

CHAPTER 9

Microcredentials futures

In this final chapter, we look at what the future may hold for microcredentials. The chapter begins by examining some of their current expected trajectories, looking at the different visions proposed by those who are developing them or influencing that development. It goes on to examine the different factors that will influence progress towards those visions, identifying some of the challenges that lie ahead. It ends by looking at recent developments in teaching and learning that could, in future, be incorporated within microcredentials.

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Visions of the future

Education, particularly education like microcredentials that is enabled by the use of technology, is a complex system. It includes communities, technologies, and practices that are informed by pedagogy (Scanlon et al. 2013). In order to succeed in the long term, each of the elements in this complex must be taken into account as the innovation is developed, modified and finally embedded. A vision of the future helps to shape the trajectory of development and also inspires those involved to take on and overcome challenges.

As previous chapters have emphasised, there is currently no single agreed definition of microcredentials. There is also no single vision of what microcredentials are trying to achieve, or of their future trajectory. The future looks different from the perspective of governments, industries and workplaces, HEIs, learners and educators. Broadly speaking, there are four main visions for the future: expanding learning opportunities, recognising learning, strengthening employment-related learning, and making money. These are not mutually exclusive but are combined in a variety of ways.

Vision: expanding learning opportunities

The vision of expanding learning opportunities has been associated with microcredentials since the term was first introduced. Community college staff interviewed by Howley (2010) were responding to an awareness that learners studying with the intention of moving into paid employment did not want to sign up for two-year degree programmes but were looking for diplomas or certificates that would take only a year or a semester of study.

Ten years later, a report on a European approach to microcredentials set out how this could be achieved not just in one college but across a continent.

Short-term learning opportunities leading to microcredentials can help to substantially widen learning and skills development opportunities, and further shape the lifelong learning dimension in higher education. A European approach to micro-credentials will allow higher education institutions to offer such courses on a larger scale and in a comparable manner throughout Europe, ensuring agreed quality standards, and facilitating their recognition and portability across the EU. (European Commission 2020: 4)

This vision of expanding learning opportunities is shared around the world. In a series of provocations published in the *Journal of Teaching and Learning for Graduate Employability*, authors in Malaysia outlined possibilities for a more flexible system, enabling increasing numbers of individuals from around the world to access education (Ahmat et al. 2021). In Australia, Healy (2021) emphasises that microcredentials should be designed and delivered in a lifelong learning ecosystem of educational, employment and social support systems, while Kift notes that, '[a]t their best, shorter, stackable (micro)credentials should allow for flexibility and learning pathways for those who do not necessarily want or need an expensive and [inflexible] formal qualification' (Kift 2021: iii).

The vision of expanding learning opportunities encompasses some of the challenges faced by traditional forms of education, such as certifying competencies, developing employability, and widening access to higher education (Martinez-Marroquin & Male 2021). Microcredentials, particularly stackable microcredentials,

could enable learners to personalise accredited learning pathways to a greater extent than was previously possible, building their skills and competencies by collecting evidence of learning in flexible ways, at their own pace, and according to their own priorities (Morris, Jones & Salem 2021). Crow (2016) identifies ways in which learning could be opened up with the introduction of courses that would be more accessible, more affordable, shorter, personalised, and available on demand.

Vision: recognising learning

One of the challenges associated with current university education is that it only accredits some forms of learning. Microcredentials have been proposed as a way:

to allow learners to receive formal recognition of their new knowledge and skills. Through the use of authenticated badges, learners can accumulate digital evidence of their knowledge, skills, and abilities and may receive transferable academic credit through a network of partner colleges. (Davis 2012: 90)

A report from Trinity University Texas goes into more detail:

Online tracking of student accomplishments makes it possible to document student learning at multiple milestones. Rather than focusing on a course grade, a diploma or transcript, microcredentials are awarded for learning achievements. (Browne et al. 2012: 6)

Microcredentials make it possible to ‘recognize a variety of skills, knowledge and experiences, both inside and outside of traditional educational settings’ (Clements, West & Hunsaker 2020: 154). They have the potential to be ‘a form of credentials which represent competencies, skills, and learning outcomes derived from

assessment-based, non-degree activities and specify a location for evidence of the content of the earned achievement’ (Ehlers 2018: 2). They can also be used to demonstrate that individuals are engaged and productive members of a community (Fedock et al. 2016).

This vision is associated with a focus on ways in which learning can be recognised – through certificates, digital badges, professional or academic credit. ‘Microcredential’ refers not only to the learning experience but also to the qualification awarded (Lantero, Finocchietti & Petrucci 2021). It is important not only that learning takes place but also that it is understood by wider society to have taken place.

Learners in European universities report that lack of awareness and appreciation of microcredentials, especially from industry, ‘significantly decreases the value of micro-credentials to them’ (Kukkonen 2021: i). A survey of 201 Canadian/employers in 2020/21 found that only 10% had a good understanding of the term, while 59% were not familiar with it at all (Pichette et al. 2021). It is therefore not surprising that a 2020 consultation in Australia reported strong support for a recommendation that ‘the approach to micro-credentials should focus on development, recognition and certification of micro-credentials’ (Government of South Australia 2020: 4).

Vision: strengthening employment-related learning

It is possible to expand learning opportunities and recognise a wide variety of learning without specifying a study focus. Following a desk research study, MICROBOL, a European project concerned with microcredentials and their links to existing frameworks, stated that ‘[a] micro-credential is designed to provide the learner

with specific knowledge, skills or competences that respond to societal, personal, cultural or labour market needs' (MICROBOL 2020: 7). However, this definition is wider than many others. There is a widespread view that not only should these courses be short; they should also be focused on preparation for, or advancement within, employment.

In terms of professional development, microcredentials are seen to provide opportunities 'to engage in rigorous, self-paced, job-embedded professional learning' (Acree 2016: 1), to strengthen professional learning at scale (Brown 2019), and to transform professional development (Berry, Airhart & Byrd 2016). They are also viewed as a potential solution to the rapid upskilling required in society (Oliver 2019) and as a way of developing the work-based learning of employees to support both reskilling and upskilling (Nic Giolla Mhichíl et al. 2020).

Even when microcredentials are placed in a wider context of learning and development, as they were by MICROBOL, the link with employment is present. 'The micro-credentialing movement offers great promise in helping to redesign and even reimagine more future-fit and complementary credential frameworks to enhance employability, continuous professional development and the goal of a thriving learning society' (Brown and Nic Giolla Mhichíl 2021: 1).

However, despite the implication in many reports and papers that workers and potential workers are searching for new forms of accreditation, there is little evidence that the impetus for the introduction of microcredentials has come from the workforce. This is a top-down, rather than a bottom-up, initiative that is considered important:

because of the disruption in labour markets being caused by automation and digitalisation, which has been

intensified by the economic impact of Covid-19, the labour market is rapidly changing, and governments believe that the labour force needs massive re-training in order to adapt. Microcredentials, being employer-focused and relatively short (and hence low-cost), offer potential benefits in this restructuring of the labour force. (Bates 2021)

Vision: making money

Government- and industry-led initiatives are often associated with income opportunities and so it is not surprising that some providers have moved into this market with an eye on the opportunities it provides for them rather than for learners. In 2021, a market intelligence platform predicted ‘Online Degree and Micro-Credential Market to reach \$117B by 2025’ (HolonIQ 2021), an indication of how attractive this development could be for investors. At the start of 2022, education group Pearson agreed to buy the certification company Credly in a deal that valued it at 200 million dollars. At the time, Pearson’s chief executive officer stated that verified credentials were increasing in importance, making individuals either better employees or more employable (Holton 2022).

Microcredentials can be seen as

an outgrowth of the neoliberal learning economy. In this economy, education resembles a commodity, a product, or service marketed and sold like any other commodity ... Educational institutions adapt to competitive market pressures by behaving like profit-seeking firms, not only conceiving education as a commodity but also treating students and their employers as paying clients. (Ralston 2021: 85)

Whelehan and Moodie argue that ‘micro-credentials are gig credentials for the gig economy ... an income stream for universities,

including the most elite universities' (2021b: 1), while Golden and her colleagues (2021) note that short learning programmes such as microcredentials provide HEIs with a source of revenue that is less regulated by governments than much of their other income.

From this perspective, microcredentials can be seen as an example of the 'Silicon Valley narrative', which declares that the current educational system is broken and requires transformation along the lines of hi-tech companies (Weller (2015) explores and critiques this view). However, as Brown and Nic Giolla Mhichíl (2021) point out, microcredentials are developed in many contexts with a variety of objectives and cannot be treated as a uniform entity. Some people see them as an important new revenue stream; some have other visions, and simply want these new courses to cover their costs.

Large-scale visions

Perhaps the most influential visions are those that will shape large-scale, national or transnational initiatives, some of which were introduced in earlier chapters.

One of the largest – extending far beyond microcredentials – consists of the 17 Sustainable Development Goals (SDGs) created by the United Nations in 2015. The fourth of these is quality education: 'Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all' (United Nations 2015). One suggestion here is that, because microcredentials offer new routes to lifelong learning, they can support citizens to be more active, and help to achieve development goals by reducing gender and other inequalities and supporting education for all (Brown, McGreal & Peters 2023). Another idea is that microcredentials could enhance sustainable practice by structured

development of the workforce (Curnow & Mori 2021). Gwin and Foggin suggest that:

Encouraging learners to progress through a series of small, culturally-relevant educational packages that address personal educational goals, and ‘badging’ their successes in a way that motivates them and validates their achievements, could greatly enhance the overall level of attainment of development goals (Gwin & Foggin 2020: 3).

These possibilities may prove to be true but, at this stage, they remain speculative and there is no clear route from microcredential implementation to achieving any of the goals.

However, although the route to the SDGs remains unclear, national and continent-wide frameworks do indicate how microcredentials can be implemented to achieve a vision. The Netherlands began a microcredentials pilot involving 32 HEIs in October 2021. This unites three visions for microcredentials.

Our aim with the pilot is for educational institutions’ continuing professional development (CPD) offer to have a clear and recognised value in the system ... give lifelong learning in the Netherlands a significant boost ... support individuals and society in flexible (lifelong) professional development. (Acceleration Plan 2022)

Europe set out its approach to microcredentials at the end of 2020 (European Commission 2020). The foreword to this document sets this work firmly in the context of the European Pillar of Social Rights, particularly ‘the right to quality and inclusive education, training and life-long learning in order to maintain and acquire skills that enable them to participate fully in society and manage successfully transitions in the labour market’ (European Commission 2017: 11). Overall, this European approach sets

its sights on two visions: expanding learning opportunities and strengthening employment-related learning. This link is also apparent in Australia's National Microcredentials Framework (Microcredentials Working Group 2021), which aims not only to enhance lifelong learning but also to relate microcredential knowledge and skills to industry needs.

In New Zealand and parts of Canada, the vision is of employment-related learning. New Zealand is making microcredentials a key part of its qualification strategy, replacing training schemes across the country with microcredentials. In each case, there must be 'strong evidence of need from employers, industry and/or community' (NZQA 2022). In Canada, the Ontario government committed almost \$60 million to a microcredential strategy that focused on employment-related upskilling (Pichette et al. 2021). Although a report related to this initiative referred to lifelong learning, one of its main conclusions was that 'institutions and governments should focus their microcredential strategies on upskilling adult learners with specific training needs, whose prior learning and experience has already provided a strong foundation of knowledge and transferable skills' (Pichette et al. 2021: 2).

Achieving the vision(s)

Overall, around the world microcredentials are part of a move to expand learning opportunities, with a focus on strengthening employment-related learning. Part of this strategy, though usually not central to it, is a move to accredit learning that previously went unrecognised. Underpinning this vision may be an intention to make money but this is seldom stated explicitly, whereas the value of microcredentials to learners and to society as a whole is frequently identified as a benefit.

In terms of an overall vision, this could be phrased as:

In 10 years, microcredentials will have increased access to learning opportunities, particularly opportunities to gain credit for workplace-related skills.

An examination of the educational complex of which microcredentials are a part makes it possible to see how attainable this vision is.

Achieving the vision: national and international contexts

The first elements of the educational complex that need to be taken into consideration are the broad contextual elements that affect these courses. These include policy context, the wider environment, funding opportunities and possibilities for revenue generation (Scanlon et al. 2013). In terms of policy, there is good support for microcredentials initiatives, with frameworks already developed to guide policy refinement in a host of countries. However, those frameworks indicate some of the complexities of the issue. The eight-line definition of microcredentials produced by Europe's MICROBOL project in 2020 refers to:

- the context of the European Higher Education Area (EHEA),
- alignment with the Lisbon Recognition Convention (law relating to the recognition of qualifications in Europe),
- the need for explicitly defined learning outcomes at levels in line with qualifications frameworks in the European Higher Education Area and National Qualification frameworks (QF-EHEA/NQF),

- an indication of workload in terms of the European Credit Transfer and Accumulation System (ECTS), and
- quality assurance in line with the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG). (MICROBOL 2020)

Worldwide, work is needed not only to align microcredentials with multiple existing frameworks but also to align them across countries and continents. There is a danger that different standards will be developed in parallel, as is already happening, leading to unnecessary confusion.

The complexity increases when the wider environment of microcredentials is taken into account because that environment includes not only government policies but also the standards associated with different industries, professions and providers. A particular area of tension is associated with quality assurance standards. Good-quality online courses are expensive to develop, so HEIs need to be able to present each course as many times as possible in order to recoup costs. At the same time, they must be able to demonstrate that the quality of the course is consistent across time, and in line with the standards of other parts of the curriculum. Fast-changing industries, such as information technology (IT), are less interested in consistency over time and more concerned with courses being up to date. A need for just-in-time training is not easily met by a course that must go through rigorous quality assurance processes to demonstrate it meets local and national standards.

Although there is a lot of work to be done in this area, there is also the political will to achieve it, as evidenced by government initiatives supporting quality assurance and standards agencies to incorporate microcredentials within their work (see, for example,

QAA 2022). At the same time, platforms are developing pathways to study that do not necessarily lead to academic credit but do lead to industry-relevant certification. For example, Coursera offers professional certificates in areas such as IT support and data analysis that are accredited by Google. FutureLearn offers ExpertTracks, which lead to a digital certificate, and microcredentials leading to professional qualifications such as PRINCE2 project management certification.

These different alliances provide various routes to accreditation and multiple ways of linking education with the job market. They are also being used to explore a variety of business models. Commercial companies and venture capitalists are unlikely to invest in or develop microcredentials if they see no return on their investment. Non-profits, including universities, will expect to be able to break even or, at least, to balance any financial loss against a gain in other areas. Partnerships with large companies are likely to attract learners willing to pay for qualifications that help them to get a job in the sector, and may also bring in revenue from companies interested in outsourcing their staff training. At the same time, learners need to be confident that the qualification in which they are investing time and money is recognised by potential employers and will continue to be recognised. A university degree maintains its currency for a lifetime – will the same be true of microcredentials?

There are currently multiple ways in which professional and academic accreditation are linked. Only some of these are described as microcredentials, but many exist within the same space and the differences are unlikely to be clear to potential learners. It is in this hinterland that a struggle between competing visions is playing out – on the one hand the visions of commercial companies

that see lucrative opportunities in providing training, and on the other hand those of not-for-profit organisations more interested in ways access to training can be extended. Central to this struggle is the issue of which accreditation learners value and who controls access to that accreditation.

Achieving the vision: learners

One conclusion of a review of the microcredential literature is that, '[d]espite the name, micro-credentials are no micro task for students to complete' (Nguyen et al. 2023: 1547). Oxley and van Rooyen (2021) consider microcredentials from the perspective of learners, writing 'as students enrolled in double undergraduate degrees across two institutions'. Considering the approach to microcredentials at both those institutions, they conclude that 'neither approach addresses how gaps in undergraduate skill-sets translate to employment outcomes' (p. 45). They propose an approach that includes the use of microcredentials to reward and incentivise university students as they develop employment-related skills.

As yet, there has been little investigation of the learner experience on microcredentials other than evaluations and market research that are not widely disseminated outside the institutions that produced them. The small-scale studies (Kazin & Clerkin 2018; Yilik 2021) that have been published focus on the experience of undergraduates, who are not typical microcredential learners in that they are already enrolled on a course of study at university level.

An internal report on microcredentials produced by The Open University (Papathoma & Ferguson 2020) drew on interviews with 27 learners from 10 countries. It found that microcredentials were

appreciated because they provide short, focused training to cover skills gaps, enabling learners to explore areas relevant to progression in a new or current career. However, some learners found the courses demanding in terms of the study skills they required. A subsequent internal report in the same series (Chandler 2023) drew on interviews with 42 learners. It found that more than a third (36%) had selected their microcredential to help with their current work, and another 29% had done so because government funding to help people develop their employment skills was available. Six of those interviewed had changed jobs since studying the course, and only one of these said studying the course had not been a factor in securing their new post.

The price of microcredentials was identified as a barrier for some learners (Papathoma & Ferguson 2020). Those interviewed from India, Nigeria and Saudi Arabia found these courses an expensive way of gaining the certificates they wanted. Interviews with enrolment advisers drew attention to the number of learners from developing countries asking whether fee reductions, paying by instalments, or scholarships would be possible because otherwise the microcredentials would not be affordable. This is a significant challenge when working towards a vision of increased access to learning opportunities. If these courses are only accessible to those from wealthy economies, then they could increase the size of the digital divide rather than helping to reduce it.

More broadly, this opens up other problems related to inclusion and accessibility. Universities typically have some degree of support available for learners with disabilities. In many countries, this is a legal requirement. There is substantially less support available on a MOOC platform, where many courses or elements of courses are available free of charge, which means there is relatively little resource available for learner support. As many

microcredentials are based on these platforms, this raises challenges for potential learners who have disabilities. Iniesto's (2020) accessibility audit of MOOC platforms concluded that 'MOOC development processes need to be updated to produce more accessible MOOCs from the early design stages, with an important change in focus from legislation to actually meeting learners' needs' (p. 211). This is particularly challenging for educational institutions offering microcredentials because learners are not based on the same campus or even in the same country but are distributed around the world.

Achieving the vision: educators

To address these issues requires work from the educator teams who produce and present microcredentials. They face multiple other challenges. Microcredentials need to:

- be aligned with multiple existing frameworks as well as across countries and continents;
- strike a balance between requirements for high-quality just-in-time training and the time required to carry out quality assurance processes;
- offer value to learners, institutions and employers;
- ensure that learners are equipped with the study skills that will enable them to complete the course successfully;
- take into account the needs of those who are least likely to have access to high-quality education – otherwise they run the risk of widening the digital divide.

These courses must be produced in a landscape that is changing rapidly and where there are few experts to advise on the best

ways forward. One way of doing this is to locate a wider support network: current examples include Microcredentials Sans Frontières (www.microcredentialssf.org), the Microcredential Observatory run by Dublin City University (www.dcu.ie/nidl/micro-credential-observatory), and the FutureLearn Academic Network for those hosting microcredentials on the FutureLearn platform. Smaller-scale initiatives have also been set up at some institutions, such as the microcredentials community of practice at Trinity College Dublin (twitter.com/tcdmicrocreds).

Some academics are well used to collaborating with industry or with professional organisations so they can align their courses with extra accreditation, arrange for students to gain workplace experience, or integrate academic study with professional development. Others will be moving out of their comfort zone when developing microcredentials that require them to ‘co-design with industry partners, drawing on contemporary real-world practice and know-how or incorporating professional associations’ accreditation standards’ (Rossiter & Tynan 2019: 6). They may need support both in setting up these collaborations and in establishing shared ways of working that enable them to succeed.

A point of conflict could be the pedagogic approach. One view of microcredentials is that larger qualifications can be disaggregated into components and unproblematically reassembled, the sum is the total of the parts, and the outcomes of learning are assumed to be observable, unproblematic and transferable (Wheelahan & Moodie 2021a). This view is more likely to be held by people who do not work in an educational setting. As Chapter 2 showed, larger qualifications require progression – courses aimed at final-year undergraduates are more complex and more specialised than those developed for first-years. In addition, the soft skills and study skills that can be developed over a

year or more of study cannot all be broken into parts and studied in any order. This means there are misconceptions about learning and teaching in the context of microcredentials that need to be addressed when hybrid educational/professional teams are working on course development.

In addition, there are extra challenges to be addressed in terms of expectations. Learners ‘highly value the ability to personalise the experience by creating individualised learning sequences based on their pre-existing knowledge or skills, diagnostics or formative assessments’ (Rossiter & Tynan 2019: 7). Personalising courses is always desirable but is particularly difficult to achieve in settings where costs are being kept low, meaning little individualised support is available and the majority of formative feedback is necessarily automated or provided by peers. This places a demand on technical support teams to help find ways of supporting individual learners as much as possible without overloading educators.

Achieving the vision: technical work

At the most basic level, microcredentials require a great deal of technical work. This may simply involve setting up a new type of course on a familiar platform. However, it is more likely to require a range of systems that need to be connected in new ways. The technical team needs to take into account the entire user journey from enquiry through registration, study and assessment to award. This is likely to include interaction with the following systems.

Search engines to find a relevant microcredential. Internal search engines need to be primed to find these new courses; choice of title and metadata are low-cost ways of raising a course’s profile on external search engines, while more elaborate forms of search engine optimisation (SEO) can be carried out to raise awareness more widely.

Registration system(s). If the microcredential is not hosted on the main platform of the university or educational provider, two or more registration systems will need to be linked. If the learner is already registered on one or more of these systems, there needs to be some process for connecting accounts. This is problematic, as learners may not remember their previous sign-in details, and information such as name and contact details may have changed.

Payment and finance systems. Payment for a microcredential must be linked to both payment and accounting systems, with a system in place to process any refunds. In some cases, bulk payment will need to be enabled so that multiple registrations can be paid by an employer or another funding organisation. If the price varies by region, or if there are discounts available for some groups, these variations need to be built into the systems and updated as necessary.

Communication systems. Newly registered learners need information about their course and the support available, as well as about their registration and future options. Too little contact will leave them confused; too many emails about trivial details can result in all communications being ignored – another source of confusion.

Course systems. These include materials on the learning management system (LMS); communication with educators and with others studying at the same time; contact with educators; access to library materials, technical support, and any external materials associated with the course. If microcredential learners are paying lower prices than full-time students, they may have only limited access to these systems. In such cases, the differences need to be agreed and clearly defined.

Assessment system. A secure method of submitting assessment is essential on courses taken for credit. At one or more points, the identity of the learner will need to be verified – a difficult task

when students are based in a variety of countries. Work to be assessed must be transferred to markers and to those responsible for validating the result.

Plagiarism check and/or proctoring. Most awarding bodies will require some system in place to provide assurance that the work submitted is the work of the learner registered for the qualification.

Achievement. Marks, results and feedback on work must be communicated to learners and results recorded securely in case they need to be evidenced in future or counted towards a stackable qualification. If this is the last element in a stackable qualification, the award of the microcredential should trigger award of the qualification.

Certification. Successful completion should trigger release of a badge, certificate or way of accessing these. Rossiter and Tynan (2019) draw attention to the importance of using metadata to describe and define the microcredential, stressing that adherence to metadata standards underpins the degree to which microcredentials are accepted because those standards ensure an accurate representation of each microcredential, including how it was earned, who issued it and how its holder's identity was verified.

Follow-up. Completion (or dropout) may trigger a variety of other systems, including evaluation surveys, marketing information about related courses, and invitations to join professional bodies or alumni groups.

Data journey. Each of these different systems will collect data about learners. Some of this data, such as search engine analytics or payment data, may be collected outside the educational institution and then transferred to it. Some, such as registration details and results, may be collected within the institution and then passed outside it – for example, to the platform hosting the

microcredential. Some data will be collected within one system and passed to others; some is highly personal and should not be shared at all. In each case, secure methods of data storage and transfer must be in place.

Moving forward

Overall, creating a thriving microcredentials infrastructure is hard. It is not the same as introducing a new course or subject – the existing system is structured to make that possible. It is a more profound change, which requires buy-in at every level, as well as recognition of the need for change in every area of the existing ecology of practices. A Delphi study carried out to explore how micro-credentials might shape higher education in the coming decade found that, ‘in order for the wider-scale influence of micro-credentials to be felt, there is a need for considerable international and national strategy development and implementation to overcome a variety of policy- and technology-related barriers that HEIs cannot influence or tackle on their own’ (Pirkkalainen et al. 2023: 40).

Nevertheless, the vision of increasing access to learning opportunities, including opportunities to gain credit for workplace-related skills, is a positive one, well worth the effort. More than a quarter of a century ago, prominent educationalist Sir John Daniel observed that ‘a sizeable new university would now be needed every week merely to sustain current participation rates in higher education’ (Daniel 1996: 4). Despite the high number of new universities opening in countries such as China and India, the percentage of the world’s population successfully completing a college degree remains around 7% (100 People 2016). There is also a great disparity from country to country, with the average individual in

Belgium, Greece, New Zealand and Australia expecting to receive 20 or more years of schooling, while individuals in 18 countries in Africa and Asia will receive on average less than 10 years (CIA 2022). There is an enormous educational gap to be filled and microcredentials present one way of achieving this.

Despite the challenges, new developments offer different ways of supporting microcredential learners. MOOCS are already making use of emergent learning technologies. These include:

learning analytics to improve feedback, adaptive learning that offers personalised pathways, social network analysis tools that highlight connections, discourse analytics that support automated assessment, semantic web technologies that provide customised support, virtual problem-based learning that allows learners to develop their skills within immersive environments. (Ferguson, Sharples & Beale 2015: 8)

At the same time, new pedagogies are being trialled and developed. The following examples, which are particularly relevant to microcredentials, are drawn from the *Innovating Pedagogy* reports published annually by The Open University since 2012.

Action learning

Action learning is a team-based approach used to address both real and immediate problems (Ferguson et al. 2019). It is particularly relevant to microcredentials because it was developed for workplace learning. Action learning is used both to improve existing skills and to solve problems that are significant to those taking part. Learners work in small groups with a trained facilitator. Each group contains a diverse set of people who have different interests and experiences. Each learner introduces a problem or issue of concern. Groups meet regularly and share different

perspectives, enabling them to find and apply solutions. They are supported to do this by being prompted to ask questions, share experiences and reflect on their actions. The approach is particularly well suited to microcredentials studied by cohorts from the same company or based in the same location.

Artificial intelligence in education

Artificial intelligence (AI) describes computer systems that interact with people and the world in ways that imitate human capabilities and behaviours (Kukulska-Hulme et al. 2020). Learning systems that make use of AI are increasingly deployed in educational settings around the world, as well as in corporate training. In addition to the generative AI tools such as ChatGPT that began to grab the headlines in late 2022, student-facing applications of AI include intelligent tutoring systems, dialogue-based tutoring systems, exploratory learning environments, automatic writing evaluation, and conversational agents.

Computational thinking

Computational thinking is a powerful approach to thinking and problem-solving (Sharples et al. 2015). The approach involves breaking large problems down into smaller ones (decomposition), recognising how these relate to problems solved in the past (pattern recognition), setting aside unimportant details (abstraction), identifying and developing steps necessary to reach a solution (algorithms) and refining these steps (debugging).

These computational thinking skills can be valuable in many aspects of life, not only while studying a microcredential but also in the workplace. The aim is to teach learners to break problems down and then structure them so they can be solved. This is a skill

that can be applied across disciplines – it is as relevant when studying mathematics and science as it is while studying art. This is an approach that microcredential learners can add to their set of study skills, enabling them to master an art of thinking that will enable them to tackle complex challenges in the workplace and beyond.

Evidence-based teaching

Evidence-based teaching (Kukulka-Hulme et al. 2021) uses research evidence to inform decisions about the best pedagogical approach to apply. Decisions might relate to the most appropriate teaching strategy for a specific topic, capturing learners' progress over time, or assessing the effectiveness of teaching. Evidence-based teaching can support educators to identify and apply best teaching practices, debunk harmful myths about teaching and improve current teaching and learning.

Evidence-based teaching examines research findings to determine whether a given approach has proven benefits, or to identify the conditions under which an approach will work. For example, robust evidence supports the provision of good-quality feedback and the development of skills that can help students understand how they learn. Several HEIs carry out studies that examine in a systematic manner which techniques are beneficial, how different approaches are perceived by learners, and what their impact may be on what is learned.

Online laboratories

In scientific disciplines, laboratories are important resources that enable students to apply their knowledge and develop their skills. However, there are times when it is not possible or not appropriate to use a physical laboratory; this may be when studying

a microcredential at a distance or when learners need to engage with dangerous activities. In these cases, online laboratories provide a viable alternative (Kukulska-Hulme et al. 2020).

An online laboratory is an interactive environment where simulated experiments can be created and conducted. In some cases, these labs are accessed through the web; in others they may be a program running on a computer. The aim is that learners will experience the procedures involved in carrying out a science experiment (including the consequences of any mistakes) and will get the results of those experiments. Learners are also able to interact with real scientific equipment at a distance through 'remote labs'. Although the sights and smells of experiments are missing from the experience, online labs are increasingly used in HE science and engineering courses. They offer flexible access, a reduction in costs, and instant feedback. They also enable learners to work with materials that would not be available to them in physical labs because they are too rare, dangerous or costly for most universities to source.

Virtual studios

Just as the laboratory is an important learning environment for science disciplines, the studio is the primary learning environment for many creative disciplines, including design and architecture. It is typically a hub of activity, a base for experiential and constructive ways of learning where tutors observe, comment and critique and students learn through doing (Ferguson et al. 2019). Virtual studios make use of the sharing experiences available on social media platforms but focus on learning activities associated with artefacts, including models, images and videos.

Virtual studios are not simply an online version of physical studios. They have their own educational value and offer new

possibilities. Like physical studios, they enable exchange of ideas and rapid feedback from both tutors and other learners. They also provide tools for recording, reflecting and archiving, enabling groups to work together even when they are far apart and not necessarily able to access the virtual studio at the same time as each other. A major benefit is scale – virtual studios can link hundreds, or even thousands, of students, enabling them to develop networks of support and learning. A globally distributed design, specification and fabrication studio is no longer an impossibility; it is a probable future for both design practice and education.

Conclusion

Microcredentials hold out the possibility of extending access to education, particularly at tertiary level and in career-relevant subjects. However, the development of a new type of course on a worldwide scale is a major endeavour, requiring input at all levels from groups including learners, educators, managers and technical staff. At present, the field is confused – the term ‘microcredential’ means different things in different regions, in different institutions, and even in very similar settings. There are substantial challenges to be overcome in order for these courses to be recognised and valued worldwide.

One evident gap at present is a learner-centred perspective. Governments see microcredentials as a route to upskilling their workforce, companies view them as a route to enhancing recruitment and training, and universities are exploring them as a way of expanding their offering. Learners are relatively silent – relatively few researchers and report authors have sought learner views on what is on offer and how it relates to the types of education they are looking for. In addition, the usual ways in which student voice

is heard – through student unions, student associations, alumni groups, face-to-face meetings and so on – are much more limited on courses that last only weeks or months than they would be on a degree course, apprenticeship programme or extended training programme. At the time of writing, there is little evidence that learners believe microcredentials are increasing access to learning opportunities, particularly opportunities to gain credit for work-place-related skills – and even less evidence that this is a vision that is important to learners. Amplifying and paying attention to their voices will be an important aspect of developing successful microcredentials programmes around the world that are really valued by learners.

At the same time, staff buy-in is crucial. Many educational initiatives show early promise, supported by the enthusiasm of staff to try something new and to explore new ways of teaching and learning. However, once the initial excitement has passed, the addition to already heavy workloads often becomes unsustainable and the innovation is set aside or replaced by something new. In the case of microcredentials, new ways of working are required, as are changes across the institution. The change required is not simply a matter of writing a few new courses or slimming down existing material – without support from other teams, educators will be overloaded. The vision for microcredentials needs to be one that teams across the institution are interested in achieving, as well as one that they view as having value for learners.

However, this is not just work for one institution. For a new type of qualification to be introduced successfully, it must extend nationally or internationally. Microcredentials need to have a value that is as well understood and recognisable as that of other qualifications. Degrees, apprenticeships, school-leaver qualifications and professional and technical certificates have different

names in different countries, but the relevant local versions of these are well understood, and these qualifications can often be transferred internationally with relative ease. This is not yet the case with microcredentials but it should be in the future as work at both national and international levels is creating the frameworks that can support this endeavour, while work at the institutional level continues exploring what is possible.

As this book has shown, developments in both technology and pedagogy can be used strategically to produce a new type of course that is not simply a cut-down version of a full credential, but an entity in its own right. Microcredentials are still a work in progress but they offer exciting possibilities for the future. If they are to achieve the vision of increasing access to learning opportunities – particularly opportunities to gain credit for workplace-related skills – then the experience of the educators and researchers on whose work this book is based will be an essential resource.

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