COMMONWEALTH *of* LEARNING

Designing & Implementing Micro-Credentials: A Guide for Practitioners

A TOPICAL START-UP GUIDE TO DISTANCE EDUCATION PRACTICE AND DELIVERY

Introduction

Interest in micro-credentials has been growing, fuelled by demand from learners for short and flexible forms of learning and from industry and employers for verified skills-based credentials to satisfy the needs of the new world of work (Deloitte Access Economics, 2017). This trajectory has been largely shaped by external drivers forecasting the need for rejuvenated workforces as our digital ways of working expand in Industry 4.0, accompanied by the increased need for soft intra- and extra-personal skills (World Economic Forum, 2018). Globally, education leaders, practitioners and technologists are being challenged to respond to demands for new forms of credentialing, such as micro-credentials, and to define how these fit with existing credentialing frameworks and an emerging digital credentialing ecosystem (Chakroun & Keevy, 2018).

What is a micro-credential?

The term "micro-credential" can mean something slightly different to various constituencies around the world. In fact, the lack of an agreed definition and a global taxonomy can make it confusing and bewildering to navigate. Unlike more formal qualifications, such as the degree, which has some intra-global frameworks, the fledgling world of micro-credentials has no such framework. A micro-credential is shorter than an award course but can represent from one to 100 hours of learning, may or may not be certified by an accrediting institution or association, and may be taken online or as a face-to-face experience. Notwithstanding this, there is generally consensus that micro-credentials are short, verified courses or learning experiences providing successful candidates with a digital certification, such as a "digital badge."

Micro-credentials can be stacked towards larger units of competence or capability, in a format that is verified, secure and shareable with peers, employers and educational providers. They normally certify achievement at a more granular, sub-course level and differ from traditional long-form credentials such as degrees and diplomas in that they are shorter, can be personalised and provide distinctive just-in-time value.

They can be earned in different ways but often through completing courses that incorporate structured learning designs with clearly evidenced outcomes. Alternatively, a micro-credential earner can demonstrate prior skills and learning achievement from work or life experience

> Micro-credentials are short, verified courses or learning experiences... with a digital certification.
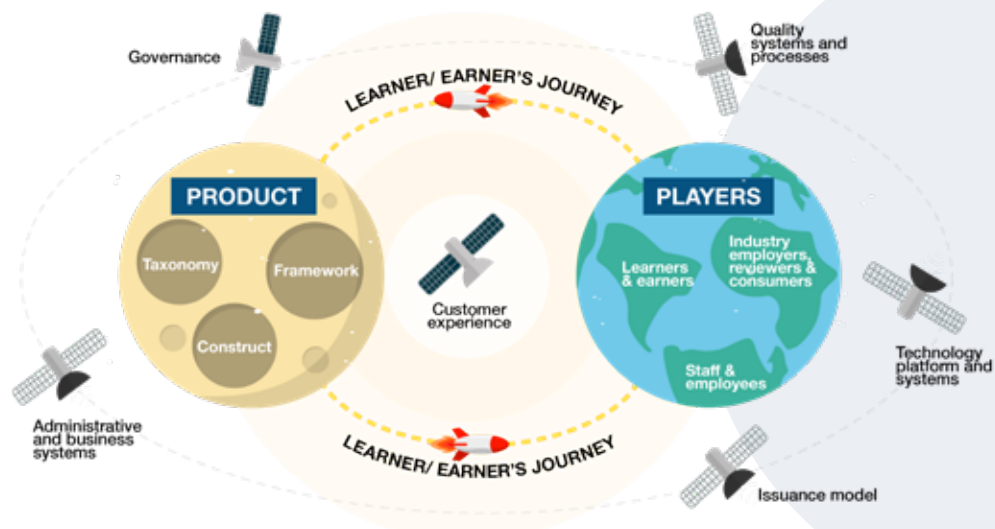
Figure 2. Micro-credential ecosystem

— assessable, for example, through a portfolio of evidence. This is the experience-earner model, also referred to as competency-based alternative credentials (ICDE, 2019). The fundamental requisite for all forms is the measurement of learning achievement through the consistent application of assessment criteria that provide verifiable evidence.

Figure 1 illustrates the common themes or attributes shared by micro-credentials, which are:

- the acquisition of small units of learning, skills or competencies, which have a distinct value in the workforce or for professional needs;
- verification by a recognised and trusted issuing authority (such as an educational institution or industry body); and
- the issuance of a digital artefact, such as a digital badge, as an alternative to a traditional attestation of learning, such as a formal transcript.
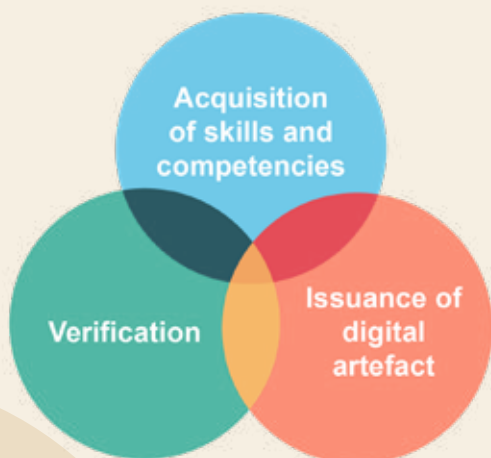
The micro-credentialing ecosystem

Micro-credentials, as with more traditional education and training credentials, do not exist in isolation but form part of a much larger ecosystem. It is therefore important to appreciate the interconnectedness of the various components of the ecosystem before embarking on any micro-credentialing initiative.

The ecosystem is made up of multifarious parts, but at its core are:

- The *players* — the learners and earners of the credential, the industry partners, employers and reviewers or consumers of the credential, and the staff or employees of the issuing organisation; and
- The educational *product* — including the product construct, which is the overall taxonomy and frameworks that show the structure and relationship between individual credentials. The product includes key attributes such as the micro-credential schedule of offer and the delivery mode.

Other elements include: the overall quality systems and processes; the customer and learner experience; the technology platform and systems; issuance models for claiming badges and other digital artefacts; the governance, policies and procedures; and the business rules to design, create and implement a full micro-credentialing solution. The micro-credentialing ecosystem, illustrated in Figure 2, may be thought of as a galaxy where the constituent elements, akin to planets, moons, satellites and so on, are all interconnected and working together in purposeful harmony.

Figure 1. Common attributes shared by micro-credentials

Planning the ecosystem

As with any new education initiative, particularly one with the potential to disrupt the status quo, the first step is to have a clear sense of what you are trying to achieve. Practitioners must be able to answer fundamental questions: "Why are we doing this?"; "What is our purpose or objective?"; "Who will be involved?"; "How will we go about it?"; and "How will we know whether we are successful?"

First, the Why

It is imperative to know why you want to develop micro-credentials, which necessitates identifying the goals of your initiative. Are these, for example, to respond to student demand for more relevant future skills, to make learning personalised, to break it into smaller, bite-sized chunks, or perhaps to work more closely with industry to ensure graduates gain mastery of work-ready skills? The options are wide but not mutually exclusive. Understanding the strategic intent will help you describe the benefits to your stakeholders, particularly to key players such as the credential earners and the reviewers or consumers of the credentials (e.g., employers and other educational institutions).

Next, the Who

The stakeholders or players in the ecosystem fall into three groups: learners and earners; reviewers and consumers; and the creators, curators and issuers of credentials. While these groups are quite diverse in many ways, they share several common attributes that should inform the design process.

The golden rule applies when designing a new product — that is, know your audience or market. These are the *learners and earners*, whether they be school leavers,

recent graduates, alumni, or mid-career employees looking to advance or pivot their career. They are not a homogenous group and will have some distinctive characteristics, but all share the common thread of being lifelong learners needing to fill skill gaps, upskill or reskill.

The next category, the *reviewers or consumers* of the credential, includes industry members, employers, government bodies, professional associations and educational institutions. In fact, this category comprises any individual or organisation that seeks to use a new form of digital credential to meet their own business requirements, such as recruitment, talent identification or upskilling staff.

Then there are the *creators, curators and issuers* of micro-credentials. These include designers, developers, subject-matter experts, IT and technology specialists, administrators and credential champions. Often, they are the staff, contractors or agents of the issuing organisation. Members of this group have specialist expertise and therefore act as micro-credential stewards, holding the ultimate responsibility for the quality and efficacy of the micro-credential initiative. If the enterprise is to thrive, it is important always to keep in mind the ecosystem's players and stakeholders, all of whom must work in harmony, appreciating and agreeing upon the value of the credential.

Now, consider the How

After reaching a clear position on the first two questions, it is time to address the issue of how to build micro-credentials and to cultivate the wider ecosystem. Consider what your preferred approach or methodology will be, one that aligns with organisational appetite, culture, funding and resources. Is it to be a small pilot, or will you take an enterprise-wide approach? Is there a sense of urgency to get going, or does a slower, more cautious approach fit better with the organisational

culture? Will an agile approach, with rapid "test-and-learn" iterations, work well, or is a waterfall project-management methodology more appropriate? Is there an intention to work with external partners? The overall purpose and objective of the project will necessarily inform your preferred approach.

What does success look like?

The scope of your initiative will inform the success factors. What will success look like in the immediate, intermediate and long term? The success metrics should include impact, cost–benefit, strategic alignment and sustainability across the components of the ecosystem, measuring product quality and efficacy, learner and stakeholder experience, and industry and employer acceptance.

Designing micro-credentials: creating a contemporary model

Micro-credential design warrants planning for the future as well as scoping out the immediate opportunity. For this reason, it is essential to consider more than the design for each stand-alone micro-credential and to ensure that each credentialed product can be situated within a

wider architecture. Important factors are: determining the relationship between individual credentialed products and whether a hierarchy or other organising structure exists; assessing the size, duration or weight of each micro-credential; and mapping the micro-credentials against the relevant skills, competencies or capabilities. Having an overarching system and schema adds rigour and value to the ecosystem by articulating a meaningful pathway for each micro-credential and minimising the risk of inadvertently creating dead-end pathways or orphan products.

Figure 3 provides a schematic view of the micro-credential product, incorporating a taxonomy, a "Skills and Capability Framework" and a micro-credential design methodology and principles.

A credentials taxonomy

A credentials taxonomy (Ifenthaler, Bellin-Mularski, & Mah, 2016) provides the overarching architecture, in particular indicating the structural relationship between the credentials. As micro-credentialed products reside primarily within the non-formal and informal learning domains, a taxonomy is desirable to demonstrate relationships, such as product "stacks" or "clusters," to articulate pathways between newer alternative forms of credentials and

Figure 3. Schematic of a micro-credential product

accredited award courses and programmes (Gallagher, 2016; Williamson & Pittinsky, 2016).

A nice analogy for a micro-credentials taxonomy is a "constellation [that] provides an overall picture of the credential system, gives a sense of scale and connects the parts" (Credly, 2017). The taxonomy can also provide a clear, standardised guide for the size or weighting of a micro-credential, capturing at a granular level attributes for each, such as the volume of learning, the depth, breadth, complexity and coherence of knowledge, and the skills and assessment criteria.

The "Skills and Capability Framework"

The "Skills and Capability Framework" provides the long view or the master plan for all the skills, competencies and personal attributes the issuing institution intends to offer. It acts as the guiding star for mapping each micro-credential to core themes and capabilities. A tenet of the framework is its focus on the application of industry-relevant knowledge, skills and competencies, rather than on a more theoretical and formal curriculum. The framework functions at a practical level to inform decisions about what skills and competencies to leave in and what to take out of the micro-credential catalogue.

Designing the individual learning module or course

Design methodology and principles

When designing a micro-credential module, a key decision is whether to build, to curate (e.g., using open educational resources — OER) or to license content. The latter two options may offer a fast and pragmatic approach to course development. OER also provide flexibility in that they can be edited, repurposed or generated as "mashups," which are blends of purpose-built and open-licence content.

There are also opportunities to co-design with industry partners, drawing on contemporary real-world practice and know-how or incorporating professional associations' accreditation standards. This approach reinforces the benefits of a "reverse-engineered" or "backward-design" methodology (as illustrated in Figure 4), where the design process starts with the outcomes or end goal — that is, the acquisition of a skill or capability — which only then is followed by considerations pertaining to assessment strategies, module design and content.

A useful way to move from a "content-driven" to a "backward-design" approach is to begin by drafting a short narrative describing the meaning of the credential, stating what the earner will be able to do and why it

World of Work — Capabilities

Digital Credentials — Criteria and Evidence

Module Design — Assessment & evidence of skills / Learning content

Figure 4. Backward-design model, focusing on the desired outcome

is important for them to possess a particular skill or competency.

Quality design principles are well accepted and understood in education. Pedagogy, learning theories, learning support and assessment models have been well documented, so only a few of the key tenets are highlighted here. These include: constructive alignment of learning outcomes; provision of scaffolded and authentic learning activities; designing for learner engagement and interactivity; inclusion of relevant, current and trusted content; learning support; appropriate choice of educational technology; usability; and adherence to disability standards and guidelines.

Micro-credential designs should incorporate constructs to deliver shorter, modularised and, ideally, stackable modules. Learners also 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.

If you envisage an online, large-scale implementation, self-directed learning approaches are a practical option but should be accompanied by adequate learner support, backed up by the ability to provide timely interventions if there is evidence that learners are struggling or disengaging.

A rigorous assessment strategy, along with careful consideration of the nature of the supporting evidence, lies at the core of the overall design process. Assessment should therefore be the anchor point within the ecosystem, to instil confidence in the value of a micro-credential. Clearly articulating assessment methods, criteria, tasks and evidence not only is a requirement for learners but is vital to enable the reviewers or consumers of the credential to appreciate its true value.

As part of the assessment process, consider new ways that might be appropriate to demonstrate the application of knowledge or skills. For example, this might involve assessment by industry professionals or the adoption of industry assessment standards. The notion of accompanying evidence and what would be appropriate to attach to a credential as proof is also an important factor, particularly in the context of data security or joint IP ownership.

The micro-credential design process will be further enhanced if undertaken with some insight into the overall learner and customer journey.

Figure 5. The learner-and-earner micro-credential journey

The learner-and-earner journey

The end-to-end experience encountered throughout the micro-credential journey can be understood as a series of steps with multiple "touchpoints" along the way, each of which represents a blend or amalgamation of the attributes associated with customer, user and learner experience. At each touchpoint throughout the journey, represented in Figure 5, there is the opportunity to influence the experience — to encourage, support, clarify, advise or intervene as appropriate.

The phases and transitions of the learner-and-earner journey are:

- *Be aware and understand* — the learner enters a period of discovery, information gathering and understanding, exiting with a good grasp of the value proposition of the micro-credential.
- *Choose* — the learner chooses the micro-credential(s) of interest and makes a decision to enrol.
- *Commit* — the learner enrols with a clear understanding of their commitment, including the effort, time, mutual obligations, benefits, costs, and terms and conditions.
- *Pre-commence* — the learner's enrolment is confirmed. This is the point of greatest motivation for most and therefore is the opportunity to engage more meaningfully with the learner, introducing peers, facilitators or mentors and providing the next steps in preparation for the start of course.
- *Commence and focus* — the learner commences the micro-credential course and is provided with support as well as, ideally, a learner dashboard to track progress and maintain motivation.
- *Complete* — the learner undertakes the micro-credential assessment, provides any required evidence and receives timely acknowledgement of their submission and notification of results and qualification.
- *Celebrate* — the earner claims their digital badge or other form of digital certification, and their achievement is acknowledged and celebrated.
- *Use, share and reconnect* — the earner publishes and shares the badge and is now encouraged to enrol in new credentials.

Technology and issuance model

Technology

The technology choices facing institutions depend on how the micro-credentials will be created, made available, managed and issued. When adopting the principle of an open system architecture, it is also important that these various composite systems, platforms and applications be fully interoperable. For example, a micro-credential offer relies on having a learning management system (or equivalent), an issuance platform and a learner/student administration system that records transactions (enrolments, completions, etc.). These systems must also interface with user authentication, identity management and data security systems. Similarly, a system of record that tracks and manages the micro-credential product lifecycle is required. While seen as core functions of today's educational institutions, these platforms and systems generally have been configured to support accredited formal educational programmes. New credentialing models will require at the very least modification to accommodate new product constructs, course design, engagement and support models for new cohorts of learners and stakeholders.

Institutions need to make early decisions about whether to create their own customised in-house software and systems, which may be expensive to build and maintain, given their complexity and ongoing need for new features. Alternatively, the option is to select an existing vendor that offers the appropriate technology features and levels of service. It may well be preferable, for example, to outsource the badging or digital credentialing issuance platform to an existing vendor.

Digital credentialing issuance model

The issuance model, depicted in Figure 6, includes the overall governance, rules and processes that determine how the credential will be released to the earner, along with the technical solution and digital badge design requirements. The issuing of a digital credential, such as a badge, is therefore the final verification and quality control gateway and should be subjected to stringent oversight and processes, ensuring the integrity of the whole micro-credentialing system. Once past this point, agency over the credential passes to the earner and into the wider ecosystem involving employers, industry, institutions and society at large.

Governance and administration

Governance is the mechanism that holds the issuing institution to account with respect to its strategy and purpose. As interest and excitement grow exponentially with the advent of new developments such as micro-credentials, many novel endeavours begin to blossom across an organisation. Clarity over governance and administrative processes will determine who has the authority to develop and issue the credentials.

Figure 6. Components of the issuance model

The administration of the micro-credentialing programme and the relevant policies, rules and processes, as well as the establishment and automation of workflows will determine the efficacy of requisites such as quality assurance, efficiency, consistency and scalability. These are necessary to engender confidence in the outcomes of the overall initiative and to ensure its sustainability. All such initiatives, irrespective of their scale or scope, need to identify key roles and functional responsibilities, such as the badge issuer and the release or quality assurance manager.

Technical solution

An essential requirement is to determine how the issuance of the credential will be triggered, at what point in the learning-and-earning journey, and from which technology platform or application within the system. The release trigger in many instances occurs within the learning management system, but as credentialing models diversify, other options may well emerge, such as from an evidence-based e-portfolio system, an enterprise integration platform or middleware software. The issuance requirement impacts the user experience, so as well as providing a technically robust and automated solution, it should also be attentive to the earner's expectations. The configuration or development of an IT system capability that can accommodate future issuance models and aspirations is definitely a key organisational decision.

Badge design

It is important to keep in mind the intended audience of the digital badge. In most cases, the badge and its inherent metadata will be used by groups external to the issuing organisation, so its design should be of most benefit to this audience. While the design should be distinctive, it needs to be identifiable with the issuer of

the micro-credential, in the same way that a testamur is associated with the institution awarding a long-form credential such as a degree. The design of the badge should reflect the brand of the issuing organisation. The shape, colour, font and use of iconography to represent a skill are influential factors but should be chosen in the context of institutional brand guidelines and with a critical eye to determining whether these elements will contribute positively to the impact of the badge.

Badge design can also reflect the taxonomy or structure of the micro-credential portfolio. For example, the badge design may represent — through colour, shape, the use of icons or logos, etc. — the skills, the weighting or the levels of competency indicated by a micro-credential, or the relationship with industry partners. The litmus test is whether it is readable, complies with disability legislation and clearly indicates the skill, competency or capability achieved. But the badge is more than an image. It is a smart digital artefact with embedded metadata, and this is what brings to the fore the real potential of digital credentials: the capacity to capture and share metadata in a way that is verifiable, trustworthy and shareable. Metadata, the information that accurately describes and defines a micro-credential, is a key attribute of this new digital form of credential. Adherence to metadata standards therefore underpins the degree to which micro-credentials are accepted within the wider ecosystem. The standards ensure an accurate representation of the micro-credential, including how the credential was earned, who issued it, verification of the earner, and potentially other details related to industry recognition and the like.

> The information that accurately describes and defines a micro-credential is a key attribute of this new digital form of credential.

Conclusion

Many organisations are experimenting with micro-credentials, while others are emerging to collect, publish and offer credentials. The decision to engage with these new forms of credentials will be influenced by many factors, as described in this guide. Each organisation will need to assess their own level of maturity as new and innovative forms of credentialing continue to evolve. The organisational appetite for change, its culture and readiness, and the availability of resources to support all the stakeholders involved in the journey should inform each implementation strategy and the accompanying operational planning activities.

To recap:

- Ensure you have a clear sense of the purpose and benefit to your key stakeholders.
- Develop an engagement and communication plan to nurture a culture for innovation.
- Assess institutional readiness to achieve your project goals against the components of the micro-credentialing ecosystem.
- Create an overarching system architecture and framework, including:
  - a credentials taxonomy (articulating the granularity of and relationship between the credentials);
  - a "Skills and Capabilities Framework"; and
  - quality principles and processes to design, develop and deliver micro-credential products.
- Create and map the micro-credentialing journey, remembering that each stakeholder will have expectations about the user, customer and learner experiences.
- Develop or modify the administrative systems, policies, business rules and processes to enable new credentialing models.
- Design an issuance model and digital badge.
- Ensure effective governance and administration are in place for analytic and reporting purposes.
- Assess the capability and capacity of the existing IT infrastructure and educational technology environment to support micro-credentialing, and select the issuance platform.
- Review and evaluate against all success factors.

Each organisation will need to assess their own level of maturity as new and innovative forms of credentialing continue to evolve.

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Useful websites

Digital Promise[1] presents the diversity of micro-credential types and provides a platform for other organisations to offer micro-credentials of their own.

The IMS Global Learning Consortium[2] provides standards and solutions to enable the sharing and transferability of digital credentials.

Open Badges 2.0[3] (OBv2) is a specification providing assurance of verification and transferability of metadata between certified badging platforms.

The Lumina Foundation launched the Credential Engine,[4] providing a registry for a common credentialing language (Credential Transparency Description Language, or CTDL) and for organisations to publish and share information about their credentials.

Making Informal Recognition Visible and Actionable[5] (MIRVA) is a European Commission project looking at conditions for effective continuity between informal and formal recognition and aiming to produce a series of enabling guidelines.

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1 https://digitalpromise.org/initiative/educator-micro-credentials/
2 https://www.imsglobal.org/initiative/advancing-digital-credentials-and-competency-based-learning
3 https://www.imsglobal.org/activity/digital-badges
4 https://credentialengine.org/
5 https://www.openrecognition.org/2017/09/27/making-informal-recognition-visible-and-actionable-mirva/

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