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# Micro-credentialing: The Janus of Higher Education

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**ABSTRACT**

The use of micro-credentials holds immense potential to address the challenges of traditional higher education, particularly in terms of accessibility, employability, and inclusivity. This study delves into the rise of micro-credentialing and its evolution in the digital learning landscape post the COVID-19 pandemic. With many people owning cell phones and a tech-savvy younger generation, micro-credentials are poised to pave a promising pathway for education and career advancement. The research explores the potential, benefits, and possible future of micro-credentials. Using an integrative literature review approach, this study uses a qualitative approach to analyse policy documents, published articles, and case studies of micro-credentialing initiatives. According to initial research, micro-credentials have the potential to provide adaptable and targeted learning opportunities. These can be combined and aligned with industry standards, bridging the divide between traditional education and the evolving requirements of the job market. This adaptability instils confidence in the relevance of the education system. Micro-credentialing is a new way of recognising and certifying skills. It is more inclusive and challenges traditional education models, offering a lifelong learning and employability framework.

**Keywords:** Micro-credentialing, Higher Education, Workforce Development, Lifelong Learning
**JEL Classifications:** A29

## 1. INTRODUCTION

In recent years, micro-credentialing has emerged as an innovative solution to the challenges faced by traditional higher education systems. Particularly in regions like South Africa, where accessibility, employability, and inclusivity are paramount, micro-credentials offer a promising alternative to conventional educational pathways. This study focuses on the rise of micro-credentialing in South Africa, examining its potential to not only complement the National Qualifications Framework (NQF) but also significantly enhance the recognition and value of employability skills, thereby ensuring the relevance and applicability of the education system.

The concept of micro-credentials has gained significant attention in recent years, particularly within lifelong learning and the evolving demands of the modern workforce, and their adoption is taking place across the globe (Hopkins and Moller, 2024). They are often called digital badges, nano-degrees, or micro-certifications (Lemoine and Richardson, 2015). Micro-credentials represent a form of alternative credentialing that aims to recognise specific skills, knowledge, or achievements that traditional degree programs may not adequately capture (Kato et al., 2020). According to Brown et al. (2021), there is still much confusion regarding the definition of micro-credentials and where they fit in the education and qualification framework. From what I have read, it seems as if there is consensus that it is called a micro-credential because it is a shorter form of learning experience which covers a single course, but it is less than a full degree. It is considered an additional, alternative, or complementary option to a full traditional formal qualification such as a bachelor's degree, taking also into account workload and hours of learning.

The study acknowledges the impact of the COVID-19 pandemic, which accelerated the shift towards digital learning on MOOC (Massive Open Online Cources) platforms, on the adoption and implementation of micro-credentials. With the high rate of cell phone ownership and the tech-savvy nature of the younger generation, micro-credentials present accessible and adaptable

learning opportunities that cater to the evolving needs of the job market.

This research evaluates micro-credentials potential to complement the NQF and assess their value in South Africa. Using a qualitative approach, the study analyses policy documents, published articles, and case studies of micro-credentialing initiatives. The findings suggest that micro-credentials can bridge the gap between traditional education and the job market, offering a more inclusive and flexible framework for lifelong learning and employability. At this point, the studies regarding micro-credentials resemble the Roman god Janus, the two-faced god of ends and new beginnings, a doorway after whom the month of January was named. Janus looked back to the previous year and forward to the future of the year to come. Scholars are doing precisely this at the moment with micro-credentials. They look back at traditional degree qualifications and look forward to the new demands of the digital era and the world of work. Micro-credentials are the doorway between the two epochs. However, the unanswered question is: Where do we go from here?

The current policy environment in South Africa is characterised by a drive towards high-skill jobs and innovation, linking research to new forms of production and services (Winberg et al., 2014). This has led to considerable curriculum development across various fields and disciplines to support the "high skills" agenda. However, there is a concern about the lack of clarity regarding appropriate qualifications and skill levels for a developing country and what might differentiate skills programs from professional programs (Winberg et al., 2014).

Despite these challenges, South African education has earned international recognition. Initial education institutions have adequate resources to fulfil their roles, enabling graduates to access domestic and international job markets (Vakalisa, 2005). Nevertheless, the current high unemployment rate among South African youth, although it can be attributed to various factors, including the country's economic climate and the legacy of inequalities in educational provisioning (Vakalisa, 2005), needs to be addressed, and micro-credentialing can play a part in finding a solution for this problem.

The World Economic Forum estimates that more than 97 million new job roles may emerge globally by 2025. From a South African perspective, research suggests that up to 1.7 million new technology-enabled jobs could be created by 2030. However, these jobs require higher levels of education with varied skill sets and competencies, so a new shift in learning is required to develop a future-fit workforce that can enable economic and societal growth and development (Govender and Singh, 2022).

## 2. METHODOLOGY

According to Snyder (2019), the literature review has become more relevant than ever as a research method. A practical and well-conducted review synthesises research findings on a meta-level to create a strong foundation for advancing knowledge and facilitating theory development. Snyder distinguishes between three types of review methodologies: Systematic, semi-systematic, and integrative approaches.

For this article, the integrative approach is considered the best. Snyder (2019) explains that some research questions require more creative data collection. In such cases, the integrative review approach is helpful. The purpose of the integrative review method is not to cover all articles ever published on the topic but rather to assess, combine, critique, and synthesise the literature on a research topic in a way that enables new theoretical frameworks and perspectives to emerge.

Most integrative literature reviews aim to address either older and established subjects or emerging subjects. When dealing with established subjects, employing an integrative review method provides an overview of the existing knowledge, conducts a critical assessment that may lead to re-conceptualisation, and augments the theoretical framework of the specific topic as it progresses. In the case of emerging subjects, the purpose is primarily to develop initial or preliminary conceptualisations and theoretical models instead of reviewing pre-existing models. This form of review often necessitates a more imaginative gathering of data, as the objective typically involves combining perspectives and insights from various disciplines or research traditions rather than encompassing all articles ever published on the subject. Integrative literature reviews are a versatile and rigorous form of research that aim to synthesise and critically analyse the existing body of knowledge on a particular topic (Torraco, 2005). Unlike traditional narrative reviews, which often merely summarise the literature, integrative reviews strive to generate new insights and perspectives by systematically analysing, critiquing, and integrating the findings from a wide range of studies (Alsalami, 2022; Torraco, 2005).

### 2.1. Steps in the Process

Conducting an integrative literature review typically involves several key steps. First, the researcher must identify an appropriate topic or issue that would benefit from a comprehensive literature synthesis (Torraco, 2005). Once the topic is selected, the researcher must justify why a literature review is the most suitable approach for addressing the research question or problem (Torraco, 2005).

Next, the researcher must thoroughly search and retrieve the relevant literature, ensuring the search is comprehensive and systematic (Torraco, 2005). The Boolean search method can be applied. This step is crucial, as the quality and breadth of the literature included in the review will directly impact the validity and generalisability of the findings (Torraco, 2005).

After gathering the relevant literature, the researcher must critically analyse and evaluate the existing research, identifying patterns, trends, and gaps in the knowledge base (Alsalami, 2022; Torraco, 2005). This analysis serves as the foundation for the subsequent synthesis, where the researcher aims to create new understandings of the topic by integrating and interpreting the findings from multiple studies (Torraco, 2005).

To source articles, an Emerald, Ebscohost, and Google Scholar search was done. The opinions and definitions of the different

researchers were synthesised to contribute to an overview of the existing body of knowledge and conceptualise a possible contribution to existing theory regarding micro-credentials to broaden understanding and add perspectives.

### 2.2. Data Analysis

The data analysis part of an integrative or critical review is not mainly developed according to a specific standard (Whittemore and Knafl, 2005). While there is no strict standard, the general aim of data analysis in an integrative review is to critically analyse and examine the literature and the main ideas and relationships of an issue. Articles published will be analysed to identify the progress and innovation happening in the academic research on micro-credentials over the last few years and explore the trend in which it is developing.

An integrative review method should advance knowledge and theoretical frameworks rather than provide an overview or description of a research area. The integrative literature review is a sophisticated form of research that requires a high degree of skill and insight (Torraco, 2005). Unlike other types of literature reviews, integrative reviews are expected to move beyond simply summarising the literature and instead offer valuable new perspectives and theoretical frameworks that can advance the field of study (Alsalami, 2022; Torraco, 2005). In this article, the review will use literature to pave the way for future adoption of micro-credentials in higher education and lifelong learning.

## 3. LITERATURE REVIEW

Higher education institutions (HEIs) increasingly focus on their students' employability skills as an integral part of their goals to improve their chances of entering the economic market. In parallel with this, the shift of focus from the recognition of conventional qualifications to micro-credentials has also emerged as a trend, which stems from a long-standing debate on the value of degrees for the future of work.

### 3.1. Theoretical Framework

The Council on Higher Education (2023) provides the theoretical framework in which this study positions itself regarding offering micro-credentials by higher education institutions in South Africa as in Communique 2 of 2023. This framework states that micro-credentials are emerging globally as flexible and responsive learning opportunities. Many countries are integrating them into their education systems, though uptake varies widely. In Southern Africa, including South Africa, policy and strategy development around micro-credentials is in its early stages. National qualifications frameworks are still figuring out how to incorporate them despite some preliminary discussions and draft frameworks by various entities. Awareness among learners, employees, and employers is low. Significant barriers to access exist, such as limited internet access, devices, and social inequalities.

Key issues still to be considtxered are:

- Defining micro-credentials in the Southern African context
- Registering micro-credentials on national qualifications frameworks
- Deciding if micro-credentials should be credit-bearing
- Enabling recognition of micro-credentials, especially in workplaces
- Understanding the relationship between micro-credentials and full qualifications
- Determining if stacking of micro-credentials towards qualifications should be allowed and under what criteria
- Ensuring quality assurance and identifying responsible entities
- Establishing a repository for micro-credentials
- Advancing social justice through access to and achievement of micro-credentials.

The Council on Higher Education, with partners, is initiating a project to develop a broad Southern African framework for micro-credential recognition, providing guidelines for individual countries and institutions. Higher education institutions that already offer micro-credentials should maintain quality and integrity. They are advised to develop institutional policies covering governance, design, delivery, approval, marketing, resources, assessment, certification, records management, and continuous improvement.

Current regulations only allow credits for learning that is part of a qualification. However, modules taken for non-degree purposes could be recognised as credit-bearing micro-credentials, potentially allowing recognition in formal qualifications through Credit Accumulation and Transfer (CAT) mechanisms. Other micro-credentials can be recognised through a Portfolio of Evidence for Recognition of Prior Learning (RPL) for access to or advanced standing in formal qualifications.

Given this theoretical framework by the Council on Higher Education, no policies are in place, and studies and discussions are still seeking the way forward. This framework indicates thus a current gap and an invitation to debate and contributions. This article and this integrative literature review aim to contribute to the debate on finding a pathway to how micro-credentialing can contribute to inclusive education and workforce development in South Africa.

## 4. OVERVIEW OF EXISTING RESEARCH ON MICRO-CREDENTIALS

After a literature search, the articles in Table 1 could be retrieved (on July 17, 2024). Since these articles are viewed as data, they are not listed again as references in the reference list at the end of this article. Only those referred to in the rest of the article have been listed. The oldest article that could be found was published in 2014. The table oversees 71 articles published within the last 10 years. Before COVID-19 was diagnosed and the lockdowns started, 32 articles were published in the preceding 6 years. Most articles, 33, were published when all learning activities moved online during the 3 years of 2021-2023. COVID thus accelerated the shift towards digital learning and an innovative way of upskilling.

According to the data in Table 1, exploratory research on micro-credentialing was conducted between 2014 and 2021. Scholars

**Table 1: Articles published on micro-credentials**

| S. No. | Article title | Authors | Year | Citations | References |
|---|---|---|---|---|---|
| 1 | The use, role and reception of open badges as a method for formative and summative reward in two Massive Open Online Courses | Cross, S., Denise Whitelock, D., and Galley, R. | 2014 | 26 | 29 |
| 2 | Exploring the use of micro-credentialing and digital badges in learning environments to encourage motivation to learn and achieve | Clayton, J., Elliott, R., and Iwata, J. | 2014 | 27 | 12 |
| 3 | Developing open badges: A comprehensive approach | Devedzic, V., and Jovanović, J. | 2015 | 91 | 51 |
| 4 | A history and frameworks of digital badges in education | Ostashewski, N., and Reid, D. | 2015 | 43 | 19 |
| 5 | Micro-credentials, nano degrees, and digital badges: New credentials for global higher education | Lemoine, P.A., and Richardson, M. | 2015 | 62 | 50 |
| 6 | Open badges: A best-practice framework | Voogt, L., Dow, L., and Dobson, S. | 2016 | 1 | 66 |
| 7 | Technology and learning: Preparing teachers for the future | Lemoine, P.A. M., Yates, H., and Richardson, M. | 2016 | 2 | 91 |
| 8 | Challenges for adult skill formation in the globalising learning economy - a European perspective | Lundvall, B., and Rasmussen, P. | 2016 | 23 | 44 |
| 9 | Understanding digital badges in higher education through assessment | Abramovich, S. | 2016 | 46 | 12 |
| 10 | To what extent do discipline, knowledge domain and curriculum affect the feasibility of the Recognition of Prior Learning (RPL) in higher education? | Harris, J., and Wihak, C. | 2017 | 19 | 37 |
| 11 | Perceptions and uses of digital badges for professional learning development in higher education | Dyjur, P., and Lindstrom, G. | 2017 | 64 | 20 |
| 12 | The emerging formalization of MOOC coursework: Rise of the MicroMasters | Caudill, J. | 2017 | 11 | 0 |
| 13 | The effect of perceived relevance of digital badges on student engagement | Higashi, R.M. | 2018 | 1 | 116 |
| 14 | Global marketing of higher education E-Learning | Mense, E.G., Garretson, C., Lemoine, P.A., and Richardson, M. | 2018 | 3 | 127 |
| 15 | Teachers' perceptions of digital badges as recognition of professional development | Jones, W.M., Hope, S., and Adams, B. | 2018 | 30 | 20 |
| 16 | Micro-credentialing in mobile learning: Implications for impactful design | Pechenkina, E. | 2018 | 1 | 39 |
| 17 | An exploration of the utility of digital badging in higher education settings | Carey, K., and Stefaniak, J.E. | 2018 | 66 | 56 |
| 18 | Digital badges, do they live up to the hype? | Roy, S., and Clark, D. | 2018 | 22 | 44 |
| 19 | A learner-centred approach for lifelong learning powered by the blockchain | Mikroyannidis, A., Domingue, J., Bachler, M., and Quick, K. | 2018 | 41 | 10 |
| 20 | Goal setting and open digital badges in higher education | Cheng, Z., and Newby, W.T. | 2018 | 41 | 49 |
| 21 | Understanding the feasibility of micro-credentials in engineering education | Mischewski, B., and Christie, A. | 2018 | 4 | 0 |
| 22 | Marketing micro-credentials in global higher education: Innovative disruption | Lemoine, P.A., Wilson,W., and Richardson, M. | 2018 | 7 | 64 |
| 23 | Micro-credentials in higher education institutions: An exploratory study of its place in Tanzania | Ghasia, M., Machumu, H.J., and Smet, E.D. | 2019 | 33 | 27 |
| 24 | Micro-credentials: The potential of personalized professional development | Hunt, T.L., Carter, R., Zhang, L., and Yang, S. | 2019 | 32 | 4 |
| 25 | Decentralising online education using blockchain technology | Mikroyannidis, A., Third, A., and Domingue, J. | 2019 | 14 | 9 |
| 26 | The FAIR TRADE framework for assessing decentralised data solutions | Domingue, J., Third, A., and Ramachandran, M. | 2019 | 14 | 25 |
| 27 | Creative disruption in higher education | Lemoine, P.A., and Richardson, M. | 2019 | 11 | 70 |
| 28 | Instructional digital badges: Effective learning tools | Newby, T., and Cheng, Z. | 2019 | 23 | 52 |
| 29 | Preparing students for university studies and beyond: A micro-credential trial that delivers academic integrity awareness | Ruddy, C., and Ponte, F | 2019 | 20 | 31 |
| 30 | Instilling purpose and value in the implementation of digital badges in higher education | Stefaniak, J.E., and Carey, K. | 2019 | 41 | 36 |
| 31 | The use of open badges in library and information science education in Estonia | Virkus, S. | 2019 | 6 | 33 |
| 32 | Value of open microcredentials to earners and issuers | Young, D., West, R., and Nylin, T.A. | 2019 | 14 | 31 |

*(Contd...)*

**Table 1:** ***(Continued)***

| S. No. | Article title | Authors | Year | Citations | References |
|---|---|---|---|---|---|
| 33 | The emergence of alternative credentials | Kato, S., Galán-Muros, V., and Weko, T.J. | 2020 | 42 | 0 |
| 34 | Microcredentialing of english learner teaching skills: An exploratory study of digital badges as an assessment tool. | Purmensky, K., Xiong, Y., Nutta, J.W., Mihai, F., and Mendez, L. | 2020 | 3 | 52 |
| 35 | Getting started with open badges and open microcredentials | Clements, K., West, R., Hunsaker, E. | 2020 | 31 | 43 |
| 36 | The use of open badges in library and information science education in Estonia | Askeroth, J., and Newby, T. | 2020 | 5 | 64 |
| 37 | Guidelines for open and online learning assessment and recognition with reference to the National and European qualification framework: Micro-credentials as a proposal for tuning and transparency | Trepule, E., Volungevičienė, A., Teresevicienė, M., Dauksienė, E., Greenspon, R., Tamoliūnė, G., Šadauskas, M., and Vaitonytė, G. | 2021 | 2 | 20 |
| 38 | Digital badges: Pinning down employer challenges | Perkins, J., and Pryor, M. | 2021 | 17 | 0 |
| 39 | Micro-credentials and badges in education: A historical overview | Gish-Lieberman, J., Tawfik, A., and Gatewood, J. | 2021 | 20 | 21 |
| 40 | How and why are digital badges being used in higher education in New Zealand? | Hartnett, M. | 2021 | 11 | 43 |
| 41 | How to increase the value of digital badges for assessment and recognition in higher education. A University Case | Trepule, E., Volungevičienė, A., Teresevicienė, M., Greenspon, R., and Costa, N. | 2021 | 5 | 42 |
| 42 | A systematic literature review of micro-credentials in higher education: A non-zero-sum game | Ngoc, N.H.T., Spittle, M., and and Van Dyke, A.M. | 2022 | 13 | 61 |
| 43 | Exploring the potential of micro-credentials: A systematic literature review | Tamoliūnė, G., Greenspon, R., Teresevicienė, M., Volungevičienė, A., Trepule, E., and Dauksienė, E. | 2022 | 8 | 68 |
| 44 | A strategic reset: Micro-credentials for higher education leaders | McGreal, R., and Olcott, D. | 2022 | 3 | 0 |
| 45 | Unboxing micro-credentials: An inside, upside and downside view | Brown, M., and and Nic-Giolla-Mhichil, M. | 2022 | 19 | 50 |
| 46 | Toward just and equitable micro-credentials: An Australian perspective | Desmarchelier, R., and Cary, L.J. | 2022 | 22 | 33 |
| 47 | Implementation of micro-credentials in higher education: A systematic literature review | Ahsan, K., Akbar, S., Kam, B., and Abdulrahman, M. | 2022 | 7 | 98 |
| 48 | Blockchain-based micro-credentialing system in higher education institutions: Systematic literature review | Alsobhi, H., Alakhtar, R.A., Ubaid, A., Hussain, O., and Hussain, F. | 2022 | 25 | 33 |
| 49 | Bridging the Gap: Micro-credentials for development | McGreal, R., Mackintosh, W.G., Cox, G., & Olcott Jr, D. | 2022 | 16 | 43 |
| 50 | Micro-credentials for social mobility in rural postsecondary communities: A landscape report | Tinsley, B., Cacicio, S., Shah, Z., Parker, D.P., Younge, O., and Luna, C.L. | 2022 | 5 | 0 |
| 51 | The international case for micro-credentials for life-wide and life-long learning: A systematic literature review | Msweli, N.T., & Ismail, H.T.M. | 2022 | 7 | 0 |
| 52 | An assessment of micro-credentials in New Zealand vocational education | Fisher, R., and Leder, H. | 2022 | 11 | 30 |
| 53 | Features of Micro-credential Platforms in Higher Education | Kiiskilä, P., Hanafy, A., and Pirkkalainen, H. | 2022 | 13 | 27 |
| 54 | Harnessing the Benefits of Micro Credentials for Industry 4.0 and 5.0: Skills Training and Lifelong Learning | Shanahan, B.W. and Organ, J. | 2022 | 4 | 4 |
| 55 | The evolution of a micro-credential | Ponte, F., and Saray, F. | 2022 | 5 | 16 |
| 56 | Micro-credentials and reflections on higher education | Orman , R., Simsek, E., and Çakır, M.A.K. | 2022 | 5 | 23 |
| 57 | Micro-credentials in leveraging emergency remote teaching: The relationship between novice users' insights and identity in Malaysia | Kumar, J.A., Richard, R.J., Osman, S., and Lowrence, K. | 2022 | 19 | 70 |
| 58 | Exploring the potential of micro-credentials: A systematic literature review | Tamoliūnė, G., Greenspon, R., Teresevicienė, M., Volungevičienė, A., Trepule, E., and Dauksienė, E. | 2023 | 8 | 68 |
| 59 | Micro-credentials in digital form - lifelong development path | Nowakowski, M. | 2023 | 0 | 0 |
| 60 | A Strategic Institutional Response to Micro-Credentials: Key Questions for Educational Leaders | Brown, M., McGreal, R., and Peters, M. | 2023 | 7 | 42 |

*(Contd...)*

**Table 1:** ***(Continued)***

| S. No. | Article title | Authors | Year | Citations | References |
|---|---|---|---|---|---|
| 61 | The implementation of micro-credentials in formal and informal learning: A systematic literature review | Rajabalee, Y. | 2023 | 0 | 50 |
| 62 | A systematic review of the opportunities and challenges of micro-credentials for multiple stakeholders: Learners, employers, higher education institutions and government | Varadarajan, S., Koh, J., and Daniel, B. | 2023 | 21 | 95 |
| 63 | Experiences with Micro-Credentials at UC3M: Academic and Technological Aspects | Hoyos, C.A., and Kloos, C.D. | 2023 | 2 | 43 |
| 64 | Micro-credentials and the role of evidence: Increasing the potential for learner-centeredness, inclusivity and an expansive model of assessment and credentialing | Reed, A. | 2023 | 3 | 38 |
| 65 | Institute of coding in wales digital skills bootcamps - a model for stackable micro-credentials | Hopkins, C., Moller, F., and Robert, L. | 2023 | 3 | 7 |
| 66 | Using skills profiling to enable badges and micro-credentials to be incorporated into higher education courses | Ward, R.R., Crick, T., Davenport, J., Hanna, P., Hayes, A., Irons, A., Miller, K., Moller, F., Prickett, T., and Walters, J. | 2023 | 11 | 95 |
| 67 | "People have started calling me an expert": The impact of open university microcredential courses | Chandler, K., and Perryman, L. | 2023 | 1 | 28 |
| 68 | Making sense of the digital badging landscape in education and workplace settings: A scoping review of the empirical literature | Cumberland, D.M., Deckard, T.G., Kahle-Piasecki, L., Kerrick, S.A., Ellinger, A.D. | 2023 | 2 | 65 |
| 69 | Workforce upskilling: Can universities meet the challenges of lifelong learning? | Lang, J. | 2023 | 6 | 9 |
| 70 | The global micro-credential landscape: Charting a new credential ecology for lifelong learning | Brown, M., Mhichíl, M.N.G., Beirne, E., and Lochlainn, C.M. | 2024 | 43 | 59 |
| 71 | The state of micro-credentials implementation and practice in Australasian higher education | Selvaratnam, R., and Sankey, M. | 2024 | 11 | 60 |

started reviewing and systemising the accumulated knowledge in 2021 with the study of Gish-Lieberman, Tawfik, and Gatewood, who published a historical overview of micro-credentials in education. Between 2022 and 2023, 11 reviews of the existing literature were published. This period coincides with the COVID pandemic, which indicates that micro-credentials became a significant and relevant topic. COVID-19 as an external factor accelerated interest in the topic. The sudden changes in the way of education, namely the move online, as well as the changes in job market demands, namely remote working and new skill sets, as well as the rapid technological advancements, ignited interest in the topic, and the research regarding micro-credentials gained momentum. It attracts more scholars at the moment. The fact that so many literature reviews saw the light also implies that a substantial body of knowledge exists at that stage that warrants synthesis and critical analysis.

Literature reviews help to identify areas of consensus and divergence in a field. They also indicate that scholars try to understand and compare different perspectives, approaches, and findings.

### 4.1. Author Map of Published Articles between 2014 and 2021

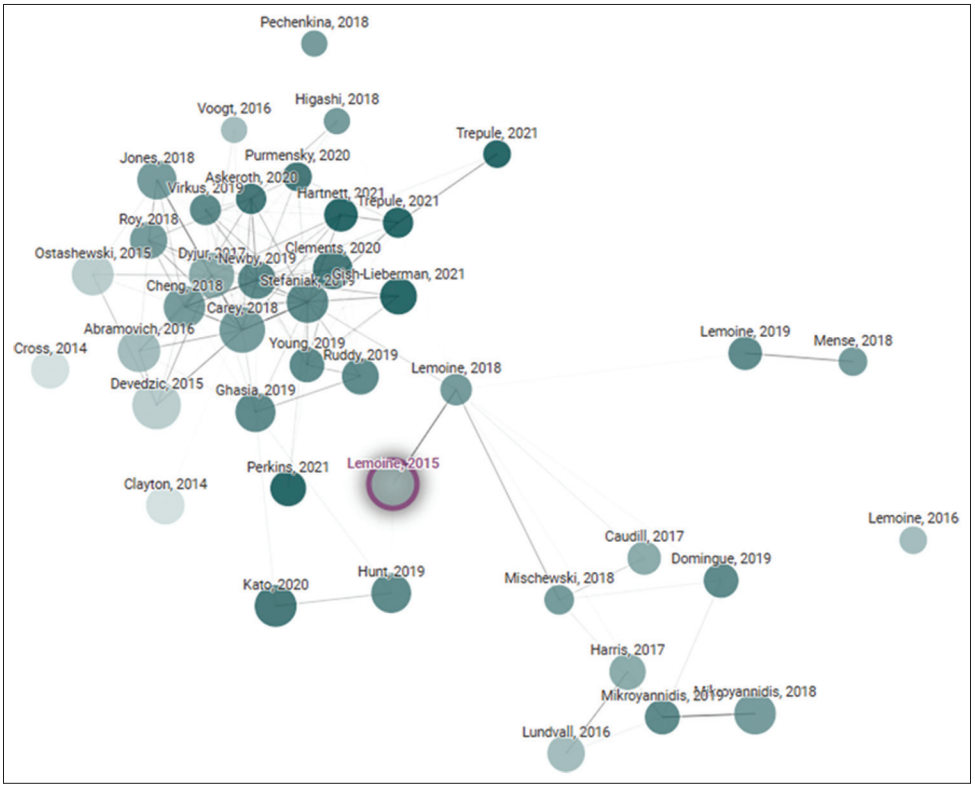
The map in Figure 1 indicates the interdependency and development of the different sources discussing micro-credentials. According to the data in the map, the 2015 article by Lemoine and Richardson seems to have sparked interest in the field. The map indicates that all articles published, except for five, are linked in one way or another.

### 4.2. Micro-credentialing Enhancing Curricula, Employability and Lifelong Learning

In today's rapidly evolving job market, micro-credentialing has become a valuable tool for individuals and institutions. Micro-credentials are small, targeted credentials that recognise specific skills or competencies, often in a shorter time frame compared to traditional academic degrees (McGreal et al., 2022). These credentials can provide significant benefits to both learners and organisations. Brown et al. (2021) explain micro-credentials as differentiated from traditional macro-credentials in the sense that it is non-status awards such as short courses and nano-credentials such as digital badges or certificates, and, in many cases unbundled, credit-bearing, but stackable credentials. They explain it with the example of an individual learner who could have a non-credit-bearing badge in project management. This badge could be assessed as recognition of prior learning by a university or as part of a wider professional portfolio, which can contribute to a credit-bearing credential.

For learners, micro-credentials offer the opportunity to have their skills and competencies formally recognised, which can lead to enhanced employability and opportunities for career advancement (McGreal et al., 2022) in a context where more and more jobs are disappearing due to the automation of basic tasks, and where many new high-skill jobs are emerging (Hopkins and Moller, 2024). However, it is essential to note that micro-credentials alone do not guarantee career success; they are one form of employability capital and an adaptive career behaviour that individuals may use to pursue their goals (Healy, 2021). Learners can access learning on-demand at a lower cost and with more choices, particularly

**Figure 1:** Author map




Source: AI-generated by connectedpapers.com

in areas where skills are in high demand (McGreal et al., 2022). They can also stack it and use it as a pathway to a larger or full qualification (Brown et al., 2021).

From the institutional perspective, micro-credentials can serve as a new revenue stream by tapping into new markets while decreasing costs associated with traditional educational programs (McGreal et al., 2022). These shorter, focused units of study offer flexibility and can be integrated into existing curricula through blended learning approaches (Sharma et al., 2024). Furthermore, stronger connections with employers and professional bodies can lead to a better understanding of the marketplace's evolving needs, enabling institutions to tailor their offerings accordingly (McGreal et al., 2022). The Employability Skills Micro-credentialing methodology, tested in East African universities, demonstrates promise in fostering pedagogical innovation and improving the visibility of employability skills (Maina et al., 2022). According to Brown et al. (2021), it is currently complementary to a full qualification. At most universities micro-credentials are part of larger programmes where they are credit-bearing modules. These programmes were unbundled for micro-credentialing purposes. Attaching credits to standalone modules is a new concept in higher education. The existing system was not built or designed for this (Hopkins and Moller, 2024).

With the current growth in global population to about 8 billion people, of which 42% are under the age of 25, the traditional brick-and-mortar approach to education and traditional credentialing through degree programmes at universities can impossibly meet the projected growing demand for higher education worldwide through traditional delivery models. Many in industry and academia argue for the disruption of higher education and the unbundling of traditional degrees to better recognise nano talents and bite-sized blocks of learning (Brown et al., 2021) that will be more relevant to the needs of society and the changing nature of work, as well as to accommodate personal circumstances of individuals, their lifestyle, financial possibilities, capabilities, personality and job and employment possibilities.

Employers also stand to benefit from the adoption of micro-credentialing. Micro-credentials allow employers to assess and certify applicants' specific skills and competencies, enabling more competency-based hiring practices (Gauthier, 2020). This can be particularly valuable as organisations seek to adapt to rapidly changing technologies and business processes (McGreal et al., 2022). Micro-credentials provide the option that employers and learners can access courses as and when needed, only addressing gaps in knowledge as and when discovered (Hopkins and Moller, 2024).

However, the rise of micro-credentialing is not without its challenges. Some scholars argue that micro-credentials may seek to change the supply of educational qualifications to address a labour demand problem, potentially diverting students from more substantial credentials with greater long-term value (Wheelahan and Moodie, 2021). Additionally, there are concerns that micro-credentials may further contribute to the privatisation and marketisation of higher education, potentially undermining its educational purposes. Despite these concerns, the potential benefits of micro-credentialing cannot be ignored. As the job

market continues to evolve, micro-credentialing offers a flexible and targeted approach to skills development and recognition, with the potential to benefit learners, institutions, and employers alike (Gauthier, 2020; McGreal et al., 2022). According to a McKinsey Global Institute report, by 2030, about 14% of the workforce will need to switch occupational categories because of technological and other innovations (Brown et al., 2021). Around 85% of the jobs today's learners will be doing in 2030 have not yet been invented. Over the next few years, the rapid evolution of technology will reshape millions of jobs. Together with this, the skills demand continues to change, and people will thus continually need to re-train, reskill or redeploy to avoid redundancy and social and economic displacement in their local communities.

To ensure the long-term value and validity of micro-credentials, institutions must develop robust governing rules and systems akin to those governing academic transcripts to ensure the integrity and transparency of these credentials (Gauthier, 2020).

### 4.3. The Impact of COVID-19 on Digital Learning and Micro-credentialing

The COVID-19 pandemic has profoundly impacted the education landscape, catalysing a rapid shift towards digital learning and the increasing prominence of micro-credentialing. As traditional educational institutions scrambled to adapt to remote instruction, the need for robust digital infrastructure and pedagogical approaches has become increasingly apparent.

The flexibility and responsiveness of internet-based learning approaches have become critical in this disruption, enabling service providers and learners to meet real-time market demands and expectations (Suguku, 2023). This has been further reinforced by the growing digital savvy of millennial learners, who are more inclined to adopt online learning modalities (Suguku, 2023).

The pandemic has also highlighted the critical importance of digital literacy for educational and vocational success and overall wellness and participation in an increasingly digital society (Murray et al., 2022). Those without digital skills have faced significant challenges in accessing essential services, maintaining social connections, and remaining informed, underscoring the need for comprehensive digital upskilling initiatives.

Higher education institutions have been compelled to undertake rapid digital transformation in response to these challenges, leveraging various technologies and platforms to sustain operations (Marks and AL-Ali, 2020). While this has exposed shortcomings in the digital readiness of many institutions, particularly in developing nations, it has also presented opportunities for innovation and collaboration (Mihovska et al., 2021).

One such innovation has been the rise of micro-credentialing, which offers flexible, targeted, and often industry-aligned learning opportunities that can be easily integrated into lifelong learning journeys. The pandemic has accelerated the adoption of micro-credentials as individuals seek to upskill and reskill in the face of economic disruption and changing labour market demands.

As the world navigates the long-term implications of the COVID-19 pandemic, the importance of digital learning and micro-credentialing will only continue to grow. Governments, educational institutions, and employers must work collaboratively to address the digital skills gap, invest in robust digital infrastructure, and ensure that learners have access to the tools and resources they need to succeed in an increasingly digitised world (Taylor et al., 2018; McGreal and Olcott, 2022; Nyashanu et al., 2023).

### 4.4. Micro-credentialing in a Global Arena

Micro-credentialing has emerged as a significant phenomenon in the global educational landscape, offering a unique approach to skill development and recognition that complements traditional degree programs. This paradigm shift is driven by the growing realisation that traditional educational models, focused on seat time and degree attainment, do not always align with the dynamic needs of the modern workplace. From a global perspective, the United States, Europe, New Zealand, and Australia have taken the lead in supporting micro-credentials, particularly among universities and colleges (Rossiter and Tynan, 2019). This trend is not limited to these regions, as emerging developments are also occurring in Canada, Peru, Indonesia, Mexico, the United Arab Emirates, South Africa, Malaysia, and other parts of the world. In addition to this growth, there is increased interest and public commentary from government, higher education, and corporate leaders internationally, who recognise the potential of micro-credentials to address skills and competency gaps. In Ireland, the Irish Universities Association has committed itself to developing a national micro-credential system for universities over the next few years to indicate where micro-credentials will fit into the national qualification framework. Australia, Canada and the Netherlands also indicated that they are on the brink of adopting uniform national approaches to micro-credentialing (Brown et al., 2021). Various models are also under review in the UK for incorporating micro-credentials into UK Higher Education (Hopkins and Moller, 2024).

The shift towards micro-credentialing is driven by the recognition that the traditional credentials continuum needs to be reconsidered, with a greater emphasis on unbundling the content and the credential itself. Employers increasingly seek ways to certify applicants' specific competencies rather than relying solely on traditional degree programs. Micro-credentials offer a mechanism for employees to articulate their competencies, providing employers with a more precise understanding of an individual's skills and abilities (Gauthier, 2020). High-profile companies such as EY, Google, and IBM have adopted a recruitment strategy that gives people an opportunity based on non-traditional education and soft skills like grit, tenacity, and perseverance. Google wants to disrupt traditional education models by offering short courses that it will recognise as equivalent to a full bachelor's degree for recruitment purposes. In 2018, Google launched an Online IT support certificate through Coursera and created a consortium of more than 20 employers interested in hiring completers. More recently, Google launched its Career Certificates, which are designed to develop job-ready skills without people needing to attend a college or university. IBM offers badges to both their

staff and the wider public through their partnership with Coursera. They also established a partnership with the USA's Northwestern University so that IBM badges can be used towards professional master's degree programs at the university. Amazon decided in 2019 to spend $700 million to retrain 100,000 of its employees outside the traditional education system using its own credential programs. The EY badging system, launched in 2017, offers staff the opportunity to upskill by earning a badge in data visualisation, AI, data transformation, and information strategy. In 2020, the Trump administration signed an executive order emphasising skills rather than degrees in federal hiring. There is a growing belief that skills, rather than specific jobs or qualifications, will be more important in the future job market (Brown et al., 2021).

This shift in the educational landscape is not without its challenges, however. Micro-credentials have been criticised for seeking to change the supply of educational qualifications or credentials to solve a problem of demand for labour, potentially diverting students from substantial credentials with substantial value to micro-credentials with micro value (Wheelahan and Moodie, 2021). Additionally, there are concerns that micro-credentials may reorient higher education from educational to employment purposes, further extending the privatisation and marketisation of higher education (Wheelahan and Moodie, 2021).

### 4.5. Micro-credentialing in South Africa

Micro-credentialing is emerging as a flexible and innovative approach to education in South Africa. It offers potential benefits such as motivating learners, supporting lifelong learning, and addressing skills gaps (Crafford and Matthee, 2016; Jones, 2022). Micro-credentials provide time and financial flexibility, can be stacked into larger qualifications, and offer a broader range of transdisciplinary competencies (Sibiya and Nyembezi, 2018; Msweli et al., 2022). They are particularly relevant in the context of high dropout rates in traditional degree programs and the need for more accessible education options (Vakalisa, 2005; Dias and Posel, 2007). The traditional South African university degree programme-spanning multiple years, premised on students having a solid educational foundation-is in dire need of a rethink in a country where 39% of university students in contact programmes fail to graduate within 6 years of initial enrolment and a shocking 80% of distance learners fail to do so within 10 years. Such programmes often inadvertently reinforce the inequalities and injustices they are meant to overcome. Part of the problem is structural. A 3-or 4-year commitment to a singular form of recognition (a degree) in a context where so many students cannot reach the finish line is wasteful and punitive. The ironic result is that many students end up with debts for degrees they never obtained and nothing to show on their CVs for what they learned (Jones, 2022).

However, challenges exist, including a lack of understanding, resistance to change, and the need for standardisation and integration into existing systems (Crafford and Matthee, 2016; McGreal et al., 2022). Despite these obstacles, micro-credentials are a promising tool for bridging educational gaps, enhancing employability, and supporting lifelong learning in an increasingly digital world (McGreal et al., 2022; Msweli et al., 2022). To address this issue, the country is embarking on a joint effort by the Department of Education, Higher Education Institutions, and different non-governmental organisations to create a framework for micro-credentials and existing higher education qualifications to fit in and to support each other to the advantage and benefit of students, the world of work and institutions of higher learning.

### 4.6. Potential of Micro-credentials in South Africa

Micro-credentials have the potential to provide adaptable and targeted learning opportunities that can be combined and aligned with industry standards. Since technology is taking over many manual jobs, employees must reskill or upskill themselves to re-enter the labour market (Tamoliūnė et al., 2023). It may provide an alternative to the one-size-fits-all approach that more education stakeholders wish to move away from in the provision of flexible course offerings. Micro-credentials offer the flexibility, accessibility and affordability that learners increasingly require.

They can help to bridge the divide between traditional education and the evolving requirements of the job market. In higher education, micro-credentials have the potential to address challenges in traditional degree programs, particularly in South Africa, where graduation rates are low (Jones, 2022). They also have the potential to extend services in the assessment and recognition of non-formal and informal learning and introduce stackable credits (Tamoliūnė et al., 2023). A growing number of adults with either a higher education degree or lower will need to reskill and upskill through more flexible options than pursuing a full degree. Micro-credentials open the higher education market to those who previously thought they would not suit higher education or those who could not access it, thus addressing the social mobility problem affecting large communities (Hopkins and Moller, 2024). This is necessary to bridge the gap between the skills acquired from formal education and the evolving needs of the job market. Additionally, the COVID-19 crisis highlighted the need for more transparency in the available continuing education and training opportunities. It is becoming evident that the demand for online learning will persist. The value of flexible alternative credentials has been proven, as many working adults have been enhancing their skills during the lockdown to better adapt to changes when the job market reopened (Brown et al., 2021).

With a high number of people owning cell phones and a tech-savvy younger generation, micro-credentials have the potential to offer a beneficial pathway for both education and career advancement in South Africa. They offer benefits such as flexibility, competency-based assessment, and cost-efficiency (Hunt et al., 2020).

### 4.7. Future of Degrees and the Role of Micro-credentials in Qualification Scaffolding

Traditional university degrees are currently facing challenges from alternative forms of education. The job market is increasingly emphasising specific skills, with many employers prioritising practical competencies over formal degrees. This shift is leading to a reassessment of the value of traditional university degrees. Some scholars believe that the importance of traditional degrees may diminish as the primary qualification for skilled professions in the future (Ralston, 2021). On the other hand, Masa and Timmis (2021) argue that university degrees will still be important, but for different reasons: They provide

a solid foundation for lifelong learning, offer opportunities to build stable networks, and allow individuals to associate with the brand of the university, thereby enhancing their personal branding. According to Coursera's CEO Maggioncalda (2023), in the future, universities will need to focus on attracting school-leavers to fill their campuses due to the increasing demand for the experience of leaving home, making friends, networking, meeting professors, gaining exposure, and obtaining an essential first qualification. Adult learners will learn through micro-credentials, and online. To get them om campus is future, will become increasingly difficult.

Micro-credentialing enables learners to customise their education based on personal interests and market demands, resulting in unique combinations of skills that closely align with specific career goals. This is particularly important in fields undergoing rapid technological advancement (Taylor et al., 2018; Caetano et al., 2023; Ward et al., 2023). By stacking micro-credentials, even from different institutions, based on interest, career advancement, employability, or marketability, students or lifelong learners can position themselves for a qualification if the collection of micro-credentials can be recognised and accredited by an institution or for a career opportunity. Stacking qualifications is gaining popularity as a more cost-effective and efficient approach to achieving educational and career objectives. For example, instead of pursuing a full degree, a student could complete a series of micro-credentials that collectively demonstrate expertise in a specific area, such as cybersecurity. This method not only reduces costs but also allows for a more gradual and flexible learning path.

Educational institutions are beginning to recognise the potential of stackable credentials. Some universities have incorporated micro-credentials into their existing frameworks, enabling students to earn credits towards degrees while also attaining industry-recognised qualifications. This integration can enhance the traditional education system by providing pathways for continuous learning and skill development, especially for those who may not have the time or resources to commit to a full degree program.

This trend is becoming more apparent with the increasing number of educational providers and platforms offering stackable credentials. These credentials allow learners to enhance their existing qualifications through targeted learning experiences. As a result, this fosters a more personalised educational journey that can lead to improved employability in a dynamic job market (Taylor et al., 2018; Gehlhaus and Koslosky, 2022; Ward et al., 2023; Caetano et al., 2023).

We have not reached the point yet where a student can apply to a university to evaluate a collection of micro-credentials and receive a qualification. Hopefully, in the near future. However, these micro-credentials are currently accepted in the Recognition of Prior Learning process, allowing students to be admitted to a qualification or receive exemptions for specific subjects within a qualification.

## 5. CONCLUSION

According to initial research, micro-credentials have the potential to provide adaptable and targeted learning opportunities that can be combined and aligned with industry standards. They can help to bridge the divide between traditional education and the evolving requirements of the job market. Micro-credentialing is a new way of recognising and certifying skills. It is more inclusive and challenges traditional education models, offering a lifelong learning and employability framework. The grand ambition is to develop the mechanisms for stacking micro-credentials across several universities to obtain a custom-made qualification in line with the student's interest or career advancement needs.

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