boot camps, apprenticeships and other internal training programs for about 15 per cent of its 'new hires' (Fain 2018).
- Google has introduced a new online certificate in IT support jobs intended for jobseekers at entry-level and middle-skill jobs, available through Coursera. It can be completed in eight months but students can move at their own speed. As of June 2018, 40,000 learners had enrolled and 1200 had completed. Traditional providers such as Duke University are preparing to offer credit for the course. Google has brought together a consortium of more than 20 employers (including Bank of America, Walmart, Sprint, GE Digital and PNC Bank) who are interested in hiring completers of its certificate (Fain 2018).
- Amazon has announced that it will spend \$700 million over six years to retrain 100,000 of its employees, expanding its own post-secondary training and credential programs, largely outside traditional higher education (Fain 2019).
- EY, a professional services firm formally known as Ernst and Young, has an in-house training program designed to provide on-demand education at a lower cost. The EY Badge system enables staff to earn badges in areas such as data visualisation, design thinking and cyber security (Tadros 2019).

7 At IBM, 'new collar' jobs are roles in growing fields such as cybersecurity, cloud computing and cognitive business and digital design. They do not always require a traditional degree, rather the right mix of in-demand skill sets.

These developments bring a change to the qualifications system because of the number and reach of such micro-credentials: new systems initiated by large employers are starting their own systems, possibly competing with traditional providers. As shown in Figure 5, the qualifications system is evolving so that:

- Traditional providers offer both micro-credentials and degree qualifications, with the former sometimes leading to the latter; and
- Large employers, as shown in this section, are beginning to offer their own micro-credentials, often in digital skills but also in leadership and management, to their own in-house programs. While some partner with higher education providers, many do not.

Figure 5: Today's evolving micro-credential ecosystem – with major employers and more private providers offering micro-credentials



Chaos, confusion and calls for quality assurance and governance

The proliferation of micro-credentials has led to a degree of chaos and confusion – for learners and for employers, but also for providers. Employers are asking for assistance to understand, judge and compare the plethora of micro-credentials presented by potential employees as evidence of capability. Providers face similar challenges when new learners request recognition of prior learning for micro-credentials (UPCEA 2018). Learners do not currently have a neat way to curate and express their collective outcomes, and this will become a greater challenge as and when micro-credentials proliferate in name, style and outcomes.

There is little research on whether terms such as micro-credentials or its variants (alternative credentials) are well understood by learners, the prime consumers, or their employers. Few micro-credentials have common standards or taxonomies related to required skills and competencies, and this can prevent credentials from being portable. Similarly, there have been calls for and action on quality assurance of micro-credentials, including alignment to national qualification frameworks (AQF Review Panel 2018, New Zealand Qualifications Authority 2018). The mass awarding of badges with little or no quality assurance could threaten credibility and result in a ‘jungle of badges’ (Chakroun & Keevy 2018). As with formal qualifications, trust, authentication and authorisation are critical to success.

Sectoral agencies and regulators are also concerned at the proliferation of names, brands, and especially the academic standing of whatever is called a micro-credential. Networks of providers are creating their own definitions and standards, and networks associated with micro-credentials are mapping their initiatives in order to understand the evolving ecosystem. In the United States, a sophisticated map of credential initiatives has been created so that various agencies can align their projects (Samson 2019, Zanville 2019):

- **The Credential Transparency Description Language (CTDL)** provides a common, unified, consistent, and transparent vocabulary for describing credentials (including diplomas, badges, certificates, certifications, licenses, and degrees of all types and levels) (Educause 2018). The non-profit entity, Credential Engine, maintains and supports the growth and development of the open-licensed CTDL, which is the backbone of the Credential Registry. As at June 2019, 6142 credentials offered by 378 providers are listed on the Registry. This includes some offered on large platforms – edX, for example, presents 50 credentials in the database, including MicroMasters offered by non-US partners such as AdelaideX, CurtinX and UQX. Coursera courses do not appear, nor do many, if any, from outside the US. The Registry is an excellent idea, even though the CTDL is extremely detailed and looks very labour-intensive.
- In March 2019, Credential Engine announced the launch of its **Credential Transparency Partner Program** with other organisations (BrightHive Inc., Ellucian, Credly, DXtera Institute, Powerminds Inc., and Credential Commons) which will focus on publishing credential data and improving communication across data systems to empower learners, workers, employers, educators, and others with the data they need to make informed decisions about credentials (Credential Engine 2019).
- In Europe, the **Common Microcredential Framework** (announced by FutureLearn, France Université Numérique, OpenupEd, Miríadax, and EduOpen in April 2019) aims for greater consistency, quality and portability of micro-credentials (European MOOC Consortium 2019). In order to qualify as a micro-credential capable of earning academic credit within this framework, a course must have a total study time of 100–150 hours, including assessment; be at Level 6 or Level 7 in the European Qualification Framework or equivalent; include a summative assessment that enables the award of academic credit, either directly or via recognition of prior learning; operate a reliable method of identity verification at the point of assessment; and provide a transcript that sets out critical information (learning outcomes, study hours required, EQF level and credit points earned).

These widescale efforts signal bold solutions to the challenge of chaos related to micro-credentials. Unfortunately, they cover limited jurisdictions and networks and institutions not using the platforms involved cannot easily participate.

Digitised transcripts, blockchain, and calls for lifelong learning accounts

The rollout of digital degree transcripts has progressed, as have analytics systems that further enable aggregation of massive datasets. That micro-credentials are predominantly digital certificates means that future aggregation may be possible, if standards are adopted (Naughtin, Reeson et al. 2017, Educause 2019, Friedman 2019). The development of the blockchain has potential to increase trust in micro-credentials and qualification transcripts (Grech & Camilleri 2017, ICDE 2019, Williams 2019), although it is still in early stages of development. Meanwhile, nine universities⁸ have announced a joint effort to create a global infrastructure for more secure digital academic records. The aim is to enable learners to keep digital credentials that show a verifiable digital record of their lifelong learning achievements including micro-credentials (badges, internships, bootcamps, certificates, MicroMasters) as well as traditional degrees (Day 2019).

8 Delft University of Technology; Harvard University Division of Continuing Education; Hasso Plattner Institute at the University of Potsdam; MIT; Tecnológico de Monterrey; Technical University of Munich; University of California at Berkeley; University of California at Irvine; and the University of Toronto.

In a related area, there have been repeated calls for policy makers to fund lifelong learning accounts to engage, among others, those displaced by the changing nature of work (Business Council of Australia 2018, Monash Commission 2018, Augar 2019). Such a strategy requires a common approach where electronically documented achievements can be authenticated and accessed anytime and anywhere (Chakroun & Keevy 2018). The Comprehensive Learner Record is similar: a digital asset that helps learners share a verifiable record of their accomplishments (skills, competencies, outcomes, assessments, courses, programs, degrees and internships) (Educause 2019).

When the digital economy evolves, so too will methods of hiring employees: pre-hire assessment, talent analytics, micro-credentials and other innovations in hiring are poised to change (Gallagher 2018). Initiatives such as the China Higher Education Student Information and Career Center are pioneering in this domain: it has registered 117 million qualifications, checked 70 million student records, and produced four million online verification reports (Chakroun & Keevy 2018). The My eQuals project in Australia and New Zealand has made solid progress in similar areas.

Calls for more systematic data collection and robust research

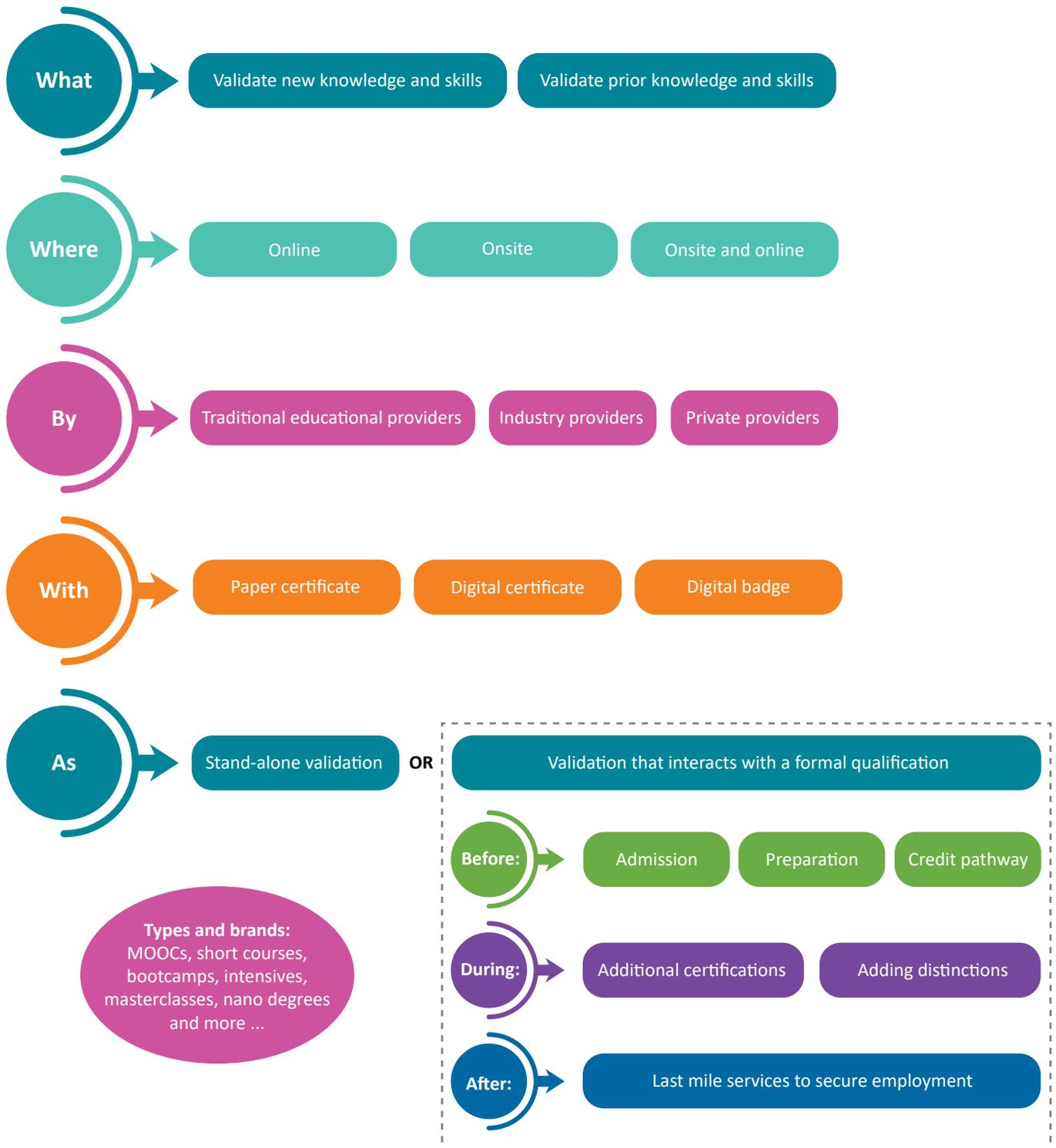
As micro-credentials become more prolific and mainstream there will be a need to collect better information, in a standard format, that can be compared between nations. Today, little is known about those who enrol in or complete micro-credentials, let alone the outcomes and benefits. Unlike traditional degrees which began with parchment and paper certification, micro-credentials are mostly digital from the outset. Collection of data against standard classifications and in digital formats would enable better research and analysis. Eventually, if they were sufficiently robust, data related to micro-credentials could be used more successfully at global level for finding skills matches and mismatches, as well as national strengths and areas of weakness.

Micro-credentials are a popular idea in higher education and industry: many agree they are beneficial as stand-alone certifications, or to complement or supplement degree programs. Nevertheless, there are still significant challenges to get them to scale and truly disrupt and improve the overall system:

- **Learners** (pre-Bachelor and post-Bachelor): learners are dabbling but not yet adopting micro-credentials at scale, possibly signalling that they remain unsure of the benefits. Based on the OECD data on engagement with non-formal learning, the greatest motivator is career advantage⁹. Learners still need to be convinced to 'buy in'.
- **Employers** are unsure what micro-credentials are and which to trust, given they are being presented with a ballooning array of micro-credentials marketed by many new brand names (MicroMasters, Nano degrees, and so on). Digital solutions such as transcripts, blockchain, learner verification and potential skills matching in recruitment are promising but nascent. Increasingly, large employers are offering their own in-house micro-credentials, unencumbered by regulatory requirements, or needing to fund the broader university remit.
- **Providers** of higher education have flocked to offering MOOCs and their variants, but enthusiastic providers also need to at least break even when they offer micro-credentials. Yet the business models of most MOOCs – and by extension MOOC-based degrees, show that this is a challenge. Academic Boards are concerned about the veracity of micro-credentials and requests for recognition of prior learning.

9 Survey of Adult Skills, a product of the OECD Program for the International Assessment of Adult Competencies (PIAAC) available at [OECD.Stat](https://oecd.stat).

In brief: Micro-credentials now



Making micro-credentials work: Next steps

Learners, employers and providers are rightly cautious about investing in a new type of credential. Credibility is at the core of what will win their confidence, and it is more likely to be achieved when micro-credentials:

- build trust
- add value in areas of importance, and
- achieve sustainability.

A central assertion of this report is that micro-credentials will work – or work better – when all stakeholders benefit equitably. Referring back to the equilateral triangle of the ideal qualification system, micro-credentials might be able to redress the balance of agency between the three major stakeholders. Learners have a great deal of choice, and prices are more affordable; employers may be overwhelmed, but some are creating their own micro-credentials. Policy makers are not passive bystanders in this process: apart from oversight for quality, they play a crucial role enabling success through all the means at their disposal. This might include incentives such as funding or subsidies for learners, employers and or providers; supporting and encouraging partnerships between providers and employers, and partnerships between providers; and instigating national systems and digital repositories that enable curation of citizens' certifications.

Building trust

Some of the best aspects of formal qualifications are their strong quality assurance and standards-based practices. Fundamental to standards is the acceptance of definitions, so everyone is clear about the boundaries. Defining micro-credentials is the first required step to building understanding and trust.

Define micro-credentials

There is as yet no universally agreed definition (or spelling) of 'micro-credential'. A casual search of Google Scholar suggests the term first appeared in about 2013, often in connection with digital badges, and it has subsequently become synonymous with certificates earned through MOOCs. It is now generally used to describe all manner of shorter form learning experiences, using a variety of names and brands, of all types, modes and sizes.

A clear and unequivocal definition of micro-credentials is essential for informed discussion, and for adopting standards-based practices. There are already many definitions of micro-credentials in play – a universal definition would be helpful, and this report recommends adapting a definition based on the International Standard Classification of Education (ISCED), the agreed framework used to report nationally comparable education statistics (UNESCO Institute for Statistics 2011). ISCED defines three main types of education:

- **formal:** education that is institutionalised, intentional and planned through public organisations and recognised private bodies, and – in their totality – constitute the formal education system of a country.
- **non-formal:** education that is institutionalised, intentional and planned by an education provider. The defining characteristic of non-formal education is that it is an addition, alternative and/or complement to formal education within the process of lifelong learning of individuals.
- **informal:** forms of learning that are intentional or deliberate but are not institutionalised.

Because micro-credentials are so broad and 'woolly' at present, a good definition should seek to put clear boundaries around what is – and is not – a micro-credential. To say that a micro-credential is 'anything shorter than a formal qualification' is still permitting a very broad and unclear boundary.

With regard to the ISCED definitions, micro-credentials are most appropriately positioned within non-formal education because they are intentional and planned by a provider and yet ‘an addition, alternative and/or complement to’ formal education within the process of the lifelong learning. On the other hand, when they earn credit towards a formal qualification, micro-credentials stray into the territory of ‘formal education’. The definition proposed here situates micro-credentials as non-formal, and further differentiates those that earn credit. It is acknowledged that if micro-credentials continue to be adopted, this will blur the boundaries even more between formal and non-formal learning. Even so, this definition is proposed because it builds on what is in place and agreed at this time.

The proposed definition, derived from ISCED, is as follows:

A micro-credential is a certification of assessed learning that is additional, alternate, complementary to or a component part of a formal qualification.

Why this wording? The proposed definition:

- focuses on *certification* of learning through assessment. This is intended to clearly separate micro-credentials from unassessed experiences which are also within non-formal learning (as *unassessed certificates of participation*)
- is broadened to include ‘component parts’ of formal qualifications (single units within a formal qualification are sometimes called micro-credentials)
- is sufficiently broad to encompass the many forms and brand names that have already appeared – such as MOOCs, nano degrees and certificates, MicroMasters, Specializations, bootcamps, intensives, short courses – regardless of their mode (onsite, online or blended) or duration.

Appendix B shows how this, and associated definitions, sit within the ISCED taxonomy. Like formal qualifications, assessed micro-credentials can be either of two types:

- taught courses (online or onsite) – for example, a MicroMasters or Specialization; or
- validation of learning independent of participation in a course (online, onsite, blended) – an example is the Deakin University Professional Practice Credentials that assess and validate workplace competencies aligned to a formal qualification level.¹⁰ Several national systems are evolving to undertake validation at scale (Villalba-Garcia & Chakroun 2019).

Put more simply, and **for everyday use**, the definition of a micro-credential could read:

A micro-credential is a certification of assessed learning that is less than a formal qualification.

Clarify the standards expected in credit-bearing micro-credentials

When micro-credentials earn admission or credit towards a formal qualification (called, for brevity, credit-bearing micro-credentials), further clarification is required, and particularly with reference to expected standards.

The proposed clarifying statement is as follows:

Credit-bearing micro-credentials include assessment aligned to a formal qualification level. Achievement of the learning outcomes leads to an offer of admission to or credit towards at least one formal qualification, regardless of whether or not the offer is taken up by the learner. Credit-bearing micro-credentials mirror and contribute to the academic standards required in the target qualification(s). The duration and effort required by the learner are in keeping with amount of credit earned in the target qualification(s).

¹⁰ See <https://credentials.deakin.edu.au>

Why this wording? The proposed clarifying statement emphasises that:

- assessment must occur, and is aligned to the target qualification level
- credit or admission may be earned to more than one qualification
- the offer of credit or admission does not depend on its being used in the future
- standards practices, including duration and effort, mirror or contribute to the standards in the target qualification(s).

Some credit-bearing micro-credentials (e.g. MicroMasters) are purposefully designed as a credit pathway to a qualification. Others may be courses that subsequently achieve recognition for credit (e.g. Australian Institute of Company Directors Course), in which case expectations of standards practices apply.

In contrast, non credit-bearing micro-credentials are assessed but they do not earn admission to or credit towards a formal qualification. They may or may not align to a formal qualification level, or conform to the academic standards expected in a formal qualification, including duration and effort.

For comparison, the statements are set out again here:

Credit-bearing micro-credentials	Non credit-bearing micro-credentials
Credit-bearing micro-credentials include assessment aligned to a formal qualification level. Achievement of the learning outcomes leads to an offer of admission to or credit towards at least one formal qualification, regardless of whether or not the offer is taken up by the learner.	Non credit-bearing micro-credentials include assessment which may or may not be aligned to a formal qualification level. Achievement of the learning outcomes does not lead to an offer of admission or credit towards a formal qualification.
Credit-bearing micro-credentials mirror and contribute to the academic standards required in the target qualification(s). The duration and effort required by the learner are in keeping with amount of credit earned in the target qualification(s).	Non credit-bearing micro-credentials may or may not conform to the academic standards, including duration and effort, required in a formal qualification.

Credit towards a qualification is generally spoken about in an agreed currency such as ‘modules’ (ISCED terminology) or ‘units of study’ (as used in Australia’s Higher Education Standards Framework; this report uses the term ‘units’). Credit is usually awarded for full units, sometimes half-units, to make it workable, and it can be specified (replacing named units) or unspecified (replacing elective units) in a course of study. It is helpful to note that credit-bearing micro-credentials may earn as little as one unit (or a fraction of a unit) or several units of credit (in edX’s MicroMasters model, for example, completion commonly earns 25 per cent of the credit required for a Master’s). Some Master’s degrees at Coursera are comprised completely of Specializations, which are usually regarded as micro-credentials. The quantum of effort required does not always appear to correlate with the amount of credit awarded across various platforms, and the fees related to credit earned using credit-bearing micro-credentials may vary enormously.

Align credit-bearing micro-credentials to qualification levels

It is relatively straightforward to align a credit-bearing micro-credential to a qualification level in one's own jurisdiction. This is done by designing the main assessment task in the micro-credential to mirror the level of complexity and autonomy required in a typical unit in the formal qualification. However, when degrees and micro-credentials become more visible on global platforms, degree levels can be slightly confusing, except the terms Bachelor, Master and Doctor which seem to be universally understood. For simplicity, clarity and global understanding, credit-bearing micro-credentials could be levelled to broad higher education levels, such as:

- Associate Bachelor level (or pre-Bachelor)
- Bachelor level
- Associate Masters level (or pre-Master's)
- Master's level
- Doctoral level.

Table 2 shows how this might work in relation to ISCED mappings and major qualifications frameworks. Similar levelling for pre-higher education qualifications alignment may be more challenging. Doctoral level is not shown in the table.

Table 2: Alignment of degree levels across various jurisdictions

Alignment	Associate Bachelor/ Pre-Bachelor	Bachelor	Associate Masters/ Pre-Masters	Masters
UNESCO ICSED mapping	Level 5	Level 6 ¹¹		Level 7
Australian Qualifications Framework	Level 6	Level 7	Level 8	Level 9
European Qualifications Framework (EQF)		Level 6 Cycle 1		Level 7 Cycle 2
Framework for HE Qualifications (Eng, Wales, NI)	Level 5	Level 6	Level 7	Level 7
Scottish Credit and Qualifications Framework	Level 8	Level 9	Level 10	Level 11
USA Degree Qualifications Profile	Associate	Bachelor		Master

Consider standards that might be required in credit-bearing micro-credentials

It is challenging to make statements about what might be universally acceptable with regard to the standards required in credit-bearing micro-credentials: partly because different jurisdictions have different expectations, and also because such micro-credentials can vary enormously in the amount of credit they earn. In Australia, the regulator (Tertiary Education Quality and Standards Agency 2016) makes it clear that 'while Higher Education Standards for Student Participation and Attainment focus primarily on a course of study, they apply equally to the completion of **units of study**' (emphasis added, p. 9). This may be interpreted as meaning that the standards required in the target qualification must be reasonably mirrored or enhanced by the credit-bearing micro-credential, regardless of the amount of credit awarded.

11 Programmes at ISCED level 6, or Bachelor's or equivalent level, are often designed to provide participants with intermediate academic and/or professional knowledge, skills and competencies, leading to a first degree or equivalent qualification. Programmes at this level are typically theoretically-based but may include practical components and are informed by state of the art research and/or best professional practice. They are traditionally offered by universities and equivalent tertiary educational institutions.

While it may be tempting to think that assessment is the sole standard required in a credit-bearing micro-credential, in fact the requirement may be much broader, especially where a large quantum of credit is awarded. Academic judgement is required – depending on the quantum of credit, providers might need to consider standards practices related to:

- Admission
- Orientation and progression
- Learning outcomes and assessment
- Qualifications and certification
- Staffing
- Learning resources and educational support
- Academic integrity
- Monitoring, review and improvement
- Delivery with other parties
- Representation, information and information management

Appendix C expands on this list, based on a reading of Australia’s Higher Education Standards Framework, and alerts providers to issues they might need to consider, especially when credit-bearing micro-credentials attract significant credit. Micro-credentials designed or retro-fitted as credit-bearing pathways to qualifications can use such academic standards as a design principle.

Ensure robust assessment, feedback, academic integrity and governance

Like products in any marketplace, quality and standards are an area of concern when consumers invest time and money to acquire them. Until recently, there has been little public scrutiny of universities’ short, extension or free courses, including MOOCs. Word of mouth between consumers, and profits or losses of the offering entity, have regulated this market.

When micro-credentials lead to academic credit, key questions pertain to assurances about assessment and academic integrity: does assessment occur, and if so, how and under what conditions, and how is the learner’s identity and contribution reasonably verified? Assessing student learning is an expensive – and essential – part of quality education. Micro-credentials that are affordably priced may not generate the same level of revenue as units within a degree program, so design decisions may have to be rethought. Since assessment is so important to building trust and credibility, micro-credentials could be designed with assessment in mind first and include where possible:

- authentic problem-solving in ill-defined tasks that test real-world application; and
- personal and personalised feedback.

It may be tempting, in an online environment, to automatically assess learners using a quizzing tool (where the system automatically assesses and grades multiple-choice test items). Robust multiple-choice tests require significant investment of time and expertise. Quizzes can be excellent for enabling the learner to test their own knowledge and provide instant feedback. However, if automated quizzes are the sole means of summative assessment this could raise concerns about quality or academic integrity. As well as using quizzes for formative self-assessment, a standards-based micro-credential could have at least one robust individualised assessment task, perhaps asking the learner to submit a concise artefact (video, audio or text) that demonstrates application of knowledge and problem-solving abilities in a work-related or industry scenario. Likewise, peer assessment can be a rich learning experience during a sustained degree program, where the process is monitored and calibrated by academic staff. Peer assessment is frequently used in micro-credentials: if it is the only method of assessment, learners may feel unsatisfied – and employers sceptical – when assessment does not have expert oversight.

Feedback information can be provided reasonably efficiently using audio or video modes. These methods create a trackable and viewable piece of evidence related to the assessment submission and the feedback received. It is feasible to have learners submit their assessments online, and ask them to provide their own judgement of the quality of their work, and where they believe they may have gaps in their knowledge or experience. Regardless of whether submitted by video, audio or text, learners can be required to work within strict word or time limitations to ensure they demonstrate concision, but also to keep the assessment process manageable. For assessors, video and audio feedback may be more efficient; for learners, hearing or seeing the voice or face of the assessor or assessors may render the assessment process far more personal and meaningful.

It may be tempting to save on resources and not include identity verification in micro-credential assessment tasks. To be fair, formal qualifications do not necessarily verify the identity of learners, or their contribution to every single assessment task. The usual approach is to have a range of rich assessment tasks throughout the program that enable sufficient points where student contribution to the assessment artefacts can be verified. To instigate a supervised and identity-verified exam in every micro-credential would be counterproductive, bearing in mind that some micro-credentials are quite brief and low stakes. The key is to find a balance, and build confidence in the integrity of the micro-credential in the light of its future use as a mechanism to grant admission to or credit towards an academic program. In either case, admission could be granted provisionally, dependent on success in the early stages of the formal qualification. The investment required for robust identity verification might more than pay off in terms of disincentives for learners who plan to cheat, and the level of trust gained with employers, as well as the potential higher education providers who are willing to consider the micro-credential for admission or credit. Other security issues have nascent solutions: blockchain, for example, is in its infancy; digital transcripts are improving as the technology develops and take-up increases around the world; identity-verification will no doubt advance when technological solutions become more cost effective, automated, or both. Providers should consider trialling or adopting these as they mature.

Providers need clear policies and procedures to ensure arms-length quality assurance. For traditional education providers, these could be through an academic board, or similar, with responsibility aligned to a responsible executive, and include specific policies on branding of micro-credentials, assessment required, verification and security, regular review and improvement based on key learning indicators, efficient business models and currency of curriculum (and the resources required to update the offering). Non-traditional providers might consider convening advisory boards with educational and industry expertise to monitor similar quality assurance mechanisms. Having industry recognition builds learner confidence that the micro-credential is designed to connect with employment opportunities in the related field; recognition from reputable education providers builds confidence in the academic standing of the micro-credential.

Enhancing assessment and feedback – *Assoc. Professor Margaret Bearman*

Micro-credentials that integrate with tertiary qualifications need to include assessment and feedback to ensure as well as to certify learning. From a learning perspective, a micro-credential should allow repeated opportunities for students, peers and teachers to make judgements about student work (assessment) and provide rich information about those judgements (feedback comments). Students should therefore be provided with meaningful tasks, suited to the level and context of the particular educational experience. Moreover, a task that prompts feedback should be followed by another opportunity to actively apply any learning into new work. Taken together this means a well-designed micro-credential should contain at least one opportunity for assessment and feedback followed by further activity which allows the student to integrate what is learnt into practice. In addition to the learning purpose of assessment, some kind of summative judgement provides the credentialing aspect of the micro-credential. The micro-credential must therefore

outline what the student is expected to be able to do upon completion of their study. This does not immediately equate to a simple checklist of skills and knowledge; in most instances, it should be a sophisticated and holistic statement of expected achievement. Such learning outcomes should be matched with tasks that allow students to demonstrate their capabilities. These tasks are optimally challenging, meaningful and avoid gamification through trivial content or inauthentic formats. Successful completion of these tasks can constitute certification of achievement. While the precise type and number of tasks should not be prescribed, they need to be substantive enough to make the appropriate claim about the student's capability. In the most robust assessment systems, judgements are made on students' performance of multiple authentic tasks, using expert judges. It may be in order to achieve this, micro-credentials could be bundled for certification, so that each serves as a singular assessment point in an overall claim about attainment.

Provide a critical information summary that communicates key quality markers

If we had the luxury of designing micro-credentials today on a blank canvas and with the benefit of hindsight, we might stipulate their characteristics from the outset – but backward design is not possible because innovators around the globe have already unleashed a multitude of micro-credential sizes, types and brands. The alternative is to create quality signals after the fact, and educate stakeholders to look out for them. This has occurred in other fields to protect consumers: our packaged foods come with mandatory nutrition labels; our white goods carry energy consumption star ratings; our mobile phone contracts come with critical information summaries.

To educate learners and busy employers – and influence design decisions by providers – micro-credentials could adopt a concise **critical information summary** that indicates the certified learning, and the conditions under which it was achieved, as well as academic governance and or industry endorsement. Table 3 provides an example of how such information might be presented. Appendix D provides three examples of critical information summaries for micro-credentials offered by Deakin University:

- A MOOC micro-credential available on the FutureLearn platform;
- A Deakin Hallmark; and
- A Deakin Professional Practice Credential.

Table 3: Information that could be included in a critical information summary

Title and brief description (30 words)	Insert name of certificate
Certified learning	In up to 100 words, describe what the successful learner knows and can do based on their assessed learning
How learner participated	Choose one: Online only, Onsite only, Both onsite and online
Effort required (including assessment)	Insert number of hours (for typical learner)
Complexity of main assessment task	Choose one (best fit): No assessment Testing recall of facts Application of a skill to a routine problem Application of a skill to a complex problem Application of multiple skills to routine problems Application of multiple skills to complex problems Portfolio and reflective evidence for validation of proficiency
Supervision and identity verification	Choose one (best fit): Unsupervised, no identity verification Supervised online or on-site , identity not verified Supervised online , identity verified (one factor) Supervised online , identity verified (two factors) Supervised onsite, identity verified (one factor) Supervised onsite, identity verified (two factors)
If assessed, equivalent level (main task)	Choose one: Not at degree level/Pre-Bachelor/Bachelor/ Pre-Masters/Masters/Doctorate
Quality assurance	Nil, or insert names of governing or endorsing bodies
Successful learner earns:	
<ul style="list-style-type: none"> • admission to a degree program • credit towards a degree program • If yes, how much credit? 	Choose one: No/Yes – state degree(s) and institution(s) Choose one: No/Yes – state degree(s) and institution(s) State credit in units (a unit is a typical semester of study in a degree program). For example: Credit is less than one unit: 0.4 unit Credit is one unit: 1.0 unit Credit is more than one but less than two units: 1.5 units

Adding value

Trust will grow when the benefits promised through micro-credentials are delivered to learners, to employers and to providers.

Offer micro-credentials that are strongly related to work, and lead to work opportunities

The literature on micro-credentials highlights their potential to focus on rapid learning for employability. Endorsement of a micro-credential by employers or industry bodies sends a strong signal. Employers that provide their own micro-credentials for current or future employees send clear messages about important future skills. When employers partner with traditional providers to offer credit-bearing micro-credentials, learners and employers see a dual signal of employability and the possibility of upgrading to a full qualification in the future. As a minimum, providers could seek endorsement and/or accreditation from the relevant employing industries or bodies. Even better, learners are likely to be highly attracted to guaranteed pathways from micro-credentials into work experience, networking opportunities, paid employment, or promotion. Assessment-only micro-credentials and related validation and recognition mechanisms are designed not to teach but to certify skills already acquired through experience, usually in the workplace. In these cases, the assessment methodology must be extremely rigorous as it is the sole event in the micro-credential.

To achieve scale and defray the costs of creating a micro-credential, providers could work with industry experts to identify skills gaps for more immediate employability outcomes. Providers might also consider building on rather than replicating micro-credentials already in the market. Bundling micro-credentials which add to or enhance those from other providers might have advantages such as the academic strength of two providers rather than one, as well as wider brand recognition. An example is the MITx MicroMasters in Supply Chain which attracts credit to a full Master's degree in many other providers around the world.

Price micro-credentials commensurate with time required and benefits realised

Consumers expect short extension courses to be priced much lower than components of degrees. It is worth considering that a micro-credential that earns credit equivalent to the introductory unit or units of the degree program be priced so as to give the learner sufficient incentive to enrol. Micro-credentials which are priced the same as existing degree components are probably not overcoming one of the barriers to learning: as shown in the OECD data, the current price of formal and non-formal learning is too high for many learners who already have financial commitments, possibly including a debt from a first degree. Because a micro-credential is a new and unknown unit of currency, the cost will be a strong consideration for the learner. Very low prices, even free, MOOC micro-credentials have not deterred learners from signing up, although there is evidence that learners do not necessarily commit to or complete free micro-credentials.

The cost to the learner needs to be balanced with the benefits, short- or long-term. Credit-bearing micro-credentials include credit that may be used at some time on the future, offering a real discount of time and money. The 'try before you buy' aspects of micro-credentials are very attractive, as long as the quality experienced in the formal qualification matches or exceeds that provided in the micro-credential. Securing endorsements from one or more educational providers that a micro-credential earns the successful learner admission to or credit towards a qualification builds the perception of value, even if the learner has no immediate plan to take up that offer. However, it is crucial that the process and the pathway to further study is frictionless; that is, the promised benefit (admission or credit) is automated or automatic, and well-known by recruitment and enrolment staff.

More precise recognition of prior learning, more learner-centred design

Educational providers generally have recognition for prior learning processes (for individuals) that are somewhat inexact yet very time-consuming. Regulators can sometimes be concerned that, because of the competitive pressure, providers might be tempted to give too much recognition for prior learning as this sets the student up to miss fundamental learning experiences that ensure success. However, the opposite can be just as harmful: learners who are given too little recognition of prior learning are likely to become bored and agitated at spending time and money showing once again that they already know the material. Retention is then the issue. Some providers may see recognition for prior learning as foregone revenue which they wish to minimize. The Swedish Government strategy has proposed to reimburse institutions for foregone credit related to credit, thus removing a disincentive (Swedish Government 2019). However giving academic credit for robust micro-credentials can bring volume to enrolments. The more precise the recognition for prior learning, the more satisfied the student, and the more likely they are to be retained to complete the degree program. Providers can consider giving academic credit for early units in a degree program, or for elective or core units later in the program. Either way, because degree programs are usually very long and very expensive, providers should consider any incentives within their power and without compromising quality that will encourage the learner to continue and complete. For example, where regulation allows, providers could discount fees for units that come later in the program, or make other benefits available later in the program such as bespoke work experience, mentoring or networking opportunities.

Because they are certified, micro-credentials have the potential to make recognition of prior learning more precise. Most degrees consist of semester-length units, the details of which are usually captured digitally in learning and student management systems. It requires little imagination to see how these units, many of which have been the subject of curriculum mapping exercises, can pinpoint the assessment and certification of embedded skills. Enterprising providers could use these key assessment tasks to enable experienced graduates to test their skills (and have for example, challenge exams or similar), and if successful, be granted a more precise amount of recognition of prior learning for knowledge and skills and experience. The Prior Learning Assessment process in the United States allows candidates to take standardised exams (such as College Level Examination Program Exams), use individualised assessments (prepare a portfolio of their learning from a variety of experiences and non-credit learning such as online courses), or college faculty-developed exams (Klein-Collins 2016).

Because they can be of any duration and any combination of assessments, micro-credentials might typically be shorter or longer than a typical unit. Providers wishing to attract credit partners might consider creating micro-credentials that singly or as a bundle equate to a typical semester length unit. This will make it easier for a range of educational providers to receive the micro-credential for credit.

When giving recognition of prior learning, it is extremely important to ensure that the target qualification maintains coherency, bearing in mind that more generic programs already usually offer a wide variety of elective subjects. Many popular postgraduate degrees are focussed on learning to lead and manage in the field of expertise, rather than higher technical proficiency. Micro-credentials could enable mature learners to exercise a degree of control over their own learning and development, particularly at postgraduate level. Micro-credentials that bundle as credit towards a formal qualification can enable mature working learners to design their program of learning – to a reasonable extent – to meet their self-identified skills gaps – and remain more engaged in their learning.

Use micro-credentials to test innovations or trigger changes to academic culture

Micro-credentials can help reset degree programs and trigger changes to academic culture. The level of resourcing for creating short online courses, such as MOOCs which are open to the world, is generally much higher than usual investment in curriculum design and implementation. Because of their higher production value, the assets created for micro-credentials probably have a longer shelf-life, subject to curriculum currency, or can be reused in programs where learners rarely overlap. Likewise, micro-credentials can be a place to test learning technologies or innovations – or indeed to transform teaching practice. Some practitioners have claimed that they set out to transform the curriculum using a micro-credential, but they themselves were transformed (Adachi, Savage et al. 2017). In the United States, three quarters (73 per cent) of surveyed US professors who had taught a MOOC agreed that their experience changed the way they would teach on-campus course in the future (Kolowich 2013). This value add of micro-credentials is often less visible but highly important to educational providers.

Achieving sustainability

Innovations are sometimes easier to imagine and more difficult to implement. Micro-credentials in the online space, and for academic credit, are still relatively new and markets are immature. While global markets may seem appealing, competitor information is scant and recruitment into micro-credentials or pursuant degree programs is likely to be challenging. Innovators in this domain need to exercise patience. Educational providers are accustomed to investing extensive time and resources into the creation of new degree programs. Typically, when enrolments fail to materialise, providers have a long time before new degree programs are closed. It may be necessary to offer the micro-credential to several cycles in order to finesse the business model by adjusting various levers including costs and benefits to the learner, cost to the provider, reputational enhancement or risk, and industry partnerships. Many micro-credentials have already achieved sustainability, but many of those offered online have not yet done so. This section offers some strategies particularly for the latter.

Manage costs by licensing, co-creating or re-using learning assets, more assessors

In the micro-credential creation process, typically the first thought and the greatest investment by the provider is the creation of new content. In a world awash with content, it is worth considering reusing content created elsewhere, if feasible. This can lower costs considerably even if content is licensed. Alternatively, providers can consider partnering with another provider or employer to co-create content. Using fewer resources creating learning assets means more resources available for assessment, supervision and verification – and possibly greater speed to market.

Employers are likely to have a great deal to contribute to innovative micro-credentials, partly as industry experts with a vested interest in acquiring new talent, but especially as assessors of learners' artefacts. More senior colleagues and practitioners are generally experts working in the fields. They make judgements about their own and others' practice in the field on a daily basis. Who better, with appropriate training and development, to be appointed, recognised and rewarded as adjunct assessors in the micro-credential learning experience? To receive audio or video feedback from an industry expert or senior practitioner would likely be a compelling experience for a learner undertaking a micro-credential. Adjunct assessors could be trained using a credit-bearing micro-credential in best-practice feedback and assessment in the context of the industry. Such a micro-credential could be used to up-skill not just academic teaching staff but industry experts, who could subsequently be appointed as adjunct assessors, and have the opportunity to access new and motivated entrants to the industry – that is, micro-credential learners.

Let learners progress at their pace – and at their place

There is clear evidence that mature working learners, particularly in the United States and in Australia, prefer to learn online. While many would love to access a face-to-face experience on campus, the asynchronous nature of online learning appeals to those who prefer to learn at their pace and place. Offering micro-credentials online also provides the opportunity to extend catchment from the usual geographical constraints to a much broader audience although cultural and geographical differences need to be taken into account: even minor differences – such as references to summer when the learner is in deepest winter – break the perception of 'just for me' online learning. International education, whereby students leave their home country and travel abroad either short or long-term, is booming. However, many mature working learners who could also benefit from an 'international' experience are often not able to travel, leave their employment, or disrupt family arrangements. Online micro-credentials need thoughtful design to ensure that learners are prompted, even provoked, to engage with their peers in different cultures. Assessment which requires such engagement can be a powerful tool for the exchange of ideas and experiences, reminding learners that their life experience is not necessarily replicated for others. However, team-based assessments are particularly challenging for mature learners with caring and work commitments. Therefore team-based assessment should be used purposefully and sparingly, and where it adds real value – many mature learners are already working successfully in teams at home at work. Asynchronous learning is often the characteristic that helps mature learners persist: without compromising quality or standards, it is worth considering designing at least some micro-credentials with as much asynchronous and flexible engagement as the provider can offer. This might include the ability for the learner to start the micro-credential at a time that suits them, to engage with peers as and when convenient, and even to submit assessments when they are ready (within a time range). This now seems to be quite prevalent on the Coursera platform, where courses begin on the day the learner happens to look at them.

Ensure discoverability and machine readability

Just as for all products, micro-credentials must be discoverable by the right learner: presence on a global platform (or being visible on the internet) will not automatically bring enrolments. There are particular challenges providing micro-credentials online for a global market. While reporting of learners in the millions may give the impression that the market is vast, consumers of micro-credentials have a great deal of choice, there is evidence that despite micro-credentials and degrees being available online, institutions such as universities still have strong geographical pull (Clinefelter, Aslanian et al. 2019). Machine readable certifications ensure that learners themselves are discoverable: emerging human resources practices use digital scanning to filter candidates at scale.

Machine readable micro-credentials – Assoc. Professor Phillip Dawson

Historically, the information provided to graduates and employers about a degree has been presented in formats like paper or electronic transcripts listing units studied. These transcripts are challenging for computers to process, as the information they contain is incomplete and inconsistently structured. In contrast, the well-structured data types offered by micro-credentials have the potential to be machine readable.

Consider the scenario below:

Jen is a recruiter looking to fill a highly specialised role, however she is inundated by applicants who are unable to evidence one key capability. To manage this, she filters by that capability from a taxonomy within her recruiting software. She is then presented with a list containing only those applicants who have attained a credential verifying they have demonstrated that specialist capability for one or more providers from a pre-screened set of universities, certification authorities and MOOC providers. She then ticks a box

requiring the assessment to have been proctored. Jen now has a short list of candidates who have demonstrated the capability she is looking for under rigorous conditions to a trustworthy provider.

The sort of software Jen is using can only exist if the credentials issued by providers are expressed in a standardised way. There is work to be done here, such as developing taxonomies of learning outcomes, and finding ways to express the varying degrees of trustworthiness of different types of assessment. There are challenges too, especially around issues of standardisation of the metadata, and competing credentialing bodies who may wish to present their graduates favourably. But the benefits of machine-readable credentials will be diverse. They will enable recruiters to quickly find the right candidates; educational institutions to automatically grant credit for prior learning; and graduates to show what they are capable of in a way that is globally understood.

Career agility, personal agility and recruitment – Assoc. Professor Marcus O'Donnell

Digital micro-credentials are a recruitment technology and a personal development technology. In a world of work shaped by the fourth industrial revolution several factors are at play which shape this emerging role of micro-credentials. Recruitment is being revolutionised through deep data mining of CVs and psychometrics which means that pre-selection and invitation will increasingly shift the emphasis of traditional job application. As the world changes rapidly, personal resilience skills, such as emotional intelligence, will become even more important as both personal and professional skillsets. Different types of micro-credentials can play a unique role at this intersection of career agility; datafied recruitment and personal resilience.

Micro-credentials can act in simple ways such as providing certification of competence in an area of technical expertise such as certified developer in a particular software language. But because

they provide granular data points of personal expertise they can also be used, individually or as a suite, to document skill connections and achievements across domains of knowledge.

Micro-credentials deployed as part of a degree or unit of study could provide granular data-points that certify future work competencies but might also offer better and more explicit certification of personal and professional qualities.

Certification in an area of personal development such as emotional intelligence, could include verified psychometric testing and be used as part of a broader training package on professional communication for managers.

This provides opportunity and challenge for providers in the way we design micro-credentials and opportunity and challenge for individual learners in the way they build and display a connected story through their portfolio of micro-credentials.

Type of Micro-credential	Purpose
Qualifying pathway	Non-traditional entry into or between degrees
Granular certification of competencies within a degree	Micro-credentials which form part of a degree or unit of study provide data-points that certify future work competencies and aid datafied recruitment
Certification of experience	Assessed portfolio's warrant experiential learning acquired outside of a formal educational context against standards of achievement
Certification of technical expertise	A qualification in a particular technical skill set – software program; management technique etc
Certification of complementary or additional expertise	Introductory certification in a complementary non-primary area of expertise e.g. data analytics for managers which extends a professional's career agility
Certification of skills update	Professional updating in emerging areas in their disciplines for previously qualified professionals e.g. learning analytics for teachers
Certification of personal development or personal attributes	Certification in an area of personal development such as emotional intelligence; could include verified psychometric testing

Future steps towards interoperable certification systems

To recap: the evolving nature of work poses fundamental challenges for education systems. OECD data show that just as the need for certified learning in new and existing fields is required more than ever, the very learners who need to engage – 25+ post Bachelor learners – are too busy working or caring for their families, or have insufficient finances, to participate, even though many would like to participate more.

Formal qualification systems are not broken, but many are at peak load, and costs are ballooning. Post-Bachelor qualifications are often too long to fill immediate needs.

Non-formal education is changing: micro-credentials can address several of these issues: they are generally shorter, contemporary, inexpensive, online and manageable on a mobile phone. The degrees to which they lead are from a range of providers. Increasingly sophisticated validation and recognition processes add to the opportunities available to learners of all ages. Micro-credentials can offer skills in need for working learners, and intellectual challenges for those not in the labour force to continue to learn.

Lifelong education leads to healthier, happier societies, and robust economies – opportunities to learn seem to have never been greater. Currently, formal and non-formal education operate quite separately: the former is regulated, researched and mapped at a granular level. Non-formal learning is much more amorphous and far less recorded or researched.

An education system for the digital future could evolve towards a more interoperable system, where formal and non-formal learning work in concert. This section presents some suggestions as to how current systems might evolve.

Create a national credit framework

To align credit-bearing micro-credentials to qualifications, the system requires more detailed guidance not just about qualifications but about credit allocation within those qualifications. The Quality Assurance Agency (UK) provides access to guidance about credit allocation. *Higher education credit framework for England: guidance on academic credit arrangements in higher education in England* (Credit Issues Development Group 2008) clarifies how much credit can be attached to each qualification, and the expected effort (notionally 10 hours per credit point), all the while properly respecting providers' autonomy and academic judgement. The framework for England aligns with the European Credit Transfer and Accumulation System (ECTS).

But not every jurisdiction has such agreed approaches to credit and qualifications: in Australia, the issues related to credit pathways have been thoroughly explored (Ithaca Group 2018), but a credit framework is different from pathways (also extremely important). A credit framework for the Australian context would be very helpful for qualifications, and also for micro-credentials. Like the example from England, it would allocate a set number of credits that comprise a degree, but this would not necessarily mean that every institution would have to reconfigure its system to reflect that credit system, only that an internal system could be translated to a national system as and when required. Such a framework for qualification would be very helpful for understanding the credit earned by a micro-credential. The framework could guide 'rule of thumb' expectations such as duration and effort required, and conditions under which learning is achieved.

This would unlock a national credit system for credit-bearing micro-credentials, making them translate more easily across national systems. Even though not identical, it would pave the way for international translation of credit and credentials, regardless of whether they were formal qualifications or micro-credentials.

Create catalysts for the recognition of prior learning for mature learners

Recognition for prior learning and experience can be muddy concepts and cumbersome processes. It is rarely an exact science. However, some countries have advanced their practices with regard to the recognition and validation of learning acquired through prior study or experience.

Recognition for prior learning and experience can be muddy concepts and cumbersome processes. International developments suggest it is rarely an exact science, and particularly difficult to manage at scale. However, some countries have advanced their practices with regard to the recognition and validation of learning acquired through prior study or experience with the obvious attraction for policy makers in reducing the cost of educating and reskilling the working adult population (Villalba-Garcia & Chakroun 2019). While earlier efforts in several countries may have pertained to enabling underserved populations and migrant populations to have their skills and knowledge validated, it is not difficult to see how this will translate to wider use when skills change more rapidly, and even those with formal qualifications acquired many years previously will be required to show evidence of contemporary skills. While there is no single international model, most are based on the identification of learning outcomes: *validation* can lead to different qualifications and types of qualification, while *assessment* and *certification* processes rely on learning outcomes criteria rather than the traditional duration or location of courses (Villalba-Garcia & Chakroun 2019).

- In **France**, the *validation des acquis de l'expérience* (VAE), defined as an individual right, has been in place since 2002. Any qualification listed in the national directory of qualifications can be acquired and accessed through the VAE process (Villalba-Garcia & Chakroun 2019);
- In the **United States**, Prior Learning Assessment (PLA) is the evaluation and assessment of learning gained outside a traditional academic environment for college credit, certification, or advanced standing toward further education or training. Assessment methods include credit by examination, challenge exams, portfolio assessment and evaluation of non-college education and training. Studies have found that students who earn PLA credit have higher graduation rates than their peers who do not earn PLA credit though further data and larger samples are required for more robust findings (Klein-Collins 2016);
- The **Swedish Government's** ambitious National Validation Strategy has the overall objective that significantly more individuals should have their prior learning validated – available across the country, at all levels of the educational system and for a broader range of qualifications in working life. The strategy states that validation as a pathway to a qualification should have the same high level of legitimacy as formal education and training (Swedish Government 2019).

Many other nations are considering similar strategies (PhillipsKPA 2018). It is encouraging to see policy documents align their statements about recognition of prior learning, and nuancing the basis for giving recognition of prior learning for mature learners. Working citizens are often too busy or too cash-strapped to undertake formal and informal learning, and certainly being given too little recognition of prior learning into a qualification is an added disincentive. Credit-bearing micro-credentials – with appropriate standards in place – have a central role to play in encouraging the workforce to re-engage with certified learning, and access to credit (or the offer of future credit) is the currency that will help make the system interoperable.

Implement lifelong learning accounts

Regardless where it is earned, credit derived from certified learning means a future discount on the time and money required for a learner to advance to a formal qualification. It is in every nation's interest, in the face of the changing nature of work, to provide a facility that enables its citizens to register their recognised credit in a national digital repository such as a lifelong learning account. The idea of lifelong learning accounts is not new, having appeared in the literature since at the 1990s, but the advantage of such accounts is gaining traction as policy makers confront the coming changes. An Aspen Institute Briefing paper (Fitzpayne & Pollack 2018) recommends creating tax-advantaged Lifelong Learning and Training Accounts, which workers can contribute funds, and use at any time during their careers to pay for education and training, portable from job to job, and managed by workers, not employers. Several countries have implemented or are considering related initiatives:

- **Korea's** Academic Credit Bank System (ACBS) saves credits acquired primarily through education and job training institutes and a range of other mechanisms; the ACBS also grants recognition of prior learning (Kee 2015).
- An Academic Credit Bank System has been launched recently in **China**, led by the Open University of China (Xinying 2019).
- **Europass** (<https://europass.cedefop.europa.eu/about-europass>) offers five documents to make skills and qualifications clearly and easily understood in Europe: a curriculum vitae, a language passport, and three issued by education and training authorities (Europass Mobility records the knowledge and skills acquired in another European country; a Certificate Supplement describes the knowledge and skills acquired by holders of vocational education and training certificates; and the Diploma Supplement describes the knowledge and skills acquired by holders of higher education degrees). Europass is currently being revised to include information on the demand and supply of jobs and skills (EU Skills Panorama, the European Job Mobility Portal), the European Qualifications Framework, and verification of digital documentation (Graham, Deij et al. 2019).
- **Singapore's SkillsFuture** provides an account for every citizen, including the facility to bank credit. The **SkillsFuture** Framework provides information on career pathways, occupations and emerging skills; a list of training programs for skills upgrading and mastery. The strategy also aims to create a common skills language for individuals, employers and training providers.
- In September 2018, the **French Government** introduced the personal training account scheme *compte personnel de formation* (CPF). It is available to workers during and up to the point of retirement (including during periods of unemployment). The CPF plays a key role in the ongoing reforms of the French qualifications system and is included in the Bill for the freedom to choose one's professional future¹².
- In **Australia**, implementing a lifelong learning account has been recommended by key entities (Business Council of Australia 2018, Monash Commission 2018) as a compelling enabler for portable certifications and work in the digital economy.
- In the **United Kingdom**, the recent Review of Post-18 Education and Funding (Augar 2019) recommended 'the introduction of a lifelong learning loan allowance to be used at higher technical and degree level at any stage of an adult's career for full and part-time students ... available in modules where required ... [to] facilitate transfer between different institutions and ... for greater investment in so-called 'second chance' learning at intermediate levels' (page 10).

Lifelong learning accounts, managed by citizens and with all due regard for privacy, enable better data collection of non-formal learning engagement. They also give policy makers the tools to map and match learning with skills needs by industry, and use the systems to incentivise citizens to make investments in their own ongoing education, employers to re-train their existing employees as well as find new talent, and providers to offer courses in clear demand.

12 LOI no. 2018-771 du 5 septembre 2018 pour la liberté de choisir son avenir professionnel.

National systems of the scale of those mentioned in this section require strategic leadership, long term planning, policy development, good governance and substantial ongoing resources. Security and privacy issues will be of paramount concern and crucial to winning learners' confidence. Planning would need to take account of the barriers to success, and the incentives required to encourage buy in by individuals, educational providers and employers – and lessons learned from implementations elsewhere.

Most importantly, change requires ongoing consultation and engagement with the public so that learners are aware of the changes coming to society, and why a new and different approach to education will be needed. These consultations are best done through partnerships between employers, providers and policy makers.

Conclusion

Certified learning through formal qualifications has supported twentieth-century societies and economies. However, the twenty-first century brings fundamental changes to work, life and citizenship, and these changes require new educational models. The United Nations Sustainable Development Goals¹³ are designed to achieve a better and more sustainable future by addressing global challenges related to poverty, inequality, climate, environmental degradation, prosperity, and peace and justice. Goal 4 aims for inclusive and equitable quality education that promotes lifelong learning opportunities for all. Specific targets (4.3–4.5) by 2030 aim to:

- ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university
- substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship
- eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations.

To meet these targets in the face of rapid change, some nations are investing enormous resources in revising their qualifications frameworks, organising their non-formal or micro-credential offerings, or implementing underpinning systems that will enable their citizens to meet the needs of the digital economy. In addition, UNESCO is working towards the adoption of a Global Convention Concerning the Recognition of Higher Education Qualifications¹⁴ designed to facilitate academic mobility, improve quality and enhance international cooperation in higher education. This should also enable greater recognition of micro-credentials.

From a social point of view, education leads to better and happier living conditions. From an economic viewpoint, certifications of learning make the economy tick and the labour market function. Micro-credentials are a spin off from the qualifications industry – and they operate at the intersection of education and industry. They present an excellent opportunity to achieve better work-integrated learning, and better learning-integrated work. Policy makers are well advised to provide strategic leadership in this domain, and the resources required for education systems and industries to capitalise on the opportunity that micro-credentials present to upskill and reskill for the future of work.

This report recommends actions required in the immediate future to allay confusion: we should agree some definitions and be clear about the standards required, particularly when micro-credentials earn admission or credit to formal qualifications. Building trust, adding value and achieving sustainability are crucial to winning stakeholders' confidence. In the longer term, national digital systems may enable greater portability of micro and macro credentials and enable citizens to take greater ownership of their educational achievements and development. Leadership and substantial investment are required – and success will be more likely if providers, employers and policy makers work in partnership.

Micro-credentials are not a silver bullet, but with thoughtful implementation they can supplement and complement quality higher education systems and enable opportunities for learners across the lifespan. A society that works towards more granular certified learning to incentivise its citizens to continue to learn and warrant their achievements will be on the path to a happier and healthier culture, and a stronger economy.

13 <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

14 <https://en.unesco.org/themes/higher-education/recognition-qualifications/global-convention>

Appendix A: Degrees on global platforms as at August 2019

Bachelor degrees

Platform	Course	Disc.	Country	University	Price (AUD\$)	Fee in local currency
FutureLearn	International Business Top Up	Business	UK	Coventry	\$24,280	£9250 (UK/EU); elsewhere £13250
FutureLearn	Arts	Humanities	Australia	Newcastle		No information
Coursera	Computer Science	Science/IT	UK	London	\$27,730	Up to £15,132

Postgraduate certificates

Platform	Course	Disc.	Country	University	Price (AUD\$)	Fee in local currency
FutureLearn	Sustainable Dev & Humanitarian Action	Humanities	Australia	Deakin	\$6,000	AUD\$6,000
FutureLearn	Digital Learning Leadership	Education	Australia	Deakin	\$6,830	AUD\$6,830
FutureLearn	Health Admin Policy & Leadership	Health	Australia	Murdoch	\$7,200	AUD\$7,200
FutureLearn	One Health	Health	Australia	Murdoch	\$7,200	AUD\$7,200
FutureLearn	Hospital Administration	Health	Australia	Deakin	\$8,000	AUD\$8,000
FutureLearn	Information Technology Leadership	Science/IT	Australia	Deakin	\$8,285	AUD\$8,285
FutureLearn	Nursing	Health	UK	Coventry	\$8,550	£4,666
FutureLearn	Entrepreneurship	Business	Australia/UK	Deakin/Coventry	\$8,800	AUD\$8,800
FutureLearn	Leadership	Business	Australia	Deakin	\$9,030	AUD\$9,030
FutureLearn	Information Technology	Science/IT	Australia	Deakin	\$9,860	AUD\$9,860
FutureLearn	Cyber Security	Science/IT	Australia	Deakin	\$9,860	AUD\$9,860
FutureLearn	Business Administration	Business	UK	Coventry	\$10,200	£5,566
FutureLearn	Diabetes Education	Health	Australia	Deakin	\$11,300	AUD\$11,300

Master's degrees

Platform	Course	Disc.	Country	University	Price (AUD\$)	Fee in local currency
Coursera	Public Health	Health	US	Michigan		US\$960/crhr (Michigan);\$1060/crhr (elsewhere) ¹²
Coursera	Data Science	Science/IT	US	Colorado Boulder		No information
Coursera	Machine Learning	Science/IT	UK	Imperial College		No information
FutureLearn	Open and Distance Education	Education	UK	Open University	\$6,580	International: £3,590 ¹³
FutureLearn	Sustainable Dev & Humanitarian Action	Humanities	Australia	Deakin	\$12,000	AUD\$12,000
FutureLearn	Project Management	Business	UK	Anglia Ruskin	\$12,277	£6,700
edX	Analytics	Science/IT	US	Georgia Tech	\$14,233	US\$9,900
edX	Cyber Security	Science/IT	US	Georgia Tech	\$14,262	US\$9,920
edX	Computer Science	Science/IT	US	Texas Austin	\$14,377	US\$10,000
FutureLearn	Digital Learning Leadership	Education	Australia	Deakin	\$14,650	AUD\$14,650
FutureLearn	Information Technology Leadership	Science/IT	Australia	Deakin	\$18,550	AUD\$18,550

Platform	Course	Disc.	Country	University	Price (AUD\$)	Fee in local currency
FutureLearn	Leadership	Business	Australia	Deakin	\$19,050	AUD\$19,050
Coursera	Computer Science	Science/IT	US	Arizona State	\$21,565	US\$15,000
edX	Data Science	Science/IT	US	UC San Diego	\$21,566	US\$15,000
edX	Leadership in Service Innovation	Business	Australia	UQ	\$25,500	Up to AUD\$25,500
FutureLearn	Business & Organisational Psych	Business	UK	Coventry	\$25,655	£14,000
FutureLearn	Nursing	Health	UK	Coventry	\$25,655	£14,000
FutureLearn	Emergency Management and Resilience	Humanities	UK	Coventry	\$25,655	£14,000
FutureLearn	Disaster Management and Resilience	Humanities	UK	Coventry	\$25,655	£14,000
edX	Marketing	Business	Australia	Curtin	\$25,850	AUD\$25,850
FutureLearn	Cyber Security	Science/IT	Australia	Deakin	\$27,200	AUD\$27,200
edX	Supply Chain Management	Business	TBA	Arizona State	\$27,432	US\$19,080
Coursera	Electrical Engineering	Science/IT	US	Colorado Boulder	\$28,754	US\$20,000
FutureLearn	Global Logistics	Business	UK	Coventry	\$28,953	£15,800
FutureLearn	Construction Management & BIM	Science/IT	UK	Coventry	\$28,953	£15,800
FutureLearn	Construction Project & Cost Mgmt	Science/IT	UK	Coventry	\$28,953	£15,800
FutureLearn	Cyber Security	Science/IT	UK	Coventry	\$28,953	£15,800
edX	Accounting	Business	US	Indiana	\$30,191	US\$21,000
edX	Info Technology Management	Science/IT	US	Indiana	\$30,191	US\$21,000
Coursera	Computer Science	Science/IT	US	Illinois	\$30,192	US\$21,000
Coursera	Computer Science in Data Science	Science/IT	US	Illinois	\$30,192	US\$21,000
FutureLearn	Business Administration	Business	UK	Coventry	\$30,602	£16,700
FutureLearn	Business Admin (Artificial Intelligence)	Business	UK	Coventry	\$30,602	£16,700
FutureLearn	Business Admin (Cyber Security Mgmt)	Business	UK	Coventry	\$30,602	£16,700
FutureLearn	Business Admin (Healthcare)	Business	UK	Coventry	\$30,602	£16,700
FutureLearn	Business Admin (Sustainable Tourism)	Business	UK	Coventry	\$30,602	£16,700
FutureLearn	Business Admin (Marketing)	Business	UK	Coventry	\$30,602	£16,700
Coursera	Business Administration (MBA)	Business	US	Illinois	\$30,744	US\$21,384
Coursera	Innovation and Entrepreneurship	Business	France	HEC Paris	\$32,786	€20,000
Coursera	Business Administration (Global)	Business	Australia	Macquarie	\$33,000	AUD \$33,000
edX	Business Administration	Business	US	Boston University	\$34,788	US\$24,000
Coursera	Public Health (Global)	Health	UK	Imperial College	\$35,623	£11,300 UK/EU; elsewhere £19,440
Coursera	Computer and Info Technology	Science/IT	US	Pennsylvania	\$37,812	US\$25,000 (tuition) + US\$1,300 (fees)
Coursera	Accountancy (IMSA)	Business	US	Illinois	\$39,106	Up to US\$27,200
Coursera	Applied Data Science	Science/IT	US	Michigan	\$60,761	Up to US\$42,262

Broad discipline:

Business Health Humanities Education Science, Engineering, Computers and IT

Appendix B: Defining micro-credentials within the ISCED taxonomy of learning

		Non-formal (which could lead to formal)	Informal									
Type of education (ISCED definitions)	<p>Formal education is education that is institutionalised, intentional and planned through public organizations and recognised private bodies, and – in their totality – constitute the formal education system of a country.</p> <p>Formal qualification: Qualifications can be obtained through: i) successful completion of a full education program; ii) successful completion of a stage of an education program (intermediate qualifications); or iii) validation of acquired knowledge, skills and competencies, independent of participation in an education program.</p>	<p>Non-formal education is education that is institutionalised, intentional and planned by an education provider. The defining characteristic of non-formal education is that it is an addition, alternative and/or complement to formal education within the process of lifelong learning of individuals.</p> <p>Non-formal qualification. Qualification awarded upon achievement of the learning objectives of an education program in non-formal education that is not recognised by the relevant national education authorities as being equivalent to a formal qualification.</p>	<p>Informal education: Forms of learning that are intentional or deliberate but are not institutionalised.</p> <p>Uncertified learning</p>									
Status and nature of certification (ISCED definitions)												
Definitions proposed in this report		<p>A micro-credential is a certification of assessed learning that is additional, alternate, complementary to or a component part of a formal qualification.</p> <table border="1"> <thead> <tr> <th>Credit-bearing</th> <th>Non credit-bearing</th> <th>Certified participation</th> </tr> </thead> <tbody> <tr> <td>Credit-bearing micro-credentials include assessment aligned to a formal qualification level. Achievement of the learning outcomes leads to an offer of admission to or credit towards at least one formal qualification, regardless of whether or not the offer is taken up by the learner.</td> <td>Non credit-bearing micro-credentials include assessment which may or may not be aligned to a formal qualification level. Achievement of the learning outcomes does not lead to an offer of admission or credit towards a formal qualification.</td> <td></td> </tr> <tr> <td>Credit-bearing micro-credentials mirror and contribute to the academic standards required in the target qualification(s). The duration and effort required by the learner are in keeping with amount of credit earned in the target qualification(s).</td> <td>Non credit-bearing micro-credentials may or may not conform to the academic standards, including duration and effort, required in a formal qualification.</td> <td>Not specified</td> </tr> </tbody> </table>	Credit-bearing	Non credit-bearing	Certified participation	Credit-bearing micro-credentials include assessment aligned to a formal qualification level. Achievement of the learning outcomes leads to an offer of admission to or credit towards at least one formal qualification, regardless of whether or not the offer is taken up by the learner.	Non credit-bearing micro-credentials include assessment which may or may not be aligned to a formal qualification level. Achievement of the learning outcomes does not lead to an offer of admission or credit towards a formal qualification.		Credit-bearing micro-credentials mirror and contribute to the academic standards required in the target qualification(s). The duration and effort required by the learner are in keeping with amount of credit earned in the target qualification(s).	Non credit-bearing micro-credentials may or may not conform to the academic standards, including duration and effort, required in a formal qualification.	Not specified	N/A
Credit-bearing	Non credit-bearing	Certified participation										
Credit-bearing micro-credentials include assessment aligned to a formal qualification level. Achievement of the learning outcomes leads to an offer of admission to or credit towards at least one formal qualification, regardless of whether or not the offer is taken up by the learner.	Non credit-bearing micro-credentials include assessment which may or may not be aligned to a formal qualification level. Achievement of the learning outcomes does not lead to an offer of admission or credit towards a formal qualification.											
Credit-bearing micro-credentials mirror and contribute to the academic standards required in the target qualification(s). The duration and effort required by the learner are in keeping with amount of credit earned in the target qualification(s).	Non credit-bearing micro-credentials may or may not conform to the academic standards, including duration and effort, required in a formal qualification.	Not specified										
Standards	Standards are required and regulated.											
Modes and types	Sustained program of learning or validation of learning independent of participation in a program (online, onsite, blended)	Assessed course or validation of learning independent of participation in a course (online, onsite, blended)	Online or onsite experiences									
Certification	Testamur, academic record (paper or digital)	Certificate (paper or digital, including badges)	Nil									
Examples	Diploma of History Bachelor of Commerce Graduate Certificate of Education Master of Engineering	MicroMasters (edX) MasterTrack (Coursera) A single unit in a qualification Deakin Professional Practice Credentials	Personal reading Viewing documentaries									
		Specialization (Coursera) that does not earn admission or credit RMIT Creds Deakin Hallmarks	Cranlana Program									

Appendix C: Standards that might pertain to credit-bearing micro-credentials

Micro-credentials designed or retro-fitted as credit-bearing pathways to qualifications can be created with academic standards as a design principle, with due consideration for the amount of credit awarded. The standards practices listed below are largely derived from Australia's Higher Education Standards Framework (Commonwealth of Australia 2015). While they should be evidenced in all quality micro-credentials, they are especially important in credit-bearing micro-credentials and the target qualification(s) to which they may lead. This list of standards is not presented as definitive, *but highlights issues that might require attention, especially when micro-credentials earn substantial credit* or are offered on global platforms including by non-traditional providers, or to non-traditional cohorts.

Admission

- Prior to enrolment and before fees are accepted, ensure learners are informed of their rights and obligations, including all charges and refunds.
- Where previous learning or experience is part of the admissions criteria, ensure these are rigorously applied.

Orientation and progression

- Orientation occurs and is tailored to the needs of learner cohorts.
- Specific strategies support transition, including assessing the needs and preparedness of individual students and cohorts; undertaking early assessment or review that provides formative feedback on academic progress and is able to identify needs for additional support, and providing access to informed advice and timely referral to academic or other support.

Learning outcomes and assessment

- The expected learning outcomes are specified, consistent with the level and field of education of the target qualification.
- Methods of assessment are consistent with the learning outcomes, and validly assess progress and provide learners with timely feedback that assists in their achievement of learning outcomes
- Learners have equivalent opportunities for success irrespective of their educational background, entry pathway, mode or place of study.

Qualifications and certification

- All certification documentation issued by the higher education provider is: unambiguously issued by the registered higher education provider; readily distinguishable from other certification documents issued by the higher education provider; protected against fraudulent issue; traceable and authenticable; designed to prevent unauthorised reproduction, and replaceable by the higher education provider through an authorised and verifiable process.
- Records of results state correctly the full name of all courses and units of study undertaken and when they were undertaken and completed, credit granted through recognition of prior learning, the weighting of units within courses of study, the grades and/or marks awarded for each unit of study undertaken, where grades are issued, an explanation of the grading system used and any parts of a course or units of study or assessment that were conducted in a language other than English, except for the use of another language to develop proficiency in that language.

Staffing

- Staff with teaching and supervisory roles are equipped for their roles, including knowledge in the field as well as contemporary teaching practice; those who are not guided and overseen by staff who are appropriately equipped.
- Staff are accessible to learners seeking individual assistance, at a level consistent with the learning needs of the student cohort.

Learning resources and educational support

- The learning resources relate directly to the learning outcomes, and are up to date and accessible when needed by learners.
- Where learning resources are part of an electronic learning management system or platform, all users have timely access to the system and training is available in use of the system.

Academic integrity

- Preventative action is taken to mitigate foreseeable risks to academic integrity including misrepresentation, fabrication, cheating, plagiarism and misuse of intellectual property.
- Learners are provided with guidance on what constitutes academic misconduct and the development of good practices in maintaining academic integrity.
- Accountability for academic integrity is maintained in arrangements with any other party involved in the provision of higher education.

Monitoring, review and improvement

- Comprehensive review occurs regularly and includes the design and content of a the micro-credential, the expected learning outcomes, the methods for assessment and the extent of learners' achievement of those outcomes, taking into account emerging developments in the field, modes of delivery, the changing needs of learners and identified risks to quality.
- Learners have opportunities to provide feedback on their educational experiences and their feedback informs monitoring, review and improvement activities.

Delivery with other parties

- Work-integrated learning, placements, other community-based learning and collaborative research training arrangements are quality assured.
- When a course of study, or any parts of a course of study, are delivered through arrangements with another party or parties, whether in Australia or overseas, the registered higher education provider remains accountable for the course of study and verifies continuing compliance of the course of study with the standards in the Higher Education Standards Framework that relate to the specific arrangement.

Representation, information and information management

- Representation of the higher education provider, its educational offerings and charges, whether directly or through agents or other parties, is accurate and not misleading.
- Courses or units of study that are offered or intended to be offered are not described as accredited, whether by TEQSA or by a professional accreditation body for the purposes of registration to practise, until such accreditation has been obtained.
- Where units of study are offered separately from a course of study and are represented as eligible for gaining credit towards a course of study or a qualification:
 - the course(s) of study and qualification(s) for which credit may be gained are specified, and
 - the terms on which credit may be granted are defined.

- Agents and other parties that are involved in representing the higher education provider are bound by formal contracts with the provider, their performance is monitored and prompt corrective action is taken in the event or likelihood of misrepresentation or unethical conduct.
- Representations, whether expressed or implied, about the outcomes associated with undertaking a course of study, eligibility for acceptance into another course of study, employment outcomes or possible migration outcomes are not false or misleading.
- Accurate, relevant and timely information for students is publicly available and accessible, including access for students with special needs, to enable informed decision making about educational offerings and experiences.
- Information for students is available prior to acceptance of an offer, written in plain English where practicable, accompanied by an explanation of any technical or specialised terms, and includes information to assist in decisions about courses or units of study; planning for and participation in educational and other activities; the obligations of students and their liabilities to the higher education provider including expected standards of behaviour; access to current academic governance policies and requirements; access to services and support; resolution of grievances; information to assist international students studying in Australia or offshore.
- Students are given reasonable notice of changes to a provider's operations including information about increases in fees and associated costs and any consequences that may affect their choice of, or ability to participate in, learning.
- Information systems and records are maintained, securely and confidentially as necessary to: maintain accurate and up-to-date records of enrolments, progression, completions and award of qualifications; prevent unauthorised or fraudulent access to private or sensitive information, including information where unauthorised access may compromise academic integrity; document and record responses to formal complaints, allegations of misconduct, breaches of academic integrity and critical incidents, and demonstrate compliance with the Higher Education Standards Framework.

Appendix D: Examples of micro-credential critical information summaries

Example 1 – Deakin micro-credential that earns a certificate on FL

Online course in [Health & Psychology](#)



Caring for Older People: a Partnership Model

As our lifespans increase, more and more of us are faced with the question: how can we care for older people more effectively?

[Join course for free](#)

Overview Topics Start dates Requirements Educators Try it More courses



 Duration
2 weeks

 Weekly study
3 hours

 Learn
Free

 Extra benefits
From \$99
[Find out more](#)

Title and brief description (30 words)	Caring for older people: a partnership model
Certified learning	Successful learners can: describe partnership-centred care; explain the benefits of a partnership-centred model of care for older people, their family and healthcare teams; explore how partnership-centred care strategies can be developed and applied to best support the needs and preferences of older people.
How learner participated	Online
Effort required (including assessment)	6 hours
Complexity of main assessment task	Application of a skill to a routine problem
Supervision and identity verification	Unsupervised, no identity verification
If assessed, equivalent level (main task)	Not at degree level
Quality assurance	Deakin University supported by the Wicking Trust
Successful learner earns	
<ul style="list-style-type: none"> admission to a degree program: 	No
<ul style="list-style-type: none"> credit towards a degree program 	No
<ul style="list-style-type: none"> If yes, how much credit? 	

Example 2 – Deakin Hallmark



Title and brief description (30 words)	Deakin Hallmark for Excellence in Leadership A Deakin University award, developed and assessed in collaboration with industry and community partners, which recognises outstanding achievement of capabilities valued in the workplace.
Certified learning	Proven ability to lead diverse people and projects; evidence of personal and social impact through leadership
How learner participated	Online
Effort required (including assessment)	Varies for individuals but requires a minimum of ten hours of effort
Complexity of main assessment task	Portfolio and reflective evidence for validation of proficiency
Supervision and identity verification	Supervised online , identity verified (one factor)
If assessed, equivalent level (main task)	Bachelor
Quality assurance	Deakin University
Successful learner earns	No
• admission to a degree program:	No
• credit towards a degree program	No
• If yes, how much credit?	

Example 3 – Professional Practice Credential



Bachelor-aligned

'I employ a range of methods and approaches to solve complex problems. I am an experienced professional.'



Pre Masters-aligned

'I design, use and evaluate research methods to investigate complex problems, situations or issues. I am a senior professional.'



Masters-aligned

'I make strategic evidence-based judgments to improve business outcomes. I am a senior leader.'

Title and brief description (30 words)	Critical Thinking Professional Practice Credential
Certified learning	The Critical thinking credential will: <ul style="list-style-type: none"> • Formalise the critical thinking skills you have gained in your career • Prove your critical thinking abilities to employers • Help future proof your career • Enable further development by benchmarking your abilities
How learner participated	Online
Effort required (including assessment)	10–12 hours
Complexity of main assessment task	Portfolio and reflective evidence for validation of proficiency
Supervision and identity verification	Supervised onsite , identity verified (two factors)
If assessed, equivalent level (main task)	Masters
Quality assurance	Deakin University
Successful learner earns	
• admission to a degree program:	No
• credit towards a degree program	Yes
• If yes, how much credit?	Any 2 credentials earn one unit of elective credit into any postgraduate degree where the course rules allow. In the case of Deakin's Professional Practice Master's degrees, students can complete 10 credentials and 3 units (totalling 4 credit points) of formal study.

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