




Advantages of Micro-credentials: The Connections among Learners, Universities and Employers

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Abstract. Micro-credentials represent an emerging area of research within the field of education and are designed to increase students' competitiveness and address employment challenges through standardized micro-professional assessments. Presently, micro-credentials have emerged as a cutting-edge approach to tackling student employment issues. This paper mainly adopts the literature analysis method as well as the inference method to analyze 12 studies on micro-credentials systematically and further explains the connections of micro-credentials among learners, universities and employers, which are helpful for the implementation of micro-credentials. Through these theoretical relationships, this paper concretely explains and dissects micro-credentials, describing implemented cases and the dynamics among the three primary stakeholders. It aims to clarify the role of micro-credentials in higher education and advocates for addressing existing challenges to promote their broader adoption and implementation.

Keywords: micro-credential, lifelong learning, RPL, education policy, open badge

1 Introduction

With the consistent development of the digital transformation of education, micro-credentials have emerged as a prospective solution for upgrading and reskilling learners in a short period of time in an open and flexible way^[1]. Micro-credentials are becoming increasingly popular in the field of education, which aligns with Open, Flexible, and Distance Learning (OFDL) ideals^[2]. It is an emerging pathway in higher education, offering specialized content and more specific professional categorizations for students. Micro-credentials are now gaining popularity in Europe and Australia, where they have achieved considerable success. In Europe and Australia, this is regarded as an important method for bridging the gap between school and the workplace. Both the government and higher education institutions are implementing a series of policies to promote this credential. In China, several universities are also implementing or piloting this credential certification method. The micro-credential system at East China Normal University (ECNU), which will be mentioned later in this article, is a successful example. Currently, higher education institutions worldwide are experimenting with micro-credentials to enhance their educational systems.

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However, previous studies focused only on the function and advantages of micro-credentials and seldom mentioned the operational mechanism and process. This paper presents an entire operational mechanism system that is based on many studies and examples. Some possibly feasible strategies are also given in the paper, including measures from each part of the system and generative artificial intelligence (GenAI) approaches.

This paper explains the definition, operational mechanism and limitations of micro-credentials on the basis of 12 studies, adopting the literature analysis method and inference method. The research solves three problems:

1. What is the definition of the micro-credential, and why is it needed?
2. What is the connection among learners, universities and employers as for micro-credentials?
3. The limitations of micro-credentials and why is micro-credential implementation challenging and difficult to cope with?

This paper is divided into three sections. Initially, the first section introduces the definition and significance of micro-credentials. Next, the connections among three main characters are explained. Finally, some strategies are given, and the limitations are discussed.

2 Micro-Credential Background and Significance

Compared with conventional credentials, micro-credentials are typically regarded as smaller units of learning, usually encompassing 5--40 credits. Unlike traditional credentials, obtaining a micro-credential requires fewer credits, enabling students to achieve qualifications more efficiently. These credentials are often issued by accredited institutions through a series of transparent and standardized processes. By achieving micro-credentials, students can obtain and match job roles better, whereas employers can more accurately identify and recruit qualified candidates through abilities presented in their micro-credentials. Despite the growing interest in micro-credentials, their ambiguous definition poses a barrier to their widespread dissemination and adoption. Through consultation over two years in Europe, in June 2022, a *Council Recommendation on a European Approach to Micro-credentials for Lifelong Learning and Employability* was formally approved^[3]. The approval of this document demonstrates that EU member states are committed to reaching a common definition of micro-credentials. This is important for the development of micro-credentials. The definition is as follows:

‘Micro-credential’ refers to the record of the learning outcomes that a learner has acquired following a small volume of learning. These learning outcomes will be assessed against transparent and clearly defined criteria. Learning experiences leading to micro-credentials are designed to provide the learner with specific knowledge, skills and competences that respond to societal, personal, cultural or labor market needs. The micro-credentials are owned by the learner, can be shared and are portable. They may be stand-alone or combined into larger credentials. They are underpinned by quality assurance following agreed-upon standards in the relevant sector or area of activity^[3].

Scholars and academic institutions generally agree with the key characteristics: fewer credits, flexible schedules, institutional accreditation, and transparent standards. Ultimately, micro-credentials serve as tools to promote educational equity and enhance student employability, contributing to a more rational and accessible educational process.

In recent years, there has been a surge in interest from governments, higher education institutions (HEIs), international governmental agencies, and the corporate sector in the potential of micro-credentials^[4]. The number of papers on micro-credentials published in English in newspapers around the world has grown exponentially. Since the first paper was published in 2011, the Nexis Newspaper Database has seen 1,538 papers mentioning “micro-credentials”, of which 1,285 (82%) have been produced since the beginning of 2020^[5]. This growing attention is driven not only by the impact of COVID-19 but also by the pressing challenges of student employment, prompting experts and HEIs to reconsider the role of micro-credentials as a viable solution.

Furthermore, the rise of modern learning methods, such as distance learning and artificial intelligence (AI), has significantly influenced education in the era of information and digital transformation. Micro-credentials complement these innovative approaches, working in tandem to address current educational and employment challenges. Promoting and disseminating the application of micro-credentials represents an ideal pathway for solving many of the issues facing higher education today, particularly in adapting to the evolving demands of the job market and reducing the uncertainty students face in securing employment. Micro-credentials need to present learners’ skills and competencies, and the assessment ensures that these skills and competencies are recognized and validated^[6]. There is an increasing need to bridge the gap between the formal programs offered by HEIs and the specific skills sought by industries. New educational models that provide these skills must be short, flexible, and incorporate industry-relevant learning experiences. Micro-credentials meet these requirements and have gained widespread availability, exemplified by platforms such as massive open online courses (MOOCs)^[7]. Owing to their low time commitment and flexibility, micro-credentials effectively bridge the divide between the specialized skills demanded by employers and the broader curricula offered by HEIs^[8]. This creates a win-win scenario for employers, employees, and underemployed students alike, fostering a more efficient and equitable alignment between education and the workforce.

3 The Composition of Characters

The primary impetus behind Aotearoa New Zealand’s introduction of micro-credentials in 2018 was to increase the relevance of educational offerings for employers, industries, communities, iwi, and learners. While the country had long benefited from robust systems allowing employer input into national qualifications, supported by regular review processes and strong quality assurance mechanisms, there remained room for improvement. Some qualifications were criticized for being slow to adapt to market needs, being overly lengthy, and failing to deliver the optimal balance of knowledge, skills, and attributes demanded by industry. The New Zealand Productivity Commission identified

short training courses as a viable solution to support lifelong learning, enabling the country to respond more effectively to technological advancements and the evolving nature of work^[9]. In essence, New Zealand's micro-credential system was designed to bridge the gap between employer needs and student employability. In New Zealand's system and other common micro-credential systems, there are usually 4 parts constituting the whole operational mechanism. As shown in Figure 1, learners, employers, universities and certification institutions are the main participants in this system. For each part of the system, it is necessary to have a connection with other parts; otherwise, the whole system may be ineffective, and the purpose of the micro-credentials will fail to be achieved as well.

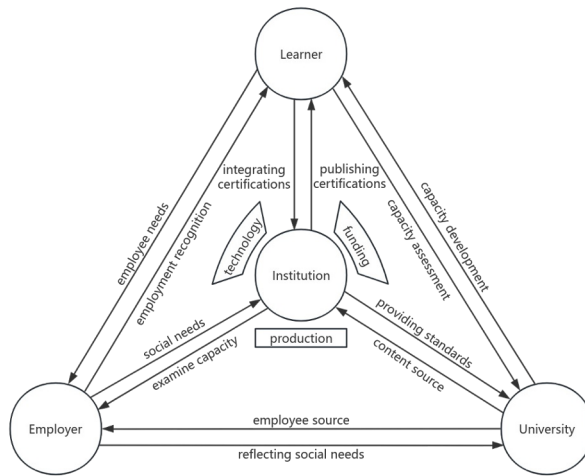


Fig. 1. Relationships among Employers, Learners and Universities

Figure Labels: The figure clarifies the relationships among learners, employers and universities. The institutions in the middle of the figure are related to the other three essential roles. Each part of the system has a necessary relationship with other parts; they are closely linked and hold the whole system jointly.

I. Learner

As an innovative pathway in higher education, micro-credentials provide significant advantages to students, enhancing both their academic and professional trajectories. Within the educational sphere, micro-credentials distill learning content into focused, actionable knowledge, thereby elucidating the objectives and tangible outcomes of education. This methodology highlights the indispensable function of education in fostering critical survival competencies in individuals.

Moreover, since micro-credentials are often based on learners' personal interests or areas of specialization, they can enhance students' motivation and engagement during their studies. Once employed, individuals can continue to earn micro-credentials by completing assessments from accredited institutions, facilitating career advancement and transitions. The segmented nature of micro-credentials ensures that competition

among job seekers does not become overly intense while simultaneously boosting individual competitiveness.

II. Employer

In regions such as India and Spain, many students face significant challenges in securing jobs that align with their academic majors after graduation. As of June 2024, India's unemployment rate reached 9.2%, with youth unemployment accounting for nearly 83% of this figure. Despite government claims of generating over 20 million jobs annually, graduates from India's higher education institutions continue to experience intense employment pressure, particularly in knowledge-intensive sectors such as manufacturing and IT. This has led many young individuals to seek better opportunities abroad. Similarly, Spain grapples with alarmingly high youth unemployment, reportedly exceeding 50%. This dire situation leaves many recent graduates struggling to find jobs, and when they do, their positions are often unrelated to their fields of study and offer low wages. A key reason behind this mismatch is the difficulty employers face in accessing accurate information about graduates' skill sets and evaluating their true competencies. Without precise tools to assess candidates' abilities, employers often struggle to make informed hiring decisions, placing students at a disadvantage in the job market. This is where micro-credentials can play a transformative role. By showcasing the specific specializations and skills students have acquired during their education, micro-credentials provide employers with clear, transparent insights into candidates' expertise. This enables employers to make more precise hiring decisions, ensuring that employees are placed in roles that align with their interests and specialized knowledge.

III. University

Establishing an effective micro-credential framework requires transparent criteria, open standards, and a rigorous review process. Schools and higher education institutions must develop robust mechanisms, authorization requirements, and inspection processes to ensure the quality and credibility of micro-credentials, thereby preventing academic proliferation. From a faculty perspective, the discussion of micro-credentials leading to significant changes in the structure of higher education may raise concerns about their role and status at the university^[10].

A notable feature of micro-credentials is their flexibility. Some institutions allow courses completed through certificates, micro-degree, or micro-master's programs to be credited toward degree programs, providing students with a pathway to further education. This not only serves as an excellent recruitment tool for higher education institutions but also acts as a predictive indicator of success for students who complete these programs. For example, when applying for PhD programs, postgraduate degree students can showcase their research achievements and proposals more effectively, supported by the transparency and precision of micro-credentials. This enables university tutors to make more informed decisions regarding student recruitment and mentorship.

Micro-credentials also empower students to pursue more specialized and digital qualifications during their undergraduate, postgraduate, or doctoral studies, fostering passion and motivation through tangible achievements. For the education sector itself, the advent of micro-credentials has broken through developmental bottlenecks, enabling students and professors to focus on specific areas of interest. This targeted ap-

proach enhances learning outcomes, teaching effectiveness, and self-efficacy, ultimately reinforcing the value of education and improving graduates' readiness for the workforce. There is a running micro-credential system that uses this method at the School of Open Learning and Education of East China Normal University (ECNU). This faculty offers a number of curricula in the teaching area. The main goal of these curricula is to improve learners' teaching ability in practice, with participants being almost all teachers, especially those in kindergarten, primary and secondary schools. To evaluate learners, this system adopts a mixed curriculum and task approach. Learners study in traditional or online lessons, passing a mission of practical teaching in the last examination. Evaluators rate their performance in teaching and ultimately decide whether they can pass and obtain the micro-credential.

4 Limitations

One of the primary challenges facing micro-credentials is the variability in their quality and the limited recognition they receive, largely due to their association with short courses. Most micro-credential programs operate informally and are usually provided by different institutions, with minimal regulatory oversight, raising concerns about the true mastery of skills by both instructors and students. Without stringent regulatory mechanisms and sufficient scale, ensuring uniformity in program transparency, assessment criteria, and overall quality is difficult. This inconsistency often results in varying levels of credibility among certificates bearing the same name. High-quality credentials may suffer from a lack of trust due to the prevalence of lower-quality counterparts, as learners and other stakeholders struggle to evaluate the legitimacy of issuing organizations, courses, and certificates.

In Aotearoa New Zealand, for example, formal qualifications typically require a minimum of 40 credits, equivalent to approximately 400 hours of learning. Historically, numerous subqualification short courses have been offered by both registered and non-registered education and training organizations, as well as industry bodies. These included NZQA-approved "Training Schemes," which were developed by providers with relatively low thresholds for demonstrating industry support. While external evaluations and reviews of tertiary providers sometimes included quality assurance for these short courses, the lack of integration into the New Zealand Qualifications Framework (NZQF) made it difficult for stakeholders to understand their value or accessibility. Additionally, since these training schemes were not recorded in a learner's Record of Achievement, students were unable to fully benefit from the recognition of their studies^[11].

Moreover, micro-credentials are still a relatively new concept, making it difficult to assess which institutions excel in specific areas. Long-term evaluation and consideration are needed to establish trust and recognition in these programs. National and regional differences further complicate the development of micro-credentials. Variations in certification standards, assessment methods, and quality assurance models across countries and regions create challenges in determining the equivalence of credits and

credentials. This lack of harmonization hinders the global recognition and transferability of micro-credentials, limiting their adoption to only a few regions where standards and practices are more aligned. Additionally, the higher education system has largely overlooked micro-credentials, with many senior leaders failing to prioritize their development. This has resulted in limited funding and support for micro-credential programs. In the U.S. and Canada, for instance, students often lose credit when transferring between institutions, a problem that micro-credentials could mitigate. However, the lack of serious attention given to micro-credentials has stalled progress in this area.

5 Discussion

To push the widespread transformation of micro-credentials, each part of the system needs to make efforts toward promotion. For universities, encouraging students to take part in such certificates' courses might be a critical issue. There are several types of activities that universities can offer, such as lectures, symposia and the distribution of sensitization brochures. In this way, students' recognition of the value of micro-credentials can be improved. Faculties and professors need to formulate a particular course pattern, thus prompting students to study micro-curricula. For example, in some specific programs created for micro-credentials, credits are separated into traditional and micro-credential courses, and students are required to complete the designated micro-credential course to receive full credit. Moreover, faculty members can set scholarships for distinguished students due to their awesome performance in the courses. In these ways, the scale of the curricula and the implementation of micro-credentials can be expanded. On the basis of their studies, internships and work experience, learners should summarize the skills that are the focus of certain fields or industries and demand that universities and institutions offer relevant micro-credentials^[12].

Evaluators should work with universities and educational institutions to jointly develop highly targeted skills curricula on the basis of the specific needs of industry development. This will ensure that the content of the curriculum keeps pace with market changes and meets the needs of enterprises for talent. Through the establishment of a continuous feedback mechanism, the practical effectiveness of the micro-credentials is regularly assessed, and adjustments and optimizations are made on the basis of the feedback. This helps keep the course content current and practical.

Given that the trend of generative artificial intelligence (GenAI) has swept the world, the construction of micro-credentials can also utilize GenAI technology for better implementation. Learners can study micro-credentials assisted by GenAI and accurately matched with employers through AI matching platforms. For employers, this big-model-based matching approach will also help companies recruit talent in short supply. For universities and governments, micro-credential courses are designed through GenAI to help teachers teach better, and learners understand micro-credential content more deeply. It is an efficient way for governments to analyze market demand through big model data collection and develop courses to address labor shortages, and they can work with companies to ensure transparency and traceability of certificates through AI blockchain technology.

6 Conclusion

Establishing a robust micro-credential system requires significant government effort, including the creation of comprehensive databases to store relevant information, the development of supportive policies and legislation, and the prioritization of programs that align with national or regional development goals. Addressing issues of quality, standardization, and harmonization adds further complexity to this endeavor. The substantial investment of human and financial resources required raises questions about whether the potential benefits of micro-credentials justify the costs. To answer this question, pilot programs in regions with established systems, along with long-term evaluation, will be essential to demonstrate the value and feasibility of micro-credentials on a broader scale.

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