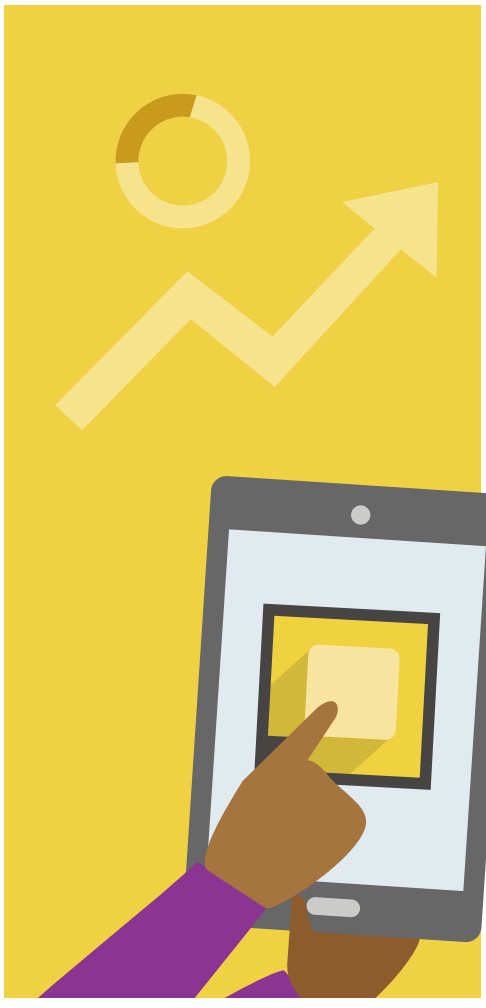
Empowering Learners,
Empowering Organizations

The Role of Micro-Credentials in Lifelong Learning and Development



Digital Promise®
Accelerating Innovation in Education

About Digital Promise

Digital Promise is a global nonprofit working to expand opportunity for each learner. We work with educators, researchers, technology leaders, and communities to design, investigate, and scale up innovations that empower learners, especially those who've been historically and systematically excluded.

Our efforts are multifaceted and grounded in the real-world challenges facing learners and educators—from working to expand K-12 students' access to high-speed internet to providing adult learners with opportunities to earn micro-credentials that further their careers and secure their well-being.

About Micro-credentials at Digital Promise

The Digital Promise micro-credential initiative has led the field through contributions of our research-backed, equity-focused framework that has been adopted across the industry. Our research and reports guide organizations, companies, institutes of higher education, and states, districts, and schools across the country to support the design of robust and scalable micro-credential systems with meaningful recognition and incentives for learners. Further, we also advocate for policy to support incentive structures and widespread adoption of micro-credentials at the school, district, state, and national levels.

The Digital Promise Micro-credential Platform has the most comprehensive micro-credential library of its kind and is the largest public platform serving the education field. Since its launch in 2015, it was the first-to-market with a focus on K-12 educators. Since then, we have offered more than 800 competency-based micro-credentials on a wide range of research-backed skills. We have worked with more than 100 issuing partners who are experts in many content areas. With more than 40,000 registered users, we have awarded 24,000+ micro-credentials. As a testament to the quality of our work, almost 40% of our micro-credential earners have received 11 or more badges.

As a nonprofit with a focus on supporting historically and systematically excluded learners, Digital Promise has developed practices and strategies that have positively impacted the digital learning ecosystem. We have led national conversations on quality assurance in the micro-credential space, addressing the growing challenges around quality content and assessment. We have also contributed to the development of a set of micro-credential design, assessment, and implementation principles that were published in January 2020. Digital Promise has also joined multi-state partnerships aimed at identifying "opportunities and challenges across states and developing model policy recommendations."

We are focused on how to enhance and scale the micro-credential platform as we continue to support historically and systematically excluded learners of all ages. Moving forward with new issuing partners and micro-credentials, we are looking to support all types of learners, with a particular focus on workforce, postsecondary, and K-12.

Table of Contents

Authors

- Marilys Galindo, Ed.D
- Rita Fennelly-Atkinson, Ed.D
- Kristen Franklin
- Christina Luke Luna, Ph.D

Editors

- Marilys Galindo, Ed.D
- Rita Fennelly-Atkinson, Ed.D
- Keying Chen
- Christina Luke Luna, Ph.D
- Ashley Miller
- Kristen Franklin
- Casey Baxley
- Sangyeon Lee
- Veronique Kulikov

Suggested Citation

Galindo, M., Fennelly-Atkinson, R., Franklin, K., Luna, C.(2024, August). The Role of Micro-Credentials in Lifelong Learning and Development: Empowering Learners, Empowering Organizations. Digital Promise. https://doi.org/10.51388/20.500.12265/225

Introduction

Competency-based micro-credentials are reshaping the way learners gain recognition for their skills and increasing access to postsecondary credentials and opportunities, particularly for historically and systematically excluded learners. They offer a quick, affordable, and flexible way to reskill or upskill, enhancing career preparation and employability. They also make skills visible that are not represented in standard higher education degrees, leading to better career alignment and employability.

To support such an inclusive credential, the Digital Promise micro-credential initiative advocates for policies supporting the widespread adoption of micro-credentials and offers the most comprehensive micro-credential library through its platform. The Digital Promise micro-credential initiative leads the field with a research-backed, equity-focused framework that has been adopted across the industry. As a nonprofit, Digital Promise focuses on supporting historically and systematically excluded learners, positively impacting the digital learning ecosystem and aiming to scale their platform for all ages.

What Are Competency-Based Micro-credentials?

The credential ecosystem has evolved significantly through macro-credentials and micro-credentials. Macro-credentials are college/university degrees and college and graduate certificates, while micro-credentials are a type of digital credential that verifies competency in a specific skill or set of skills (Brown, Mhichil, Beirne, & Mac Lochlainn, 2021; Tinsley et al., 2022). According to UNESCO (2022), a micro-credential "is a record of focused learning achievement verifying what the learner knows, understands or can do; includes assessment based on clearly defined standards and is awarded by a trusted provider, has standalone value and may also contribute to or complement other micro-credentials or macro-credentials, including through recognition of prior learning; and meets the standards required by relevant quality assurance" (p. 6).

According to Digital Promise (2023), micro-credentials are competency-based, research-backed, personalized, on-demand, and shareable. Micro-credentials leverage badging technology to issue digital certifications that verify competence of a skill or set of skills.

By recognizing and verifying a skill or set of skills, a learner can stand out amongst others. The Council of Chief State School Officers (2020) adds, "A micro-credential is a competency-based certification of a discrete skill." A micro-credential is earned when the learner successfully demonstrates competency via an assessment of the specific skill. This assessment requires the learner to implement the new skills in a workplace setting and show evidence of this implementation. Micro-credentials use the representation of a digital badge to provide details about the earning process, such as criteria and evidence.

Micro-credentials are usually offered online and can be earned asynchronously. A micro-credential can be standalone or sometimes stacked with others to demonstrate a higher level of understanding, depending on the offerings. Micro-credentials are offered and adopted by educational institutions, organizations, and companies.

The definition of micro-credentials can vary, depending on who uses the term and in what context. In this eBook, micro-credentials are not a learning or training program, but rather, they represent the ability to apply learning and knowledge. They recognize and certify specific skills and competencies no matter how people acquire them—through different types of formal and informal learning, work, and life experiences. Micro-credentials are competency-based, on-demand, personalized, shareable, research-backed, individually assessed by a subject matter expert, and awarded based on the successful demonstration of a skill. Micro-credentials are awarded as digital badges containing secure metadata that adhere to the 1EdTech Open Badges standard. Micro-credentials are not learning or training programs like courses or MOOCs, they are not completion-based or time-based, and they are not prescribed "sit and get." For example, an educator can earn the micro-credential Integrating Computational Thinking into Curriculum, by demonstrating how they support students in using computational thinking to develop understandings of ideas central to a discipline. This competency is focuses directly on the skill, and not the method by which the skill or knowledge was acquired.

To learn more about this topic, please read the chapters "The Role of Micro-credentials in the Credential Ecosystem" and "The Relationship between Digital Badges and Micro-credentials."

Designing Quality Competency-Based Micro-credentials

Throughout this eBook, the term "learners" represents everyone, regardless of age, because individuals engage in lifelong learning through their daily life experiences.

Digital Promise's framework takes a more rigorous approach to design high-quality micro-credentials that assess and recognize the application of specific skills and competencies. Learners submit evidence to demonstrate their competency, and they receive a digital badge if the issuing organization determines that the evidence meets the criteria outlined in the rubrics.

The following diagram shows where competency-based micro-credentials sit in the recognition and assessment space. There are two types of assessment: the one that assesses learning and knowledge and the one that recognizes skills. Digital credentials can be the proof or display for either one (e.g., an electronic diploma proves the completion of the degree in assessing learning and knowledge; a digital certificate proves that the earners show competency after a coding bootcamp where their skills were recognized). In digital credentials, there are digital badges or micro-credentials that test and verify knowledge, and there are competency-based micro-credentials that recognize skills—which is the concept that this eBook focuses on.

This diagram highlights a general overview of different types of credentials and how they are issued. As technology has spurred innovation and new capabilities, the educational landscape has also evolved. Historically, recognition for learning and skills were fairly standard, however, increased participation in postsecondary education has led to changes. As a result, learning programs may combine many of these elements and also issue multiple types of credentials to recognize learners.

	Recognition for Participation (No Assessment)	**Learning and Knowledge Recognition and Assessment**	**Skill Application Recognition and Assessment**	
Digital Credentials These types of credentials have emerged in the last decade and use 1EdTech's Open Badges standard for verification and sharing.	Digital badges issued for completion, attendance, or participation	Digital credentials or Micro-credentials that recognize achievements in learning and knowledge	Digital credentials or Micro-credentials that recognize achievements in learning and knowledge	**Issuing Organization** • Establishes criteria for earning the digital credential. • Issues the credential **Learner/Earner** • Owns and controls the learner record • Can share the record freely
Credentials These types of credentials have historically been issued and verified via paper records. Technology has allowed many of these records to be shared electronically through transcripts or other verifiable formats from the issuing organization.	• Completion Certificates • Participation Certificates • Attendance Certificates	• Institutional Credits • Standardized Assessments • Diplomas • Post-secondary degrees	• Practicums • Skills Labs • Apprenticeships/ Internships • Performance-based Assessments • Certificates that recognize skills-based programs	**Issuing Organization** • Establishes criteria for earning the digital credential. • Issues the credential • Owns and controls the learner record **Learner/Earner** • Has ability to share their personal copies of the learner record • May request a verified copy of the record to be shared

While standard macro-credential programs are criticized for their cost, time constraints, and lack of alignment with employment needs, micro-credentials are gaining momentum for their focus on specific, in-demand skills, affordability, and flexibility. The quality of micro-credentials varies; the most rigorous and meaningful micro-credentials are:

- **Competency-based**: These micro-credentials articulate a discrete skill to support professional practice and the specific evidence an individual must submit to demonstrate their competence in that skill.
- **Research-backed**: Each micro-credential is grounded in sound research that illustrates how that competency supports positive professional impact.
- **Personalized**: Learners can select the ones that are best aligned to personal goals or professional needs, and they complete them at their own pace according to their own schedules.
- **On-demand**: Individuals can start and continue their micro-credential journeys on their own time and in their own ways.
- **Shareable**: Micro-credentials can be added to a résumé and online profile and shared with current and potential employers, thus offering learners a flexible, affordable, and inclusive learning opportunity compared to standard higher education degrees (Digital Promise, 2023).

- **Recognizing**: Micro-credentials allow for the recognition of specific skills regardless of when, how, and where they were attained. They provide opportunities for learners to receive recognition for prior learning and skill attainment through a multitude of contexts and settings.

The terms "micro-credential" and "badge" are often used interchangeably since digital badges often represent micro-credentials. According to Education Design Lab (2023), a micro-credential is the "learning/earning experience," and a digital badge is the "technology used to display it." Digital badges are electronic images containing embedded metadata to recognize, display, and share information about a learner's skills and knowledge. However, digital badges are not always connected to a micro-credential. They are used to recognize achievements in formal and informal learning experiences, such as attending or presenting at a conference, making progress in coursework, or gamified learning—not necessarily tied to the recognition of specific skills.

To learn more about this topic, please read the chapters "How Micro-credentials Can Unlock Success for Learners" and "U.S. Trends: The Shifting Micro-credentials Policy Map."

Micro-credentials for Competency-Based Educational Innovation

Micro-credentials disrupt postsecondary pathways by offering ways to verify competencies gained through prior learning, on-the-job training, and lived experiences. Micro-credentials allow learners to get recognized for their skills by proving their competence through assessments. The assessment requires implementing the skill as evidence of competency. After completing the assessment, learners receive a micro-credential that they can share with higher education institutions and employers. The digital badge of the micro-credentials contains metadata, including evidence of their skills. This approach to skill recognition is reshaping how learners access and demonstrate skills in their careers. It also increases access to postsecondary credentials, particularly for historically and systematically excluded learners because it broadens opportunities to gain recognition for skills regardless of when and where they were developed.

Micro-credentials are a more inclusive and accessible option for learners to gain recognition for their skills and competencies. With over 71,000 credentials that exist on the Credential Registry (including diplomas, badges, certificates, apprenticeships, certifications, licenses, and degrees of all types and levels), a fraction of the logged 71,000 credentials are micro-credentials (Credential Engine, 2022). Micro-credentials are reshaping how we recognize and measure competence today. By offering a quick way to reskill or upskill, they provide affordable, flexible, and personalized credentialing options compared to standard higher education degrees, enhancing career preparation, employability, and lifelong and life-wide learning opportunities.

Digital Promise's micro-credentials are grounded in competency-based education (Brown, 2019). Competency-based education (CBE) focuses on the learner's ability to acquire and demonstrate specific skills. Competency-based micro-credentials are based on research depicting the importance of competency to the learner and require the learner to demonstrate their competence in a skill. Digital Promise's Competency-Based Assessment Framework emphasizes principles like impact, equity, access, and language to ensure inclusiveness and relevance (Brown, 2019).

To learn more about this topic, please read the chapters "Disrupting Postsecondary Pathways Using Micro-credentials," "Using Micro-credentials to Assess Competency-Based Education," and "Micro-credentials Designed for Today's Higher Education Learners."

Micro-credentials for Employment Innovations

In the workforce, micro-credentials are seen as a solution to rapid industry changes, allowing employees to demonstrate critical skills quickly. Micro-credentials personalize skill recognition by making visible skills not represented in standard higher education credentials, leading to better career alignment and employability. Due to their accessibility, affordability, and flexibility, micro-credentials help reduce inequities that historically and systematically excluded learners face. Employers value micro-credentials as they help narrow down the pool of candidates and verify specific skills needed to be successful for a position (Catalano & Doucet, 2013). Organizations are incorporating micro-credentials into their professional development programs to enhance productivity and offer employees opportunities for career-aligned skills development. Some of these organizations include Meta, IBM, AWS, Google, and Netflix, and they are using micro-credentials "to bridge talent gaps and create opportunities for learners who are oftentimes left behind by the high barriers to access that traditional education presents" (Agarwal, 2022).

To learn more about this topic, please read the chapters "How Micro-credentials are Meeting the Needs of the Workforce" and "The Power of Professional Development: How to Use Micro-credentials as an Organization."

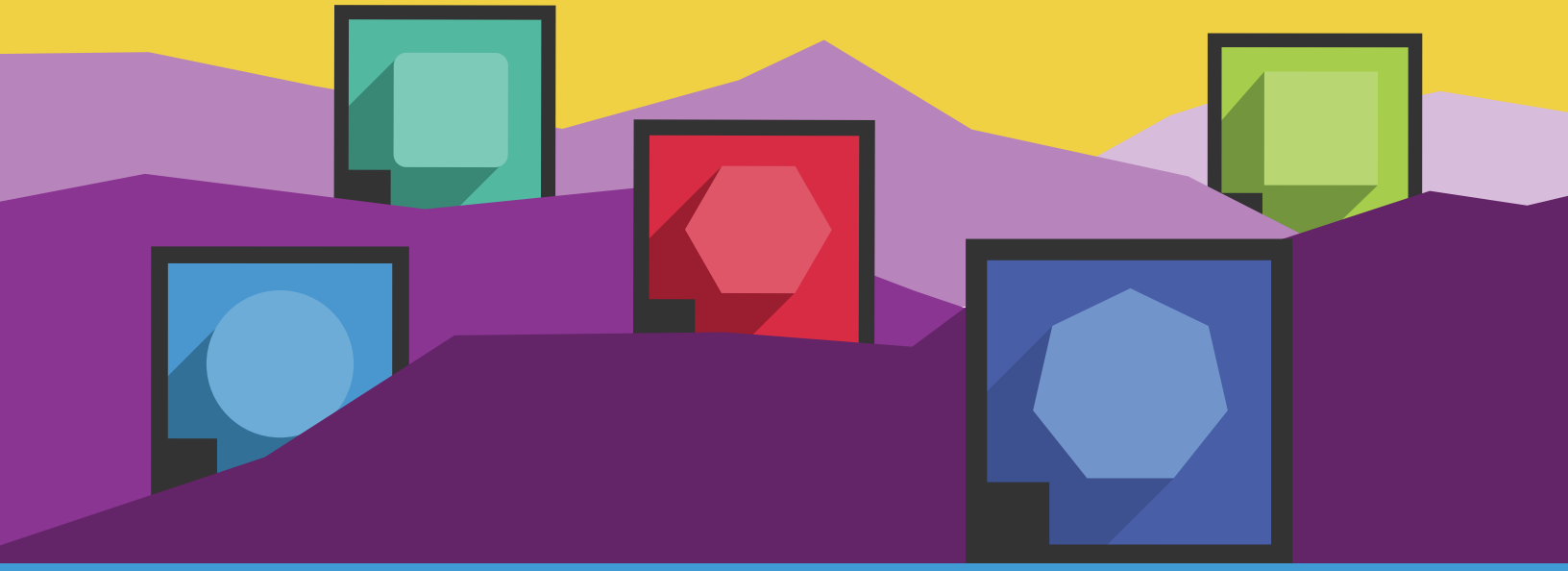
Micro-credentials and AI for Future Skills

As we look ahead, proponents of micro-credentials wonder about the role artificial intelligence (AI) will play in assessment. Assessing skills and competencies is crucial in micro-credentialing, but using AI for assessments, especially competency-based work, is currently not the best practice (Bubeck et al., 2023). While AI has made strides in natural language processing, it needs more specific contextual understanding and subject matter expertise for accurate evaluation. AI's assessment capabilities are limited to pattern recognition and statistical analysis. Despite being useful, human assessors remain indispensable for fair and accurate evaluations.

Still, we remain optimistic about the potential of AI within competency-based micro-credentialing. As we learn more about how to leverage this technology, we are confident that we will discover applications for AI that enhance equitable access and attainment to high-quality micro-credentials without compromising quality and trust.

To learn more about this topic, please read the chapter "Leveraging AI to Support Competency-Based Assessments."

This eBook focuses on various critical aspects essential for comprehending micro-credentials. It begins by presenting Digital Promise's definition of micro-credentials, followed by describing the position and role of micro-credentials in the credential ecosystem. The exploration extends to the value micro-credentials offer to learners, higher education institutions, and the workforce. Lastly, the implications of AI to micro-credentials and national trends on micro-credentials are introduced. Overall, this eBook serves as a comprehensive resource accessible to all interested in understanding micro-credentials.



The Role of Micro-credentials in the Credential Ecosystem

The first recorded credential ecosystem started in the year 859 at the University of Al-Quaraouiyine, Morocco, and was composed of scholars, bachelors, and masters (Ikhmal, 2021). Through the centuries, the credential ecosystem has evolved to meet the needs of society. Currently, it is composed of macro-credentials and micro-credentials. A macro-credential is a historically recognized credential like college and university degrees, diplomas, and college certificates. In contrast, micro-credentials refer to credentials that leverage innovations in technology, learning program design, and skill recognition such as digital badges, online certificates, micro-masters, nano-degrees, and endorsements.

Macro-credentials

Macro-credentials include four types of college/university degrees and two types of certificates. The four types of college/university degrees are associate, bachelor, master, and doctoral. The two types of certificates are college and graduate. Table 1 further explains and compares them.

Table 1. Types of Macro-credentials

Issuer(s)	Credentials	Credits	Time	Verification
Community, state, technical, and career college	Associate	60	2 Years	Transcript
Universities and some colleges	Bachelor	120	4 Years	Transcript
Universities	Master	30–60	2 Years	Transcript
Universities	Doctoral	48–120	3+ Years	Transcript
Colleges	College Certificate (undergrad level)	12–36	1+ Years	Transcript or license from accrediting body
Universities	Graduate Certificate	18+	1+ Years	Transcript or Degree Endorsement

"Educational degrees, which are being increasingly criticized for their high cost, especially in the United States, lack of alignment with employment needs, and inability to adapt in a timely manner to changing trends, are no longer the only answer" (Brown et al., 2021, p. 1). Macro-credentials no longer provide the job security or career proofing they once did. They fail to teach specific skills needed to stay competitive in today's workforce.

Micro-credentials

Soft and digital skills are two types of skills acknowledged by modern-day society as essential to success in the workforce. These skills are also increasingly being recognized by micro-credentials. Competency-based micro-credentials allow the learner to demonstrate evidence of their competence in a skill. They are grounded in research that illustrates how the competency will positively impact the learner's ability to effectively implement the skill. Learners can select which micro-credentials to complete and when to align them to their professional needs, making them personalized. Lastly, micro-credentials can be included on a resume or shared on online platforms like LinkedIn with current and potential employers.

By focusing on a specific skill(s), micro-credentials allow learners to earn a micro-credential as soon as a competency is attained, which makes the experience more attainable, affordable, and accessible. This model also creates opportunities to separate the skill assessment and recognition from the learning process, which enables learners to be credentialed for skills regardless of how, when, and where they attained them. This type of micro-learning is favored by learners who cannot pursue longer learning programs that lead to credentials such as a college degree. "Micro-credentials emerge as flexible and more inclusive learning opportunities to meet society's current and future challenges" (Bozkurt & Brown, 2022, p. 2). Micro-credentials allow the learner to quickly earn recognition for newly acquired skills to stay current with their industry, in contrast to pursuing a more costly degree that takes years to complete. Micro-credentials "are seen as the bridge to achieve 'better work-integrated learning and better learning-integrated work" (Saray & Ponte, 2019).

Micro-credentials in Action: Educator Development

Since 2014, Digital Promise has partnered with several organizations and educational institutions to integrate micro-credentials into professional learning pathways, with the goal of empowering learners, specifically those who have been historically and systematically excluded.

"Micro-credentials have supported my practice by providing me with a pathway to focus on a specific professional development goal without the regulated stress of a formal class. In many ways, I have learned more about my teaching style, current standards of 21st-century teaching, and best practices through micro-credentials," said Jessica, a sixth through eighth-grade science educator. "This is largely due to the structure and nature of micro-credentials as self-paced and self-monitored ways of professional development that are driven by my choice."

Digital Promise offers more than 580 competency-based micro-credentials on various research-backed skills, such as the Kentucky Valley Educational Cooperative (KVEC) stack of micro-credentials, Friday Institute's Learner Variability stack, and Childhood Education International's Refugee Educator stack. Digital Promise's micro-credentials are developed, assessed, and issued by more than 115 partner organizations.

Key Takeaways

- The credential ecosystem is ever-changing to meet the latest needs of society.
- Micro-credentials provide learners with skill recognition for the new skills they are learning and implementing to stay current with their industry.
- Micro-credentials shorten skill recognition, making them more attainable, affordable, and accessible for learners not able to pursue longer macro-credential programs.

The Relationship between Digital Badges and Micro-credentials

Credentials provide a method of verifying all types of achievements. Historically, achievements have been recognized with paper records, medals, badges, and other signifiers. In academic settings, credentials have included college and university degrees, diplomas, certificates, and endorsements that were often verified with paper records. Within the past few decades, technology has enabled paper records to be digitized in a variety of formats, which include digital badging technology. Digital credentials is inclusive of the digital versions of previously mentioned credentials, including digital badges and micro-credentials.

What are Digital Badges?

Digital badges are electronic symbolic representations sometimes used as micro-credentials to recognize competency in a skill (Stefaniak & Carey, 2019). Post University (2022) adds that a digital badge "acts as a visual representation of the micro-credential for sharing purposes." The micro-credentials earned on Digital Promise's Micro-credential Platform meet the Open Badges technical specifications stewarded by 1EdTech. A digital badge must be portable, shareable, controllable, and verifiable by the issuer and earner to be considered an Open Badge. A digital badge is portable if it can be transferred between any Open Badge standard-compliant system without losing achievement data. A digital badge is shareable, allowing the learner to share via social media, such as LinkedIn, and display it on their resume and email signature. Aside from the digital badge being portable, the earner can also control who sees it and which platform it lives on.

At Digital Promise, digital badges are used exclusively to issue competency-based micro-credentials which require learners to demonstrate their competence of a specific skill through implementation and evidence of such implementation. The evidence allows the employer to see the learner's ability to implement the skill, paving the way for authentic accountability.

Since their introduction, digital badges have been used for a variety of purposes. Earning a digital badge is "a way to demonstrate skills to potential employers, build identity and reputation within learning communities, and create pathways for continued learning and leadership roles" (Digital Promise, 2014). Digital badges are a way to recognize, display, and share information about a learner's skills and knowledge.

They recognize a variety of achievements that include participation, learning, and skill application.

For example, event organizers have used digital badges to verify that someone has attended or presented at a conference. Badges are sometimes used by instructors to mark progress in coursework or within gamified learning. These types of badges are often issued after completing a task or exam and may represent anything from completing an assignment, unit, or entire course. Digital badges can also provide a customizable learning experience, allowing the learner to choose what to pursue based on their career needs. Also, digital badges provide the opportunity to bridge the gap in career development, allowing individuals to acquire skills to stay up to date in their current position or prepare for a career change, displaying marketable skill sets to prospective employers. Digital badges can be issued for a variety of reasons and they are not always connected to a micro-credential.

*To learn more about micro-credentials, please read the "*What Are Competency-Based Micro-credentials?*" section in the Introduction.*

What Is the Difference Between Digital Badges and Micro-credentials?

Micro-credentials "are held to more rigorous standards than digital badges" and issued by an educational institution or organization (Post University, 2022). Digital badge and micro-credential are used interchangeably, especially since a digital badge represents earning a micro-credential. Digital badging technology is used to provide information about the learning, skill, or competency that is being verified. This provides flexibility in how a program that awards digital badges and/or micro-credentials is designed. Some organizations award just digital badges, while others award just micro-credentials, and others award both. For example, digital badges for certifications are offered by Google and Amazon, both multinational technology companies. On the other hand, micro-credentials are offered by educational institutions like the University of Maryland Baltimore County, the Project Management Institute, the University of Colorado Boulder, and many others. An example of both digital badges and micro-credentials being offered is at the Institute of Excellence in Early Care and Education at Palm Beach State College, where learners complete intentional pathways to earn competency-based digital badges and then the competency-based micro-credential, as a capstone. Lastly, some micro-credentials support the earning of college or graduate credit. For example, Wichita Public Schools offers to their educators micro-credentials that are connected to graduate credit from Friends University.

At Digital Promise, the micro-credentials require evidence of practice or implementation of a skill. Digital Promise's micro-credential offerings include standalone badges, stackable credentials towards a certificate, college credit, and many other purposes.

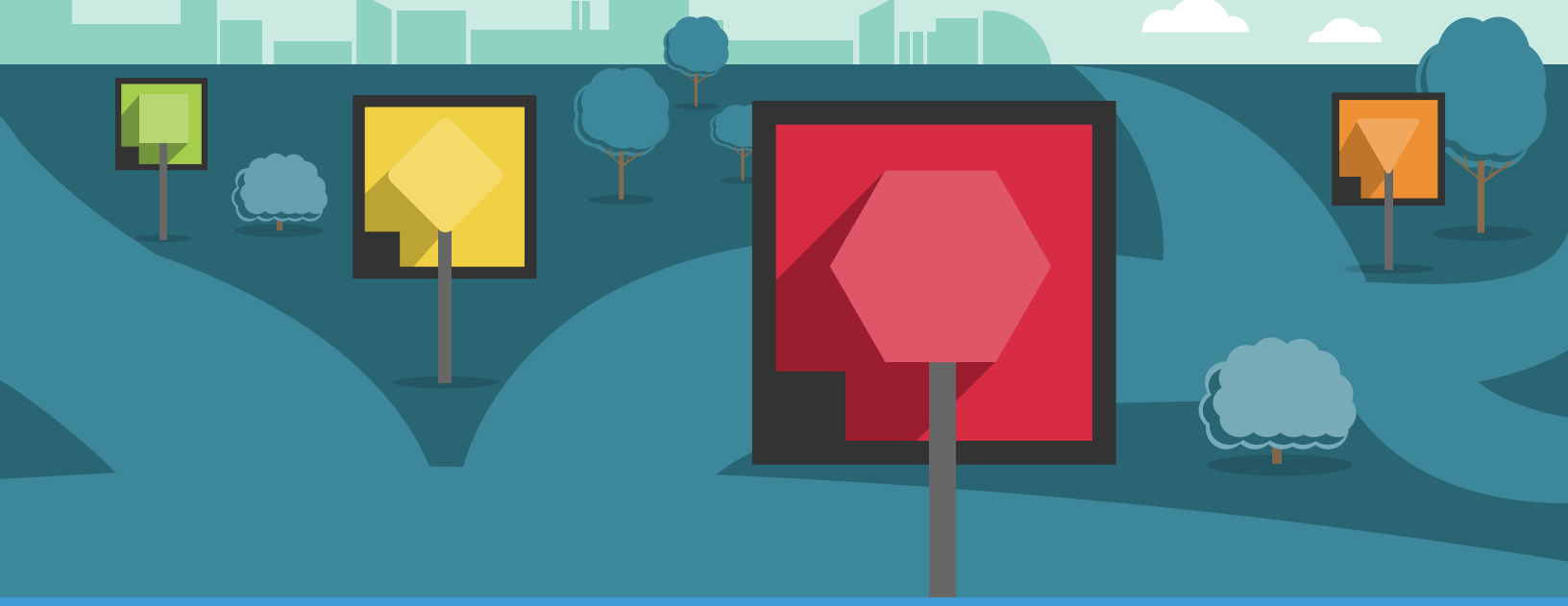
Using Open Badges as the Representation of Micro-credentials

This evidence is part of the digital badge's metadata. Digital badges that are Open Badges carry metadata about the learning experience, specifically what the learner had to do. Unlike transcripts, certificates, and diplomas that just state which learning program was completed and when, digital badges convey what the learner has demonstrated they can do. This metadata includes but is not limited to the badge name, badge criteria, badge image, issuer, issue date, recipient, tags, alignment/standards, expiration date, and evidence URL. The metadata "connects evidence and criteria" to provide "a wealth of information beyond what current educational credentials communicate" (Young, West, & Nylon, 2019, p. 106). Lastly, the metadata verifies the authenticity of the digital badge.

Micro-credentials use digital badges as representation and share metadata about the learning experience. They harness the technology of digital badges to create a professional learning currency (Cator, 2016). Hence, digital badges and micro-credentials go together.

Key Takeaways

- Digital badges are electronic representations that recognize a variety of achievements that include participation, learning, and skill application.
- Micro-credentials use digital badges as visual representation for sharing and verification of competency of a skill or set of skills.
- Micro-credentials rely on the metadata in digital badges to share information about the skills attained.
- Digital badges and micro-credentials offer learners a way to have ownership of their verifiable learning record.



Disrupting Postsecondary Pathways Using Micro-credentials

Micro-credentials as a Disrupting Force

Today, micro-credentials are used for verifying skill attainment that is typically outside of standard academic institutions, such as universities and colleges. While they are connected to learning, they can provide a mechanism to verify competencies gained through prior learning, on-the-job training, and lived experiences. Credential Engine (2019) noted that many micro-credentials have been issued by providers of Massive Open Online Course (MOOCs). Spearheaded by edX, MOOCs are online courses that can accommodate a very large enrollment. Online courses offered by MOOC providers were one of the early disruptive forces in education since they upended the idea that all postsecondary learning had to or should occur in academic institutions.

These disruptions in postsecondary pathways continued as a variety of organizations incorporated micro-credentials into their training and learning programs. Companies such as Google, IBM, and Amazon offer digital badges to represent their certifications that verify knowledge and skills in project management, UX/UI, cybersecurity, data analysis, and more. Outside of traditional learning institutions and employers, there are a host of organizations that offer professional learning services. Many professional development providers are now incorporating badging to verify completion of coursework completion. In some cases, micro-credentials may also be used with these offerings. 1EdTech (2024) distinguishes between types of micro-credentials: TrustEd Microcredential Knowledge, TrustEd Microcredential Application, and other micro-credentials or recognition badges. A TrustEd Microcredential Knowledge is issued when a learner develops foundational knowledge and is demonstrated by a validated assessment aligned to defined learning outcomes. A TrustEd Microcredential Application is issued when a learner demonstrates the ability to apply specific knowledge which is assessed by a validated assessment aligned to defined learning outcomes. Other micro-credentials or recognition badges are issued to a learner when they complete a task or participate in an event.

Digital Promise stands apart by exclusively offering professional learning providers a method to offer micro-credentials that verify the implementation of the practice. Developed with more than 115 institutions, we collaborate to provide a stamp of approval that signifies a learner has successfully implemented best practices. This type of micro-credential requires learners to submit a robust portfolio of implementation evidence, which objective subject-matter experts assess.

A Disruptive Force to Increase Access and Participation

This disruptive force is critical to improving equitable access to provide historically and systematically excluded learners with opportunities to achieve postsecondary credentials that offer economic security, well-being, and agency. In the past, institutions and systems have intentionally prevented many learners from accessing or participating in academic programs at all levels. Inadvertently, many learners have been unable to participate due to barriers such as time, money, proximity to institutions of learning, or knowledge of how to navigate the process.

Access to online learning and micro-credentials has allowed a remarkable number of learners to attain skills and evidence of their proficiency in less time and for less money. As more learners seek faster, inexpensive, and flexible paths toward postsecondary credentials, interest in incorporating micro-credentials into traditional and non-traditional programs has increased. However, it is imperative to collectively continue to increase access to more secondary pathways that lead to success as defined by learners themselves.

Ways to Continue Improving Access to Pathways of Success

With many types of credentials that already exist, it can be easy to use micro-credentials to verify learning and skills that are already confirmed using existing credentials such as a degree, certificate, or credit hour. Still there are questions to ask ourselves to continue the path toward innovation and access. These are some questions to ask when designing micro-credentials:

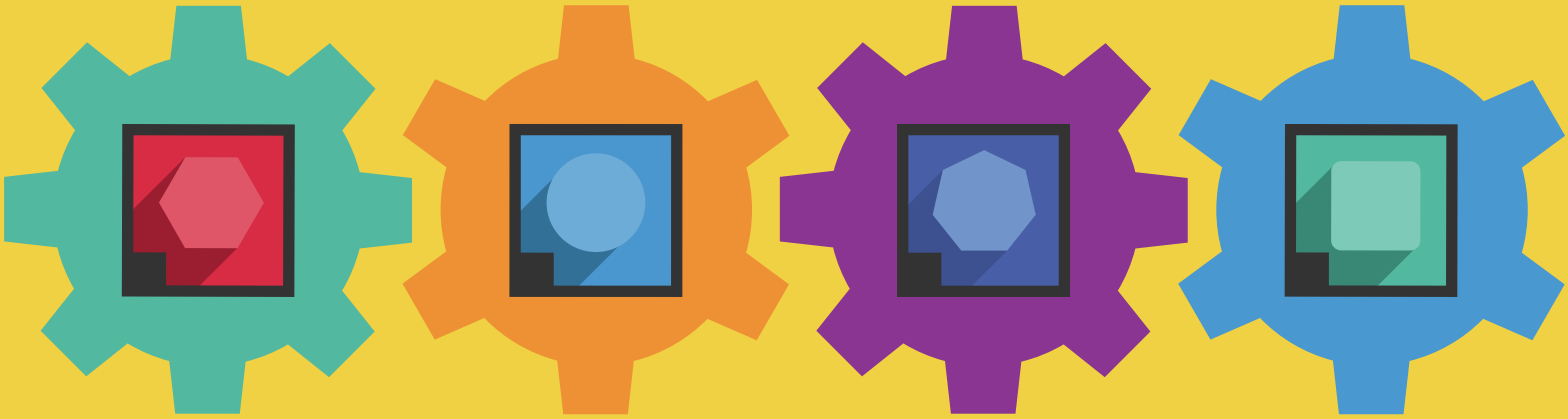
- How will this offering remove barriers that have prevented learners from earning other types of credentials?
- How is this offering different from other credentials we may already grant?
- How is this offering inviting learners who have been historically and systematically excluded to participate?
- How can I make this offering meaningful to learners' goals in gaining postsecondary credentials, employment opportunities and advancement, economic security, agency, and well-being?

By asking yourselves these questions, you can begin disrupting how learners access opportunities to verify their skills using micro-credentials.

> *Verifying skills is very important. One of the problems I have is that I don't think people understand my skills... my education. So, if you give a name to something that somebody is looking for, then they've got that verification, "Oh, yeah. Okay, you've got that skillset that I'm looking for." Whereas, I may have some of those skills right now, but because I don't have a name for them, that verification isn't there."*
>
> - Lynn O'Kane (Learner), Maine
> (Tinsley et al., 2022)

Key Takeaways

- Digital badging has created the opportunity to disrupt traditional pathways of learning through the innovative use of competency-based micro-credentials, which provides access to new learning opportunities and methods of sharing their learner records.
- Micro-credentials have emerged as a viable type of a digital postsecondary credential that supports economic security, well-being, and agency.
- Micro-credentials have provided an unparalleled number of historically and systematically excluded learners entry to postsecondary skill recognition and workforce opportunities.



Using Micro-credentials to Assess Competency-Based Education

Learning is happening all of the time, everywhere. People test and share ideas, navigate complex relationships, and communicate with multiple audiences throughout their lives. Even a 10-month-old baby, experimenting with walking while vocally dodging her older sister, demonstrates new skills daily. But the way that we formally recognize learning remains limited and inaccessible. Currently, the signals used by educators, education institutions, and employers to determine an individual's skills focus more on knowledge recall in a dominant cultural context rather than the application of learning in a culturally relevant context. What if there was a way to recognize the many different skills, competencies, and ways of knowing that people develop throughout their lives?

What Are Competency-Based Assessments?

Competency-based assessments are rooted in the pedagogical approach called competency-based education (CBE). CBE centers on a learner's ability to obtain and demonstrate a specific skill, set of skills, or piece of knowledge (Digital Promise, 2014). To assess competencies accurately, it often takes a different methodology than a traditional summative assessment; some rightly describe competency-based assessments as performance or demonstration assessments, where the learner develops and creates a portfolio of materials to demonstrate a full picture of the skill or knowledge.

Competency-based micro-credentials allow learners to demonstrate evidence of their competence in a skill (Galindo, 2023). They are grounded in research that illustrates how the competency will positively impact the learner.

Digital Promise's Competency-Based Assessment Framework

Early on, Digital Promise convened practitioners around the United States to come together and investigate the opportunities and challenges of micro-credentials. Out of that work came the first principles of the Digital Promise Micro-credential Framework: "built based on demonstrable skills, research-based rationale, multiple forms of evidence, and transparent and rigorous assessment and review" (Digital Promise, 2014). The framework—as it was meant to reflect continuous improvement, much like competency-based learning—has gained increased specificity regarding different learning contexts and types of skills that can be assessed via a micro-credential on the platform. In 2021, after conducting the first round of an internal content audit, Digital Promise iterated on the framework to ensure each micro-credential had exceeded principles in inclusiveness, equity, and accessibility (Younge & Franklin, 2022), on which most, if not all, micro-credentials on the platform are based on:

- **Impact**: Does this competency support all learners? Is there research that demonstrates how this competency or skill may negatively impact historically and systematically excluded learners?
- **Equity**: Does the micro-credential consider equity in how it asks for the competency to be demonstrated? Does it promote engagement with a diversity of learners? Are there options for the types of artifacts requested? If demographic data is requested, is it appropriate and relevant to the micro-credential?
- **Access**: Are content-specific words or jargon defined when necessary? Are the majority of links and resources free to access? If behind a paywall, are articles summarized or directed to locally available resources, such as a library?
- **Language**: Does the micro-credential use person-first, strength-based language instead of deficit language? Is there gender-neutral language used throughout?
- **The "Big Picture"**: Is the micro-credential still relevant? Does it reflect current best practices and research?

> *Julie Kasper, Refugee Educator Academy Program Manager at the Carey Institute for Global Good, described the [micro-credential] template as "constraining in a good way—and really rigorous." The organization knew it was working from strong research on refugee populations and pedagogy for its Sustainable Learning Design for Refugee Educators micro-credential, but found the translation to a micro-credential format to be a constructive challenge. Kasper explained, "The template forced us to think about the language we were using and the research we were citing. We rewrote and revised to make sure we had clarity. It made us slow down. Also it challenged us to find and cite research that is openly available, since some of the key research for our work isn't public. Doing those additional layers of research strengthened our work and our micro-credential."*
>
> (Brown, 2019)

All Digital Promise micro-credentials have been developed on the same research-backed framework. It has three major components:

- The first component is comprised of the Competency, Key Method, and Method Components. They are an overview of the competency: what are the skills and how the competency is demonstrated.
- The second component is comprised of Research and Resources. They are a series of helpful links and learning resources. Research is about what studies support this skill, and Resources are items to help, such as blog posts, videos, and templates–items that might be used in the submission or when demonstrating those skills.
- The third component is comprised of the Submission Criteria and Scoring Rubrics. This area will tell the learner specifically about what they need to answer, what evidence they need to submit, and what needs to be included in their response. It also has an assessment rubric, which the learner will see in advance, so they can use that as a guide to prepare their response. And it'll also be the guide that assessors will follow when assessing the submission.

Recognizing Learning through Competency-based Micro-credentials

Why are micro-credentials based on competencies, not admissions tests like the SAT or standardized testing? Because micro-credentials reflect a person's experience and skill, each person will submit something different. For example, below is the partial prompt for the Live Coding micro-credential:

Your video should capture the following:

- When you made a mistake and how you responded to it (debugging)
- How do you verbalize your thought processes
- How do you provide students with an opportunity to make a prediction or pose a question for them to discuss

The micro-credential does not ask about how much experience one might have, their other credentials, completed learning/training programs, or other privileged information—it only focuses on items related to the competency itself. This assessment approach is inclusive since people develop skills over time and at different paces.

Competency-based micro-credentials could be important in making skill acquisition that occurs inside and outside of school more visible to educational institutions and employers. For example, during the pandemic, many students experienced setbacks in terms of curricular gains as measured by benchmark and high-stakes assessments. The gaps were particularly pronounced among historically and systematically excluded learners. However, over the same period of time, those same learners may have gained a multitude of skills that were not formally recognized, such as tutoring a sibling, teaching an adult to navigate services and

support online, solving a problem using YouTube, and managing multiple tasks and deadlines. If learners had a way to demonstrate all they can do by earning competency-based micro-credentials, they could flip the narrative from one of learning loss to one of learning gains. These types of skills are often referred to as durable skills and are highly desired by employers because they are transferable across a wide variety of settings and roles.

Collaborating for Meaningful Recognition

It all comes back to recognition. Increasingly, learners are expected to ask and answer their own questions and pursue self-directed learning opportunities to explore their curiosities and develop skills. Therefore, learners need to feel confident that the effort they put into learning in all corners of their lives will be meaningfully recognized by those who control their access to future learning and employment opportunities.

As we explore pathways for students to earn competency-based micro-credentials and manage their learning data in digital wallets, we must simultaneously collaborate with and achieve commitments from employers and education institutions to meaningfully recognize the skills and competencies each badge holds. With recognition, these shifts will matter.

Digital Promise's Micro-credential Platform is a competency-based assessment platform. Learners explore and select micro-credentials of their choice, review the requirements, prepare evidence showing their competency of the skill they are pursuing, and submit it. The micro-credential is then assessed by assessors, who are subject matter experts in the content area. Then, if competency of the skill is demonstrated, the micro-credential is awarded by the issuing organization, and the learner receives meaningful recognition.

Today, Tomorrow, and Beyond

Traditional methods of measuring and assessing competence, such as standardized testing and formal degrees, have increased inequities in educational and workplace settings. While a many-pronged solution is necessary, one of the paths forward is through competency-based micro-credentials.

Micro-credentials acknowledge that individuals can obtain skills in many ways, whether through online learning, lived experience, self-directed study, or other learning pathways.

Fortunately, many employers have begun to recognize this opportunity and are implementing hiring practices that emphasize skills over degrees. Various higher education institutions are designing micro-credentials to meet the needs of their learners through the innovative, constructive, and specific learning experiences micro-credentials provide.

Key Takeaways

- Competency-based education (CBE) centers learners' ability to obtain and demonstrate their skills, set of skills, or knowledge; CBE assessments allow learners to experience authentic assessment aligned with the competency and method to describe or demonstrate the skill.
- Digital Promise's Competency-Based Micro-credential Framework has been developed with the community of experts and practitioners in mind; from describing the what and how of the skill to a transparent and equitable method of assessment.
- Micro-credentials verify and honor skills built over time, both through formal and informal channels.

How Micro-credentials Can Unlock Success for Learners

Why are Micro-credentials Valuable?

Through earning a micro-credential, learners can quickly gain recognition for reskilling and upskilling. A micro-credential provides the learner with recognition opportunities to showcase their growing expertise or expand into a new area of interest. It can lead to licensure, recertification, salary bumps, or bonuses. Micro-credentials provide affordability, flexibility, and personalization compared to macro-credentials like degrees. Pursuing a degree is more timely, costly, and less specific than micro-credentials. They are favored by historically and systematically excluded learners who find it challenging to commit to the financial and time requirements of higher education pathways. This allows micro-credentials to close the gap.

Micro-credentials "attest to specific learning outcomes that might be lost in a degree or degree transcript," making the educational experience more relevant and efficient (Milligan & Kennedy, 2017). This unbundling of higher education pathways into micro-units of learning creates granular accomplishments that are motivational and encouraging to learners (Pirkkalainen et al., 2022). Hence, earning a micro-credential is a valuable opportunity for learning and professional growth.

> *Micro-credentials have been an excellent way to ensure that I am developing teaching practices that are exactly what I am looking for."*
>
> - Alisha, Technology Integration Specialist (Franklin, 2022)

Micro-credentials in Action: Examples of Designed for Educators

Two examples of micro-credential issuers, for educators, are Childhood Education International and International Baccalaureate.

In Childhood Education International's Social and Emotional Learning and Psychosocial Support for Quality and Holistic Learning Micro-credential, the learner (an educator) recognizes the role of social and emotional learning (SEL) and psychosocial support (PSS) in their classroom and can adapt existing SEL/PSS tools to meet the unique needs of their learners and their educational context.

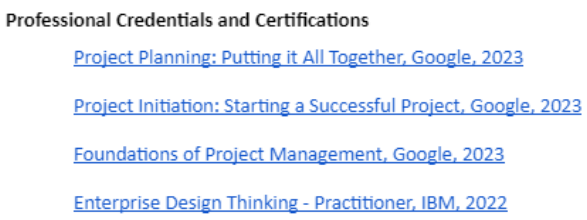
In International Baccalaureate's Design an Analytic Rubric for Formative Assessment in Collaboration with Students Micro-credential, the learner (an educator) designs an analytic rubric for formative assessment in collaboration with students.

How and Where Do You Put Micro-credentials on a Resume?

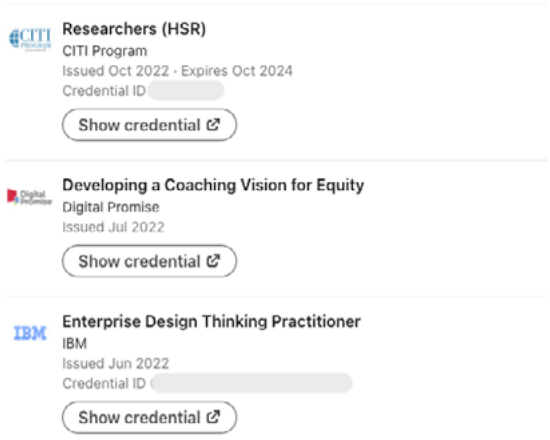
Earning a micro-credential is a career accomplishment, and it can be included on a resume or shared on online platforms like LinkedIn. This allows current and potential employers to view the learner's complete picture of their skills or competencies and what they bring to the organization. The employer can view and understand the micro-credential's requirements, the assessment completed, and the evidence submitted.

Following the standard resume format, micro-credentials can be listed by date earned in either the Licenses and Certificates section or the Education section. Including information about the micro-credential, like the issuer's information and title is essential.

Resume Example



LinkedIn Example



Does Including Micro-credentials on Your Resume Help?

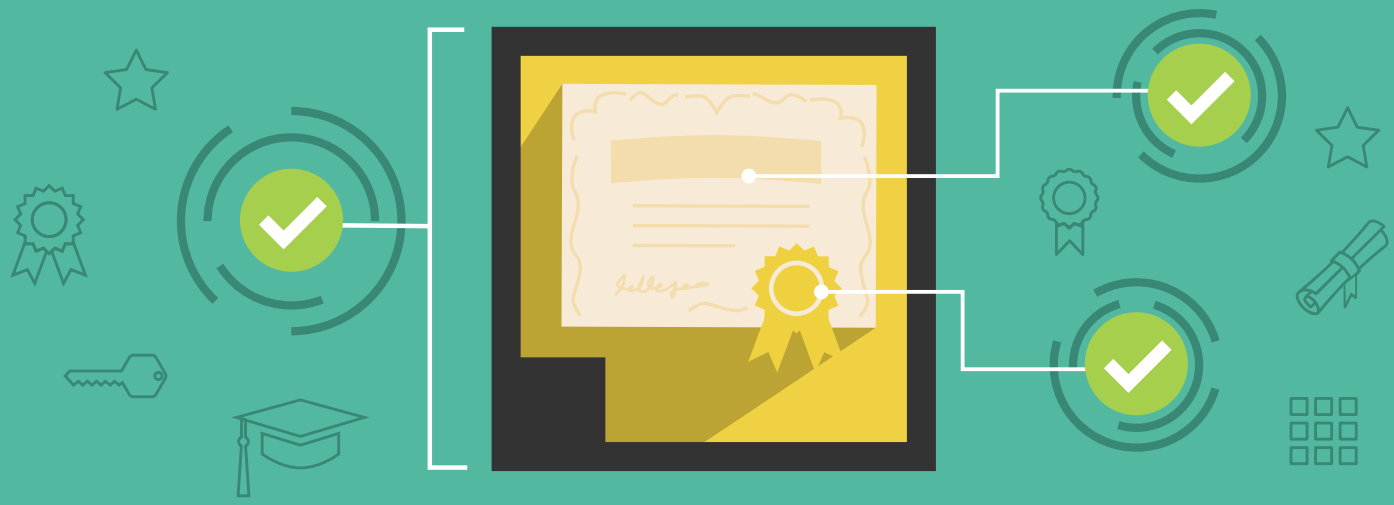
Earning a micro-credential is an asset to an individual's well-being, agency, and economic security. Micro-credentials "play a key role in displaying specific marketable skill sets to employers'' (Janckenko & Rodi, 2019, p. 22). They help bridge gaps in an individual's journey, verifying the attainment of specific skills or set of skills they need to be successful. Micro-credentials help learners who have higher education degrees, as well as those who do not. Earning a micro-credential shows that the individual is learning and improving themselves professionally.

A number of different educational institutions, companies, and organizations offer micro-credentials. A prospective earner should consider and review who the issuer is, paying attention to what the micro-credential entails and what past earners have to say. Typically, micro-credentials associated with a higher education institution are better vetted than ones without an affiliation (Post University, 2022). 1EdTech's TrustEd Micro-credential Framework is built on the Open Badges criteria and defines a set of minimum recommended requirements to ensure quality in micro-credentials.

Displaying micro-credentials on a resume or LinkedIn allows a prospective employer to view the complete picture of the learner through their verified achievements. A learner can use micro-credentials to demonstrate the attainment of skills they need to upskill or reskill, which allows them to close the gap between their existing certificates, diplomas, and degrees, as well as expand to new areas. Because micro-credentials recognize micro-units of achievement, the array of options encourages lifelong learning.

Key Takeaways

- Through their affordability, flexibility, and personalization, micro-credentials enable learners to build on their expertise or expand into a new area of interest.
- Micro-credentials help bridge gaps in an individual's learning journey through the verification of skills.
- Micro-credentials are closing the gap for historically and systematically excluded learners who find it challenging to commit to the financial and time requirements of higher education pathways.



Micro-credentials Designed for Today's Higher Education Learners

Since 2013, Digital Promise micro-credentials have provided learners with pathways to obtaining educational certifications. Micro-credentials provide "learners with recognition for the skills they have developed across their education and work experiences" (Tinsley et al., 2022, p. 3) and shine a light on industry skills that an academic transcript cannot. Unlike other credentials, micro-credentials demonstrate the evidence or artifact that verifies the competence of the skill or set of skills through its assessment piece.

Micro-credentials demand an assessment design of their own. Requiring a thoughtful design, competencies, supportive resources, assessment, and evidence for the learner to demonstrate, education institutions that issue micro-credentials are rethinking their curriculum and practices (West & Cheng, 2023). "Micro-credentials' gain is not macro-credentials' loss; each potentially complements and strengthens the other" (Ngoc et al., 2022, p. 12). Several education institutions are designing micro-credentials to meet the needs of higher education learners by providing innovative and specific credentialing learning opportunities. These innovative options can be or not be part of a standard higher education pathway.

> *"Our commitment to the micro-credentials grew from our experiences with the content provided and skills expected. The list of resources provided as part of each micro-credential also provides assurance of a strong alignment to research and best practices."*
>
> - Theresa Ewald, Assistant Superintendent of Teaching and Learning (Brown, 2019)

Meeting the Needs of Higher Education Learners

To meet the needs of higher education learners, micro-credentials have been designed to create a constructive competency-based assessment opportunity. Through a high level of peer support, the learner can achieve a higher learning performance (Ngoc et al., 2022). Also, to further meet the needs of higher education learners, micro-credentials provide affordability, flexibility, and personalization, unlike standard higher education pathways. The learning behind micro-credentials makes higher education more relevant and efficient. "Institutional openness to micro-credentials can reduce drop-out rates" (Pirkkalainen et al., 2022, p. 12). When educational institutions meet their learners' needs, completion rates increase.

"Micro-credentials can have an impact on the flexibility of institutions by meeting students' need for more flexible and personalised learning [sic]" (Pirkkalainen et al., 2022, p. 11).

Unbundling standard higher education pathways into micro-units of learning that recognize specific, granular accomplishments makes earning a micro-credential an ideal option for learners who can't afford the time or resources needed to pursue formal degrees.

Learners can pursue micro-credentials that upskill or reskill them when it is most convenient for them. Since micro-credentials represent skill attainment, it expands the opportunities that learners have to acquire them, which makes the process affordable. Plus, recognizing granular accomplishments along the higher education journey motivates and encourages learners. "The recognition of micro-credentials can enhance student motivation, responsibility, and determination, enabling more effective learning" (Pirkkalainen et al., 2022, p. 13).

Moreover, micro-credentials enable learners to earn postsecondary credentials that offer economic security, well-being, and agency. Micro-credentials have been favored by historically and systematically excluded learners, such as learners from low-income backgrounds, rural learners, learners with learning disabilities, and Black, Indigenous, and Latinx learners, who are not able to commit to the financial and time requirements of a standard higher education pathway. Micro-credentials are paving the way for present-day higher education learners, closing the gap in a way no other credential has been able to. Today's higher education learners are typically "25 year[s]-old or older who did not immediately pursue college following high school graduation" (Bennett, Evans, & Riedle, 2007, p. 155) and maintain employment, family, and other adult responsibilities (Hudson, Towey, & Shinar, 2008).

> *"I think that micro-credentials are a great way to allow people to have the opportunity to achieve things that maybe otherwise they couldn't. I go back to the whole concept of making it micro, making it smaller, condensing the information so that you experience success quicker versus having a string of courses and months before you can see any gratification that comes from being able to successfully complete it. I think that part of it is great and new. I know for me and traditional classroom settings, when you talk about a semester, that's a long time. But if I can meet small goals and feel accomplished, then that might give me what I need to go on and not quit, and see that it's attainable."*
>
> - Yolando Ingram (Learner), ClearPath ECE, Tennessee State University Genesis Family Child Care, Owner/Operator
> (Cacicio & Tinsley, 2022)

Impact Beyond Higher Education

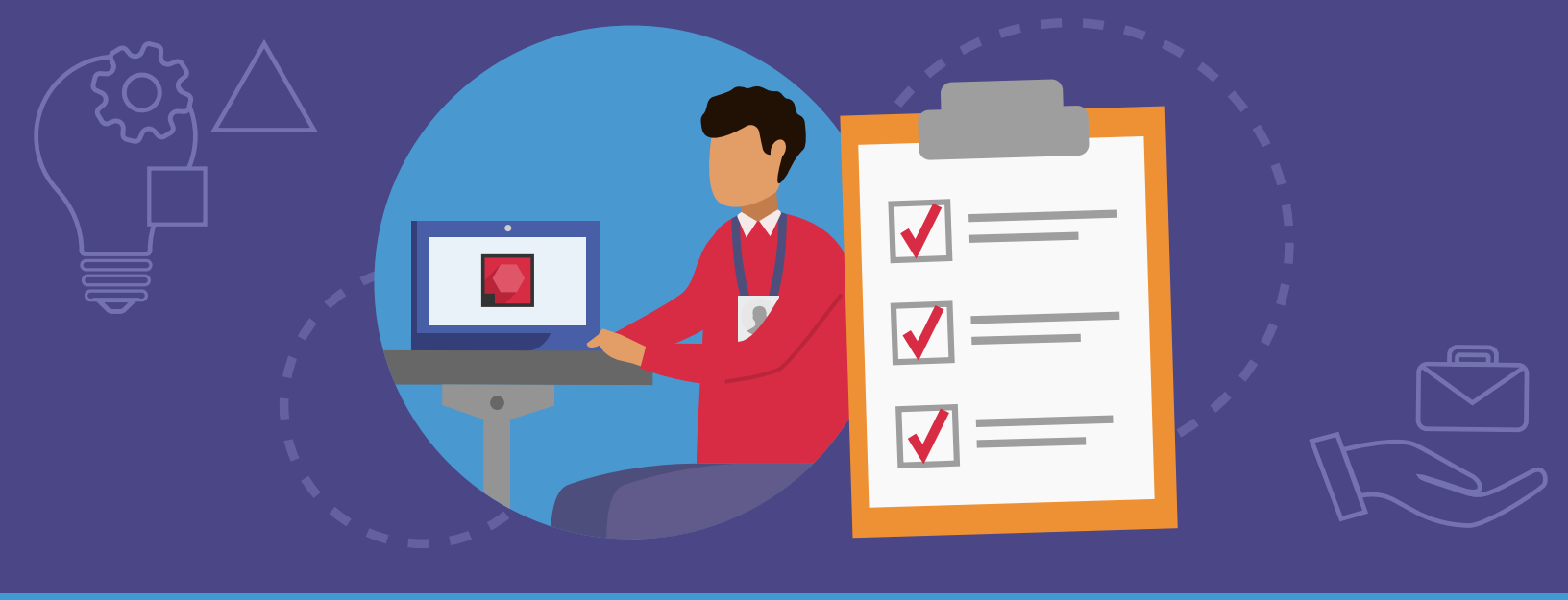
The journey of completing a micro-credential enhances the experience for the learner and leads to better career preparation. Janchenko and Rodi (2019) state that micro-credentials "play a key role in displaying specific marketable skill sets to employers" (p. 22). This is possible since micro-credentials verify the competence of a specific skill or set of skills necessary to succeed in the learner's career.

Pirkkalainen et al. (2022) states that better career preparation leads to a decrease in the mismatch of skills, enhancing the learner's employability. Ngoc et al. (2022) add that "micro-credentials increase the university responsiveness to labour [sic] markets, as well as contribute to social inclusion and education accessibility" (p. 2). Micro-credentials allow learners to obtain competencies in demand by an industry. Because of the nature of micro-credentials, learners are not limited to where and how they can access them. This means that learners are not limited to higher education institutions to earn micro-credentials, as they can be offered through online providers, nonprofit organizations, employers, and others interested in certifying skills.

With their affordability, flexibility, and personalization while creating a constructive learning environment, micro-credentials have provided opportunities for learners to upskill or reskill to stay current with competencies required in their career and industry.

Key Takeaways

- Micro-credentials provide learners with pathways to obtaining skill recognition that afford them additional paths toward personalized success.
- Micro-credentials contribute to constructive learning environments, while also being affordable, flexible, and personalizable.
- Micro-credentials provide learners the opportunity to reskill or upskill with competencies in demand by industry, which decreases a mismatch of skills and enhances the employability of the learner.



How Micro-credentials are Meeting the Needs of the Workforce

With all the technological advances in the past few decades, industries are constantly evolving to meet the needs of society. This generates new job opportunities to address those needs; however, it also brings about job displacement for individuals in the workforce who lack the necessary skills for these emerging job prospects. According to the World Economic Forum, 50 percent of the workforce must reskill by 2025 (Timmes, 2022). Based on the impacts of many emerging technologies, it is expected that this trend will continue.

Today, employers find it difficult to recruit and retain employees with the necessary skills their industry seeks. Standard higher education pathways are criticized for lacking alignment with employer and employee needs and not being current with teaching the latest skills (Brown et al., 2021). Pursuing a standard higher education pathway will not address the lack of alignment and gap between employees and employers; it will widen it since such credentials require a longer time commitment (Brown et al., 2021). The skill may no longer be relevant when a standard higher education degree is earned.

Several employers see competency-based micro-credentials as the solution to the rapid change in industries' demands, allowing their workforce to quickly gain recognition for skills critical to perform their job-related tasks (Orman, Şimşek, & Kozak Çakir, 2023). Due to their design, micro-credentials hold the potential for employees, or workforce learners, to develop career-aligned skills and become lifelong learners.

Designing Micro-credentials for Workforce

Micro-credentials are designed to be affordable, flexible, and personalized for workforce learners. A workforce learner is an employee who strives to obtain skills critical to their success in their career's industry. With micro-credentials, the employee can become competent in a skill or set of skills needed to

succeed in their current or future role. In the workplace setting, micro-credentials represent competency-based units of learning aligned to workplace tasks (Galindo, 2023). They archive the skill achievements of workforce learners and encourage them to develop other skills essential to success in their industry. The workforce learner can learn quickly and implement the new skill or set of skills to remain current in the workplace instead of pursuing a degree that will require extensive time and financial commitment.

Micro-credentials often highlight skills not represented by a transcript, certificate degree, or diploma, which allows for a higher level of personalization. The employee can pursue a specific skill or set of skills that they need to be successful in their industry but did not acquire via the completion of a standard education pathway.

Moreover, micro-credentials provide visibility into the knowledge and skills held by the employee. The micro-credential assessment requires the employee to implement the new skill or set of skills in an authentic workplace setting and demonstrate evidence of this implementation. For example, earning the Social Media Marketing Micro-credential required employees to gather information about their employer and "distill it into the essential elements needed for social media marketing platforms such as Facebook and Instagram." With earning this micro-credential, the employee demonstrated that they are able to do social media marketing. The employee can share this evidence of skill implementation with their current or prospective employer, allowing the employer to validate the understanding. Clicking on the micro-credential's digital badge "enables any employer to independently verify, in more detail, the individual's skills" (Bell, Liu, & Murphy, 2022, p. 37). The employer is able to view the metadata of the digital badge which includes but is not limited to the badge name, badge criteria, badge image, issuer, issue date, recipient, tags, alignment/standards, expiration date, and URL to the evidence.

Just as employers are looking for quick ways to train their workforce to increase productivity, workforce learners are looking for quick ways to reskill and upskill (Gauthier, 2020). Micro-credentials help both the employee and the employer; employees compete for job opportunities just like employers compete for employees. "Micro-credentials expand the competitiveness and capacities of both groups by providing opportunities for employees in both recruitment and professional development processes" (Orman, Şimşek, & Kozak Çakir, 2023, p. 12).

Micro-credentials Help Upskill/Reskill Employees

"In the past decade, micro-credentialing has emerged as a time-saving and cost-effective method to prepare workers in an ever-changing job market." Aside from strengthening and filling in the gaps in an employee's learning journey, micro-credentials allow employees to upskill or reskill with competencies currently in demand by the industry. "Micro-credentials will decrease skills mismatch and enhance employability" (Pirkkalainen et al., 2022, p.12).

Tamoliune et al. (2023) states that micro-credentials that give "learners a quicker and more cost-effective mechanism for acquiring specific industry-recognized competencies and skills that are necessary for successful work performance and/or employability are valued and recognized by employers" (p. 10). By the time the micro-credential is earned to meet the industry demand, years have not passed like they do when pursuing a formal degree. They provide the opportunity to obtain the right credentials at the right time.

Aside from being affordable, flexible, and personalized, micro-credentials create a constructive learning environment. The micro-credential assessment requires the employee to construct their knowledge by applying the specific skill or set of skills authentically in a workplace setting. This learning opportunity allows employees to build on their expertise or expand into a new area of interest.

> *I still have several jobs posted that we're not able to find people to fill. I'm hopeful that when we do find applicants, and if they are alternative certifications, that we can utilize these micro-credentials to expedite their learning."*
>
> - Anna Prince, Director of Personnel and Pupil Personnel, Lawrence County Schools (Tinsley et al., 2022)

Impact on Workforce

The employer can provide intentional skill-focused learning opportunities to employees and subsequently offer micro-credentials to recognize these competencies. Other employers request their employees obtain specific micro-credentials from educational institutions or subject matter expert organizations. Regardless of an employer's avenue, the micro-credential option provides them with a fast avenue to improve or increase the skill set of their employees.

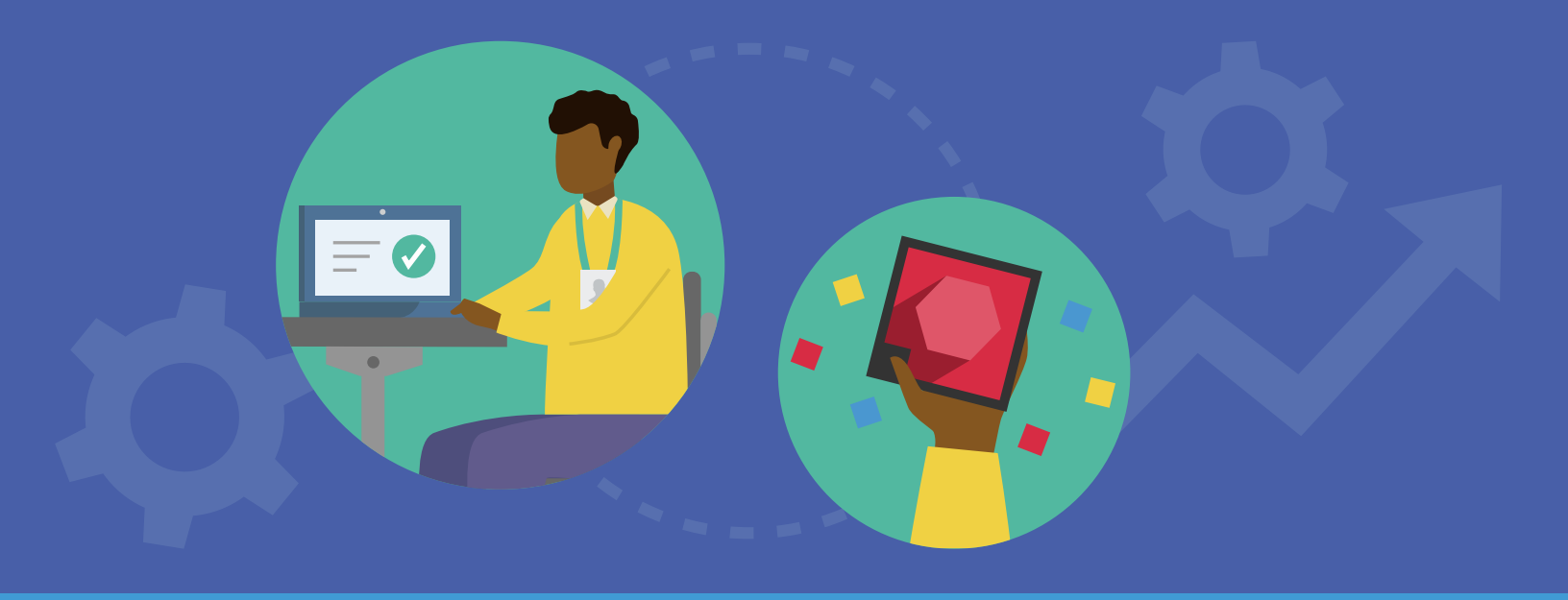
"As the skill demands continue to change, people will continually need to re-train, reskill or redeploy to avoid redundancy and social and economic displacement in their local communities"

(Brown et al., 2021, p. 234).

Workforce learners need affordable, flexible, and personalized lifelong and life-wide learning that provides them with the skills necessary to adapt to an ever-evolving society.

Key Takeaways

- Micro-credentials provide learners with pathways to reaching their education and/or employment goals through verifiable skill recognition.
- Micro-credentials create a constructive learning environment, while also being affordable, flexible, and personalizable.
- Micro-credentials provide learners the opportunity to reskill or upskill with competencies in demand by industry, which decreases a mismatch of skills and enhances the employability of the learner.



The Power of Professional Development: How to Use Micro-credentials as an Organization

Micro-credentials document the competencies of individuals and encourage the development of skills necessary to be successful in their careers. Typically, they are not meant to replace higher education degrees but to supplement them by better identifying specific skills and knowledge. On the other hand, micro-credentials lessen the inequities of higher education pathways, such as cost and time constraints, making it an option for those unable to pursue a higher education degree. This option has been favored by historically and systematically excluded learners like those from low-income backgrounds; rural learners; those with learning disabilities; and Black, Indigenous, and Latinx learners. Currently, many learners are finding that higher education is not necessary to attain skills needed for high-quality jobs, and they are increasingly opting to create their own path. The variability in pathways signifies the current opportunity for learners to customize their own journey to success.

Micro-credentials in Action: Examples of Organizational Professional Development

Digital Promise works with dozens of micro-credential issuers, including the Clark County Education Association and Jefferson County Schools.

Clark County Education Association offers multiple pathways composed of several micro-credentials. These pathways focus on professional development topics such as 21st Century Learning through Global Education, Engaging Stakeholders in Effective Communication, Families as Partners in Education, and more. More than 18,000 educators can participate in the learning opportunities that these micro-credentials offer via their organization.

Jefferson County Schools takes the application of micro-credentials to a broader level. Starting in 2022, Jefferson County Schools has been developing micro-credentials with Digital Promise to provide both additional pay and opportunities to grow and learn in jobs. This program provides not only educators but also all regular JCS staff the opportunity to earn an extra $500 per micro-credential throughout the year by completing professional development outside of their already paid workday. This is a commitment from Jefferson County Schools to the people who make JCS great as they continue to learn and grow together.

Why Are Micro-credentials Valuable to an Organization?

The assessment experience required by micro-credentials enhances the professional development of an organization. An individual earns a micro-credential by successfully demonstrating competency, submitting evidence, and being assessed for the specific skill or set of skills by a subject matter expert. The assessment requires the individual to implement the new skill(s) in an authentic setting and show evidence of this implementation. The implementation verification is possible because of the metadata stored in the digital badge accompanying the micro-credential. This alleviates competency concerns organizations may have about their current or prospective employees.

> "Employers are looking for quick ways to train a workforce to increase productivity"
>
> (Gauthier, 2020, p. 2).

Micro-credentials are a valuable option to increase productivity since they remove the time constraints of pursuing a degree. Organizations like Google and Amazon are developing micro-credentials to incorporate into their organization's skills programs. Micro-credentials are valuable to organizations when it comes to hiring because they "help narrow down the pool of potential candidates and select those who demonstrate the specific skills needed for a job" (Tamoliune et al., 2023, p. 10). Gauthier (2020) adds, "Micro-credentials would help employers identify an applicant's authentic skills related to the job for which they applied" (p.4). The skill(s) that a micro-credential recognizes are lost in a degree or transcript. Today, a transcript does not provide detailed information on the individual's accomplishments needed to demonstrate skills and competencies.

As influential representatives of their industries, employers are the key end consumers of micro-credentials and the driving force in determining and cultivating the skills these credentials should assess. With that established, organizations can offer micro-credentials to add value to professional development programs. The recognition that micro-credentials provide allow employees to upskill or reskill while also increasing productivity. Whoever views the micro-credential, be it a current or prospective employer, can verify that the individual is competent in that specific skill. Earning micro-credentials throughout a learning journey captures lifelong and life-wide knowledge, showing the individual is learning and improving themselves.

Key Takeaways

- Micro-credentials validate skills, making the individual marketable to employers.
- Micro-credentials alleviate competency concerns organizations may have about their current or prospective employees.
- Micro-credentials allow the employee to build on their expertise or expand into a new area of interest.

Leveraging AI to Support Competency-Based Assessments

Assessing skill and competency is a critical aspect of any micro-credential process. Using AI in various fields has become increasingly prevalent as technology advances. However, using AI may not always be the best practice when assessing micro-credential submissions (often similar to performance assessments).

AI and Micro-credential Assessments

Many have wondered how innovative technologies and tools can help speed up the assessment process, and AI is just the latest tool that folks hope to leverage. Digital Promise, and the Credentials team specifically, have been researching AI with regard to assessments. Current large language models (LLMs), driven by deep learning, cannot understand content and context and may have learned bias from their training data. This is holding up their ability to assess competency-based work effectively.

While AI has made remarkable strides in natural language processing within certain contexts, it still lacks the subject matter expertise and *specific* contextual understanding of the learner being assessed. Without this understanding, AI cannot accurately evaluate the nuances and complexities of competency-based work. This is especially true when assessing complex evidence-based submissions that might include a variety of artifacts with text, audio, video, and images to provide nuanced context and information about skill implementation.

No micro-credentials utilizing AI have been developed in partnership with Digital Promise and/or using the Digital Promise micro-credential framework, and this has been by design. Competency-based assessments require evaluators to gauge a person's skills, knowledge, and abilities within a specific domain. AI's assessment capabilities are limited to pattern recognition and statistical analysis, which may not be sufficient to evaluate complex competencies comprehensively.

Mistaking the Stochastic Parrot for a Human

AI has great utility for supporting many types of workflows. ChatGPT helped brainstorm how to write the introduction to this eBook. However, while it allowed us to overcome the writer's block of a blank page, we still had to carefully review the content and evaluate accuracy and alignment with our stance and values. So why is it okay to use AI for this task, but not competency-based assessment?

Language models (LM) rely on large training datasets often derived from the Internet. As a result, AI tools tend to replicate the dominant patterns, biases, and other issues in the data (Bender et al., 2021). The authors use stochastic parrot to refer to the ability of these tools to sound like a human, while lacking the ability to produce "meaningful text" from which humans gain a coherent understanding of a speaker's intent, beliefs, and context. Further, Bender and colleagues caution about "mistak[ing] LM-driven performance gains for actual natural language understanding," which can lead to real risks and harm to human beings. More recent research has shown that popular tools, such as ChatGPT, demonstrate rudimentary levels of creative reasoning and technical proficiency while lacking the ability to reason critically (Bubeck et al., 2023). Further, the authors state that these tools are still prone to errors, bias, and misinformation.

When considering AI in learning, assessment, and credentialing, the risk of harming learners does not outweigh the cost of increasing efficiency or decreasing costs.

Humans at the Center

Performance assessments are not just about scoring or evaluating; they are also an opportunity for valuable feedback and personalized guidance. Human assessors can provide constructive criticism, motivational feedback, and individualized recommendations for improvement. AI, on the other hand, lacks empathy and cannot offer the human touch required to foster growth and development in learners.

AI models are trained on large datasets, and if those datasets contain biases, the AI's assessments may also inherit those biases. This can lead to unfair evaluations, disadvantages certain groups or individuals. Ensuring fairness and impartiality in assessments is crucial, and human assessors are better equipped to address these concerns with sensitivity and understanding. While people may also be prone to bias, it can be more easily corrected with appropriate systems, processes, or training.

Micro-credential assessments often involve real-world scenarios and tasks that require creativity, critical thinking, and problem-solving abilities. These complex assessments are challenging for AI because they demand a deep understanding of context and context-specific knowledge. Human assessors can apply their experience and expertise to adapt to unique situations and evaluate learners more comprehensively, while also connecting with learners to enhance their learning process.

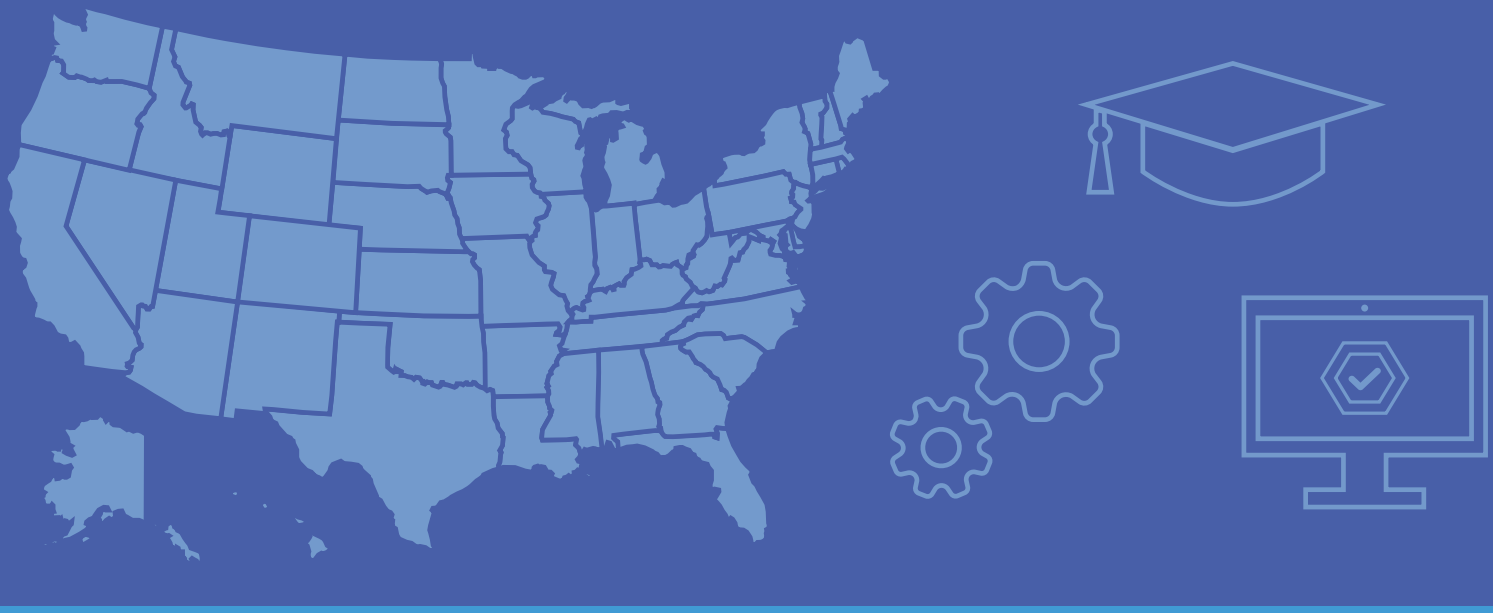
Flexibility and Adaptability

The education and professional development field is constantly evolving, with new skills and knowledge emerging regularly. AI models require updates and retraining to keep up with these changes. In contrast, human assessors can continuously learn and adapt their assessment methods to stay current with the latest trends and developments in their respective fields.

While AI is a remarkable tool with immense potential when used correctly, using it for performance assessments, particularly in micro-credentialing, comes with inherent limitations. The lack of content understanding, ineffective assessment of competency, absence of human touch, bias concerns, complexity of assessments, and the inability to adapt are significant drawbacks of relying solely on AI for assessments. A balanced approach that combines AI's efficiency with human assessors' expertise is likely the best practice for fair and accurate performance evaluations. As technology progresses, AI may indeed become more proficient in assessments. Still, for now, human assessors remain indispensable for providing the valuable insights and guidance needed for personal and professional growth.

Key Takeaways

- AI cannot accurately evaluate the nuances and complexities of competency-based work in contrast to the contextual understanding and subject matter expertise that human assessors possess.
- Performance assessments are not just about scoring or evaluating; they are also an opportunity for valuable and motivational feedback, constructive criticism, and personalized guidance.
- A balanced approach that combines AI's efficiency with human assessors' expertise is likely the best practice for fair and accurate performance evaluations, although experts would have to ensure that the AI models are free of bias and risk.



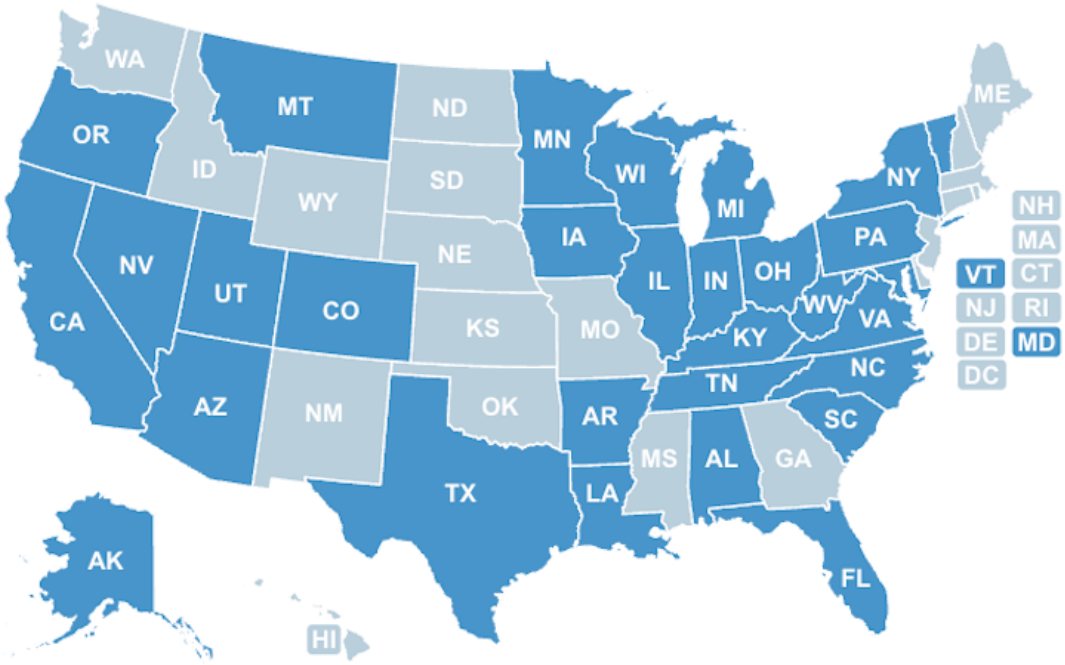
National Trends: The Shifting Micro-credentials Policy Map

In the past decade, micro-credentials have influenced the credential ecosystem and shifted the landscape of recognizing knowledge and skills (Galindo, 2023). Digital Promise launched its Micro-credential Policy Map in January 2020 to inform how school districts, higher education institutions, and states throughout the United States are engaging with micro-credentials.

Updates to the Micro-credential Policy Map are done on a yearly basis. Publicly available resources are consulted to update the map. Digital Promise tries to create a snapshot of what is happening in the space by capturing everything, but sometimes something may be missed.

To capture the growth of micro-credentials in the credential ecosystem, the following filter is used:

- **District-level Incentives**: Individual schools and/or districts have policies recognizing micro-credentials earned by educators.
- **State-level Policy and/or Guidelines**: Policies supporting micro-credentials are in place state-wide through legislation or the state's department of education. States without policies feature district implementation examples instead.
- **State-level Exploration**: The state or the state's department of education has endorsed the use of micro-credentials or has facilitated a relationship between a third-party organization offering credentialing and other institutions (e.g., higher education) within the state. This may include piloting micro-credentials; creating a committee to evaluate the use; partnering with an organization to develop or distribute micro-credentials; or having a formal discussion on the functionality of it.
- **Institutes of Higher Education**: Micro-credentials are in higher education as part of the curriculum or are available to educators for credit.



Below are the 2023 updates to the Micro-credential Policy Map:

District-level

Since 2022, there has been an increase in district-level initiatives and both states and higher education institutions implementing micro-credentials. During this scan of the Micro-credential Policy Map, we identified eight new district-level initiatives exploring micro-credentials for teacher professional development or K-12 students.

- Alaska offers its first micro-credential via the National Education Association, Improving Teaching Practices through Competency-based Personalized Learning.
- In Colorado, Cherry Creek Schools has a Micro-credential Program for high school gifted and talented students.
- In Snellville, Georgia, the city's Digital Badge Program has partnered with area schools to offer the program to elementary, middle, and high school students.
- In Maryland, Anne Arundel County Public Schools offers educator micro-credentials.
- Michigan CoOp offers its network of school districts personalized professional development through micro-credentials.
- In Ohio, the University Heights City School District offers its ninth and 10th graders and parents micro-credentials that recognize practical skills. Also, the Educational Service Center of Central Ohio offers educators the Specialized Behavior Technician micro-credential.
- In Tennessee, STEM School Chattanooga awards digital fabrication micro-credentials to its high school students.
- In West Virginia, Jefferson County Schools offers micro-credentials to its educators.

State-level

While reviewing state-level micro-credential policies, we found that eight new state-level policies or guidelines explore micro-credentials, from accepting micro-credentials for educator licensure or re-licensure to awarding micro-credentials to recognizing skills and awarding high school students.

- Alabama accepts micro-credentials from educators with a Non-Professional Temporary Certificate pursuing the Professional Educator Certificate.
- IdahoSTARS offers early childhood development-related badges to early childhood educators. Also, Idaho SkillStack® offers industry-relevant digital badges to validate educators' demonstrated skills.
- The Illinois State Board of Education offers technology-related micro-credentials to its educators. Additionally, the Latino Policy Forum has partnered with the DuPage Regional Office of Education to offer the English Learner Administrator Academies as micro-credentials.
- The Indiana Department of Education has partnered with All4Ed and BloomBoard to offer micro-credentials to high school students who demonstrate mastery of career-readiness skills needed for postsecondary success.
- The Louisiana Department of Education accepts micro-credentials for their Pre-Educator Pathway.
- The Nevada Department of Education accepts re-licensure of K-12 staff via micro-credentials.
- The New Hampshire Education Department allows educators to earn micro-credentials focused on the science of reading.
- The New Mexico Public Education Department offers its educators micro-credentials as a licensure advancement option.

During this scan of the Micro-credential Policy Map, one new state-level exploration was conducted by New Jersey. New Jersey's *Report on K-12 Climate Change Education Needs* recommends creating a micro-credentialing system to ensure teachers receive acknowledgment for completing school district professional learning opportunities.

Higher education-level

While reviewing higher education micro-credential initiatives, 13 new higher education institutions' exploration of micro-credentials were identified, ranging from micro-credentials being offered through general education courses to micro-credentials for current students to workforce and education-related micro-credentials.

- Higher education institutions in Arizona have begun offering micro-credentials, such as Northern Arizona University's Foundations in Effective Teaching Micro-credential.
- The University of Connecticut's Center for Excellence in Teaching and Learning offers micro-credentials to show mastery after completing Massive Open Online Courses (MOOCs).
- In Florida, all public postsecondary institutions are required to award students a digital badge upon completing general education core courses.

- Mississippi State's Office of the Provost and the Center for Teaching and Learning's Maroon Academy for Teaching Excellence offers micro-credentials in course design and assessment, active learning, inclusive teaching, and supporting student learning.
- The University of Nebraska offers micro-credentials for students and graduates in the workforce.
- North Dakota State University's Office of Teaching and Learning offers education-related badges.
- Ohio's Miami University offers for-credit and non-credit micro-credentials in business, communication and culture, computing and technology, engineering, and personal and professional development. Moreover, Kent State University in Ohio offers micro-credentials in educational live streaming, K-12 computer science, K-12 teaching and learning with games, and soft skills for the workplace.
- The University of Oregon offers a graduate micro-credential in child behavioral health.
- The Center for Holistic Education offers a workshop-based pathway to Southern Oregon University's School of Education Social Emotional Learning Micro-credential.
- The University of Rhode Island offers community, equity, and diversity-related micro-credentials.
- The Vermont State University offers industry-relevant micro-credentials for every degree path.
- The University of Washington's Professional and Continuing Education offers micro-credentials for those in e-learning, K-12 and higher education, human resources, and training and development.

As more districts, states, and higher education institutions adopt micro-credentials and digital badging to recognize skills earned, the Micro-credential Policy Map will be updated periodically to reflect those changes. As the interest and implementation of micro-credentialing grows, we expect to see continued adoption of micro-credentials, enactment of policies allowing for increased acceptance and recognition of micro-credentials, and sustained inclusion of micro-credentials as options for learners.

Key Takeaways

- Since 2020, Digital Promise has captured the use of micro-credentials throughout the United States, informing how school districts, states, and higher education institutions engage with them.
- In our 2023 policy scan, we captured eight new district-level initiatives that explore micro-credentials for teacher professional development or K-12 students, and eight new state-level policies or guidelines that explore micro-credentials from accepting micro-credentials for educator licensure or relicensure to awarding micro-credentials to recognize skills.
- New exploration of micro-credentials from 13 higher education institutions ranged from micro-credentials being offered through general education courses to micro-credentials for current students to workforce and education-related micro-credentials.

Conclusion

The evolution of the credential ecosystem through macro-credentials and micro-credentials has significantly impacted how learners acquire and demonstrate skills. Technology has enabled this shift, causing learning to be self-driven, accessible, and developed in a variety of ways. Micro-credentials help showcase the competence of skills developed across different contexts. Grounded in competency-based education, micro-credentials allow learners to gain recognition for specific skills and competencies, reshaping how competence is recognized and measured. Represented by digital badges, micro-credentials offer a personalized experience, addressing the needs of learners and employers in a rapidly changing workforce, specifically those who have been historically and systematically excluded. Their inclusive nature of flexibility, affordability, and accessibility provides learners from diverse backgrounds with opportunities for career advancement and lifelong learning. Overall, micro-credentials are redefining the landscape of education and workforce development, offering a pathway for skills acquisition and recognition for learners to enhance their careers and skills in a more accessible, equitable, and personalized manner.

> *"If we don't step up to meet the populations that we want to service where they are, we're going to totally lose them. If the ultimate goal is to increase the education, knowledge, and skill set of individuals, we're going to have to continue to find ways that are feasible and makes sense for the end-user. I think micro-credentialing is growing in a positive trajectory, and it's only going to continue and expand."*
>
> - Dr. Kimberly Smith, Director, Center of Excellence for Learning Sciences, Tennessee State University (Tinsley et al., 2022)

This eBook is part of a series exploring micro-credentials, how to design and use them, and their impact and advocacy. If you are interested in learning more about micro-credentials, check out our current offerings on the Micro-credential Platform, or visit our website to learn more about our services.

Glossary

Badge - The term "badge" is typically used as shorthand to mean "Digital Badge" or "Micro-credential." All micro-credentials are awarded as digital badges, but not all digital badges are created or awarded by Digital Promise.

Competency - A specific and discrete skill that a learner can demonstrate through the application of knowledge. Competencies represent the capability to successfully do something.

Competency-based - Each micro-credential is competency-based. In other words, a learner must demonstrate their competence through the submission of evidence, which is assessed by content experts.

Credential - A method of verifying any type of achievement that can be recognized through a variety of signifiers that include paper records, medals, badges, and more recently, digitized records. In academic settings, the term credentials usually refers to college and university degrees, diplomas, certificates, and endorsements. Digital credentials is inclusive of the digital versions of previously mentioned credentials, including digital badges and micro-credentials.

Digital Credential - This term is often used interchangeably with "Digital Badge." This term may refer to any digitized form of credential such as PDFs, digital images, and credentials that adhere to specific technical standards, such as 1EdTech's Open Badges Standard.

Evidence - Learners must collect and submit evidence of their ability to implement a skill before their competence can be assessed. Once the evidence is assessed, the learner will either receive their award or they are given tailored feedback from issuing organizations.

Issuer - The institution or organization that awards the micro-credential (or digital badge) to the learner.

Learner - This term refers to the person submitting evidence to earn the micro-credential. Learners come to micro-credential earning through various pathways, including conventional classroom settings, workplaces, community-based programs and more. The term also represents everyone, regardless of age, because individuals engage in lifelong learning through their daily life experiences.

Metadata - A set of data that describes and gives information about other data. In this case, when we use the word Metadata, we are generally referring to the data that combines with the badge image to produce a micro-credential. This data provides transparent information about what a learner had to specifically achieve in order to earn a specific micro-credential. It allows a level of detail that is often unavailable in records such as transcripts.

Micro-credential - Micro-credentials are competency-based digital credentials that recognize a person's competence in a specific skill or set of skills. Micro-credentials are competency-based, on-demand, personalized, and shareable digital credentials. Micro-credentials leverage badging technology to issue digital certifications that verify competence of a skill or set of skills. Micro-credentials are awarded as digital badges containing secure metadata that adhere to the 1EdTech Open Badges standard.

Open Badges Standard - The Open Badges standard is a specification of the badge data that makes it an open and interoperable badge. This standard is set by 1EdTech.

The Digital Promise Micro-credential Framework - Every micro-credential developed by Digital Promise and its partner organizations (content experts) aligns with the Micro-credential Framework. The Micro-credential Framework consists of a competency, key method, method components, research and resources, and evidence section (submission guidelines and evaluation criteria). This framework is specifically designed for competency-based micro-credentials that recognize successful skill implementation.

References

1EdTech. (2024). Open badges. https://www.1edtech.org/standards/open-badges

1EdTech. (2024). TrustEd microcredential coalition. https://www.1edtech.org/program/tmc

Agarwal, A. (2022). How companies like Meta, IBM, AWS and Netflix are using microcredentials to bridge the talent gap. *LinkedIn.* https://www.linkedin.com/pulse/how-companies-like-meta-ibm-aws-netflix-using-bridge-talent-agarwal/

Bell, N., Liu, M., & Murphy, D. (2022). A framework to implement academic digital badges when reskilling the IT workforce. *Information Systems Education Journal*, 20(1). 36-46. https://eric.ed.gov/?id=EJ1333890

Bender, E. M., Gebru, T., McMillan-Major, A., & Scmitchell, S. (2021). On the dangers of stochastic parrots: Can language models be too big?. *FAccT '21: Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency*. 610-623. https://doi.org/10.1145/3442188.3445922

Bennett, S., Evans, T., & Riedle, J. (2007). Comparing academic motivation and accomplishments among traditional, nontraditional, and distance education college students. *Psi Chi Journal of Undergraduate Research*, 12(4). 154-161.

Brown, D. (2019). Research and educator micro-credentials. *Digital Promise.* https://digitalpromise.dspacedirect.org/server/api/core/bitstreams/1b66afd1-2673-40d6-a0ae-aaffdcb84faf/content

Brown, M., Mhichil, M. N. C., Beirne, E., & Mac Lochlainn, C. (2021). The global micro-credential landscape: Charting a new credential ecology for lifelong learning. *Journal of Learning for Development,* 8(2), 228-254.

Bozkurt, A. & Brown, M. (2022). Micro-credentials: Stackable, combinable, or transferable qualifications. *EdTechnica: The Open Encyclopedia of Educational Technology*. http://eprints.rclis.org/43714/

Bubeck, S., Chandrasekaran, V., Eldan, R., Gehrke, J., Horvitz, E., Kamar, E., Lee, P., Lee, Y. T., Li, Y., Lundberg, S., Nori, H., Palangi, H., Ribeiro, M. T., & Zhang, Y. (2023). Sparks of artificial general intelligence: Early experiments with GPT-4. https://arxiv.org/abs/2303.12712

Cacicio, S., & Tinsley, B. (2022). How micro-credentials can support social mobility in rural communities. https://digitalpromise.org/2022/03/28/how-micro-credentials-can-support-social-mobility-in-rural-communities/

Catalano, F., & Doucet, K. J. (2013). Digital "badges" emerge as part of credentialing's future. *Professional Examination Service.* https://finepointwriting.com/wp-content/uploads/2013/07/White-Paper-Freelance-Writer-Sample.pdf

Council of Chief State School Officers. (2020). Design, assessment, and implementation principles for educator micro-credentials. https://ccsso.org/sites/default/files/2020-01/Micro-credentials%20-%20Design%20Principles_FINAL_0.pdf

Credential Engine. (2019). Counting U.S. postsecondary and secondary credentials. https://credentialengine.org/wp-content/uploads/2019/09/Counting-US-Postsecondary-and-Secondary-Credentials_190925_FINAL.pdf

Credential Engine. (2022). Counting credentials. https://credentialengine.org/all-resources/counting-credentials/

Digital Promise. (2014). Developing rigorous, reputable micro-credentials. https://digitalpromise.org/2014/04/04/developing-rigorous-reputable-micro-credentials/

Digital Promise. (2014). Micro-credentials: Empowering lifelong learners. https://digitalpromise.org/2014/04/14/micro-credentials-empowering-lifelong-learners/

Digital Promise. (2014). Schools see results with competency-based learning. https://digitalpromise.org/2014/07/30/schools-see-results-with-competency-based-learning/

Digital Promise. (2023). Micro-credentials. https://digitalpromise.org/initiative/educator-micro-credentials/

Education Design Lab. (2023). Micro-credentialing. https://eddesignlab.org/microcredentialing/

Franklin, K. (2022). How micro-credentials are changing professional development for educators for the better. https://digitalpromise.org/2022/01/11/how-micro-credentials-are-changing-professional-development-for-educators-for-the-better/

Galindo, M. (2023). Making macro impact: How micro-credentials are shaping a skills-based economy. https://digitalpromise.org/2023/05/11/making-macro-impact-how-micro-credentials-are-shaping-a-skills-based-economy/

Galindo, M. (2023). The role of micro-credentials in the credential ecosystem. https://digitalpromise.org/2023/03/23/the-role-of-micro-credentials-in-the-credential-ecosystem/

Gauthier, T. (2020). The value of microcredentials: The employer's perspective. *Competency-based Education*, 5(2). 1-6. https://doi.org/10.1002/cbe2.1209

Hudson, R., Towey, J., Shinar, O. (2008). Depression and racial/ethnic variations within a diverse nontraditional college sample. *College Student Journal*, 42(1). 103-114.

Ikhmal, M. (2021). The origins of academic degrees. *LinkedIn*. https://www.linkedin.com/pulse/origins-academic-degrees-muhammad-ikhmal/?trk=portfolio_article-card_title

Janckenko, G., & Rodi, A. (2019). Using digital badges to promote professional development in higher education. Issues in Information Systems, 20(4). 21-26

Milligan, S. & Kennedy, G. (2017). To what degree? Alternative micro-credentialing in a digital age. In James, R., French, S. & Kelly, P. (Eds.) *Visions for the Future of Australian Tertiary Education* (1 ed., pp. 41-54) Centre for the Study of Higher Education, University of Melbourne.

Ngoc, N. H. T., Spittle, M., Watt, A., & Van Dyke, N. (2022). A systematic literature review of micro-credentials in higher education: A non-zero-sum game. *Higher Education Research & Development*. https://doi.org/10.1080/07294360.2022.2146061

Orman, R., Şimşek, E., & Kozak Çakir, M. A. (2023). Micro-credentials and reflections on higher education. Higher Education Evaluation and Development. https://www.emerald.com/insight/content/doi/10.1108/HEED-08-2022-0028/full/html

Pirkkalainen, H., Sood, I., Padron Napoles, C., Kukkonen, A., & Camilleri, A. (2022). How might micro-credentials influence institutions and empower learners in higher education? *Educational Research*, 65(1). 40-63. https://doi.org/10.1080/00131881.2022.2157302

Post University. (2022). Badges and micro-credentials – What's the difference? https://post.edu/blog/badges-and-microcredentials-whats-the-difference/

Saray, V. & Ponte, F. (2019). The evolution of a micro-credential. In Y. W. Chew, K. M. Chan, and A. Alphonso (Eds.), *Personalised Learning. Diverse Goals*. One Heart. ASCILITE 2019 Singapore. (pp.546-551). https://2019conference.ascilite.org/assets/papers/Paper-076.pdf

Stefaniak, J. & Carey, K. (2019). Instilling purpose and value in the implementation of digital badges in higher education. *International Journal of Educational Technology in Higher Education*, 16(44). https://educationaltechnologyjournal.springeropen.com/articles/10.1186/s41239-019-0175-9

Tamoliune, G., Greenspon, R., Tereseviciene, M., Volungeviciene, A., Trepule, E., & Dauksiene, E. (2023). Exploring the potential of micro-credentials: A systematic literature review. *Frontiers in Education*. https://doi.org/10.3389/feduc.2022.1006811

Timmes, M. (2022). Where to start in reskilling the workforce. *Forbes.* https://www.forbes.com/councils/forbescoachescouncil/2022/08/17/where-to-start-in-reskilling-the-workforce/

Tinsley, B., Cacicio, S., Shah, Z., Parker, D., Younge, O., & Luke Luna, C. (2022). Micro-credentials for social mobility in rural postsecondary communities: A landscape report. http://hdl.handle.net/20.500.12265/151

UNESCO. (2022). Towards a common definition of micro-credentials. https://unesdoc.unesco.org/ark:/48223/pf0000381668

West, R. E., & Cheng, Z. (2022). How open micro-credentials/badges support learning in micro-, meso-, and macro-levels. *Handbook of Open, Distance and Digital Education.* https://doi.org/10.1007/978-981-19-0351-9_71-1

Young, D., West, R. E., & Nylon, T. A. (2019). Value of open microcredentials to earners and issuers: A case study of national instruments Open Badges. *International Review of Research in Open and Distributed Learning*, 20(5) 104-121. https://doi.org/10.19173/irrodl.v20i5.4345

Younge, O., & Franklin, K. (2022). How our micro-credential audit supports equitable and accessible professional development. https://digitalpromise.org/2022/03/10/how-our-micro-credential-audit-supports-equitable-and-accessible-professional-development/

Washington, D.C.:
1001 Connecticut Ave. NW, Suite 935
Washington, D.C. 20036

Redwood City, CA:
702 Marshall St., Suite 340
Redwood City, CA 94063

Website: https://digitalpromise.org/