

Comparative Analysis of Various Micro-Credentials Framework at Global Level

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ABSTRACT:

Micro-credentials are competencies-based certifications or qualifications which are playing a major role to shift learners from traditional system of learning to lifelong learning. This shift helps in their skill development and employability. This comparative analysis within various micro-credential framework stresses upon structural features, quality assurance and policies within learning environment. This paper highlights a brief theoretical context and guidelines of micro-credentials within the learning and workplace paradigm. There are various adoption approaches of micro-credentials which have been analyzed based on their region-specific frameworks including quality assurance, evaluation mechanism and functioning of policies to provide better integration. Various differences within structural system, validity mechanism and incorporation in the National Qualification Framework has been probed within regions. It is found that there is a need for common global standard which provide uniformity, better portability and quality learning outcomes within global level of education system.

Keywords: Micro-credentials, Quality assurance, Policies, Global level.

Introduction

Higher education system at global level has prominently flourished the practices of micro-credentials for skill development among learners (Brown et al., 2021; Orman et al., 2023). This growth in learning paths demands to provide an analysis on various micro-credentials framework governed across the various nations at global level to disclose various guidelines and practices implemented and to find out the various areas within framework for proper recognition with respect to professional advancement (Selvaratnam & Sankey, 2021).

There are variations within the micro-credentials' framework in terms of definition, its scope and quality assurance mechanisms at global level (Varadarajan et al., 2023). This analysis

approaches to deal fundamental components, accreditation processes and integration strategies of various micro-credential frameworks of different nations such as United States, Europe and Australasia (Orman et al., 2023). A comparative analysis will evaluate the resemblance and dissimilarity in the definition, validity criteria and incorporation with their existing education system (Rami et al., 2023; Selvaratnam & Sankey, 2021). This perspective will help to address the various opportunities of micro-credentials associated with employability to enhance the connection between different global learning pathways (Gamage & Dehideniya, 2025). To achieve targeted skills, these frameworks contribute across the nations, enabling upskilling, reskilling, lifelong learning with greater portability and credibility rate among

learners which result in the increase of interrelation between different learning environment to balance professional work life (Mhichil et al., 2023). This analysis will provide comprehensive approach to address workforce demands within various regions such as in European, North American, Asia-Pacific, African and South American that align with successful implementation of various micro-credentials (Mhichil et al., 2023; Rami et al., 2023).

The growth of skill-based short-term programs called micro-credentials reinforces to analyze existing literature to critically acknowledge the quality, utility, and implication and its further area of research (Tamoliūnė et al., 2023). Various researches have been underpinned that have governed the potential behind increased adoption of micro-credentials, addressing skill gap at workforce, and lifelong learning (Ahsan et al., 2023; Brown & Nic-Giolla-Mhichil, 2022). Micro-credentials are found to increase employability, social inclusion and continuous learning among learners and professionals (Ha et al., 2022; Mhichil et al., 2023; OECD, 2023). The scrutinized pedagogical vision, evaluation strategies and mechanism which are aimed to adopt micro-credentials which must align with changing job market and learning objectives (Reed et al., 2024). To standardize the specifications related to micro-credentials, it is needed to develop common online micro-credentials instructions for general learners which provide a ground to enhance its quality, transparent cross countries transferability, and widespread recognition. This comprehensive analysis addresses variety of structured approaches reflected within different educational system globally.

Global Overview of Various Micro-credentials Framework

The adoption of various micro-credential framework fulfills the gap between formal type of education system and industrial needs (Kiiskilä et al., 2023). Micro-credentials act as a tool which helps to promote lifelong learning by upskilling and reskilling the learners and employees at global workforce. This comparative analysis helps

to understand various perspectives of varied policies with respect to their development, regulation, and its integration within existing learning system and employment environment (Tamoliūnė et al., 2023).

A minimum 5 credits for micro-credentials courses is compulsory within European Credit Transfer System while in case of New Zealand Qualifications Authority deals in between 5 to 40 credits i.e., varied size to showcase credentials (Ahsan et al., 2023). These gaps demand for the establishment of universal standards and need for international networking to attain greater credibility and portability of credentials (Alasmari & Al-Zahrani, 2024).

The report known as 'Digital Credentialing: Implications for the Recognition of Learning Across Border' by UNESCO given in the year 2018 promotes the global approach for recognition of credentials across the digital platforms which foster the important role of learning and technological aspect to increase the inclusion of cross border credibility (Selvaratnam & Sankey, 2021). This analysis demands for synchronized framework to ensure proper recognition and transferability of micro-credentials across different context (Selvaratnam & Sankey, 2021).

European Framework

The European Commission promotes flexible learning pathways which results in higher employability across the members of states. Hence, European Union focuses on the integration of micro-credentials into educational system (Ha et al., 2022). This integration approach leads to the development of a Common Micro-credentials Framework by European MOOC Consortium guided on established European developments like European Credit Transfer and Accumulation System and The European Qualification Framework which focused on enhancing the regular maintenance, proper quality, accountability and better portability of micro-credentials perspectives (Massive Open Online Courses- Current Practice and Future Trends, 2023; Orman et al., 2023; Wheelahan & Moodie, 2021). This initiative

facilitates widespread implementation by stakeholders in the field of educational institutes and industrial recruiters across the national borders. Yet there are various barriers to legally recognize and implement at various national level (Griffiths et al., 2024; Orman et al., 2023). In Spain, there are variety of challenges in legal recognition of micro-credentials offered by Universities (OECD, 2023). Also, European Council Recommendations on European Approach to Micro-credentials with respect to a universal definition, guidelines to design, issuance and quality assurance which results in proper integration into National Qualification Framework (Kušić et al., 2022). Hence, there is a need for mutual guidelines for standardization within the European Union to execute proper transferability of credits (Massive Open Online Courses- Current Practice and Future Trends, 2023; OECD, 2023). European online platforms such as FutureLearn, Miriadex, FUN, and EduOpen adopts the framework which has recognized by academicians and recruiters (Antonaci et al., 2021). Also, the European Commission by 2025 focused to propose a unified European education area to provide broader usability, quality, flexibility, credibility, portability within higher education area to improve skilled workforce (Antonaci et al., 2021; Ebner et al., 2023; Varadarajan et al., 2023).

In 2020, Europass platform launched for learners to register themselves and create profile according to their own skills which display all their credentials to increase their position at market place. This later on collaborated with European Union Commission's Communication and the European Education Area by 2025 to draw strategies. The main aim of micro-credentials should be to shape entrepreneurial perspectives across Europe by 2021 which was proposed by minister of education (Antonaci et al., 2021; Massive Open Online Courses- Current Practice and Future Trends, 2023). European Higher Education Area aimed to achieve the recognition of micro-credential within policy of European Union by 2025 in higher education system (Antonaci et al., 2021). In 2020, an official statement for a meeting at Rome by 49 European

Ministers emphasize on development of professional, cultural and transversal skills within micro-credentials (Gómez et al., 2023).

The Common Micro-credential framework aligned with ECTS, the Diploma statement and the European Qualification framework promote quality assurance which aligns with Standard guidelines for better quality assurance in European Higher Education Area (Antonaci et al., 2021). Micro-credentials higher education consultation group by European Commission aims to propose common definition to build trust within learners, stakeholder, recruiters (Antonaci et al., 2021; Varadarajan et al., 2023). The member of European Association of Digital Teaching Universities focused on policy making and its implementation to promote learners' identity, issuing authority, awarding institution for better establishment of micro-credentials (A European Approach To Micro-Credentials By Employers, Learners And, Education And Training Institutions, As Well As Guiding Principles To Consider When Designing Or Issuing High-Quality Micro-Credentials., 2021; Antonaci et al., 2021).

Also, The Dutch National Micro-Credentials Pilot promotes necessary quality assurance with special reference to institution to govern internal approach towards quality and credibility (OECD, 2023). For external approach towards quality assurance, evaluation made through internal mechanism to ensure the credibility of micro-credentials and its effectiveness plays a vital role to establish credibility and trust (A European Approach To Micro-Credentials By Employers, Learners And, Education And Training Institutions, As Well As Guiding Principles To Consider When Designing Or Issuing High-Quality Micro-Credentials., 2021). Hence, this dual approach towards quality assurance provides both internal and external perspectives towards the overall integrity of European higher education environment (OECD, 2023). Quality assurance agencies in nations like Spain and UK provide extension of existing institutional accreditation schemes to micro-credentials while in Ireland for smaller awards for skill development within education system of existing

programme level quality assurance (OECD, 2023).

North American Framework

The policy of State University of New York framed set of rules and regulations for the development and recommendations of various micro-credential courses focusing on academic credibility, fulfil the learning objectives, align with industrial standards (Ehlers & Eigbrecht, 2024). In addition to it, Ministry of Advanced Education and skill training in Canada proposed Micro-credential Framework in 2021 which provided guidelines for short term courses (OECD, 2023).

Also, in Ontario, the government has funded and defined strategies for micro-credentials which was later on published by eCampusOntario in 2019 which framed principles and framework for micro-credentials to smooth implementation (Farias-Gaytan et al., 2023).

It is observed that with respect to North American context, due to decentralized government, there is a divergence at provincial and state level which demands for modular accommodation of micro-credentials which should not compromise the quality across the continent (Brown et al., 2022; Osborne, 2023).

The lack of singular federal authority within United States and Canada creates a hindrance to accomplish a common framework which leads to regulate regional guidelines which creates a void to harmonize quality, credibility and transferability of credits (Griffiths et al., 2024). In addition to, University of Maryland, Baltimore addressed on the rubrics for the proper execution of assessment of micro-credentials to work on consistency, transparency, credibility, quality and portability of credits to build trust among learners, educators, recruiters, industrialist and stakeholders (Sullivan, 2025). This assessment is based on national level models like 1EdTech and Quality Matters which works upon quality, equity, credibility of micro-credential (Sullivan, 2025). Hence, this assessment demands collaboration among institutions and regulatory bodies for widespread adoption across North American higher education sector (Farias-Gaytan et al., 2023). The north American micro-

credential framework indeed outlines the importance of well-defined learning opportunities and evaluator mechanism similar to European framework for micro-credentials (Tamoliūnė et al., 2023).

Asia- Pacific Framework

Nations such as Australia are actively framing national framework to provide learners a flexible learning experience through initiatives related to micro-credentials at their country level (Farias-Gaytan et al., 2023). While Australian qualification framework in 2019 provides review of expert as not to include shorter form credentials such as micro-credentials because of diversified scope, complex approach, implementation barrier etc., (OECD, 2023).

Moreover, nations such as Malaysia and New Zealand, actively focused on implementing micro-credentials into their national qualification framework in order to enhance their industrial need to balance workforce opportunities (McGreal et al., 2022; Selvaratnam & Sankey, 2021). Additionally, this integration into already existing national accreditation systems involves to include new credit system by focusing on providing recognition in a formal pattern (Pollard & Vincent, 2022). Regional qualification framework across the nations in Asia-Pacific regions such as the Southeast Asian Nations framework plays an important role for inclusion of portability, quality, credibility, and recognition (Selvaratnam & Sankey, 2021). In Asia, it is found that the perception about free micro-credentials is of less value with respect to career progression hence it is suggested that to choose which have less fees (Msweli et al., 2022). Also, Korea, Singapore, and China, have integrated micro-credentials and made learners to register themselves and earn learning credits (Hartnett, 2021).

New Zealand focused to integrate micro-credentials in 2020 into its national qualification and credentials framework and recognized in formal setting into educational system (OECD, 2023). Malaysia on the other hand found to incorporate micro-credentials into conventional educational system as list of all the digital

credentials taken into consideration to make them recognized and validated for the ease of learning opportunities for learners (OECD, 2023). Malaysian Qualification Agency transfer the grades of MOOCs and other online digital credits which helps individual to bridge their non formal learning credits and formal credits which result in promotion of implementation of micro-credentials within higher education (Garcia et al., 2021). Moreover, the Malaysian Ministry of Higher education has notably supported the incorporation of online courses and MOOCs into curriculum and made a blueprint for 2015-2025 to integrate digital credits as one of the important and transformative approach in education system in the early 2016 (Garcia et al., 2021). Also, the Malaysia has established national guidelines to allow up to 30% of total credits be earned through MOOCs and online courses and formally recognized these credits (Garcia et al., 2021).

In Indonesia, Cyber Education Institute has developed a blockchain-enabled digital credentialing system where learners are given an infrastructure to securely earn, issue, stack, verify and share their credits for national and international transferability (Garcia et al., 2021).

In India, National Education Policy 2020, paved way for the incorporation of blockchain technology in National Credit Framework and the Academic Bank of Credits to securely transfer credits across the institutions which helped to overcome the conventional barrier with establishment of universal system of flexible yet recognized learning system. (Dogra, 2026).

African and South American Framework

African and South American regions have less than 5 % studies on micro-credentials globally (Msweli et al., 2022). This lack of global framework highlights the undeveloped approach of skill recognition within African and South American regions.

Countries such as South Africa and Brazil doesn't have any formalized national framework yet addresses gaps within job force (McGreal et al., 2022). South Africa, for example, proposed a strategy which explores various online sources in

order to fulfil the demands of industry and workforce which helps to develop digital resources which acts as national perspective and is under establishment and invests for digital infrastructure to support portability, innovation, and quality monitoring of micro-credentials (Adeniyi et al., 2024).

In North African Universities has found to initiate the micro-credentials where they have focused on the development of foundational policies and its incorporation to curriculum (Alasmari & Al-Zahrani, 2024). This integration leads to the challenges such as lack of clear understanding of micro-credentials, absence of recognized definition which results in creating a barrier to integrate into national qualification framework at global level (Mhichil et al., 2023; Ergin, 2024). The absence of standardized policy creates a disparity in widespread adoption of micro-credentials within African regions (Alasmari & Al-Zahrani, 2024). Also, it's proven that difference in results within research analysis in regions of Africa deals with Fourth Industrial Revolution (4IR) technology advancements for learning outcomes in online platforms which leads to remain in initial stage which creates challenges for learners and recruiters to direct micro-credentials (Msweli et al., 2022; Unravelling Challenges of Higher Education Institutions in Implementing Effective Micro-Credentials: A Multi-Stakeholder Qualitative Study, 2024).

Comparative Analysis of Various Frameworks

Definition And Scope of Micro-Credentials Framework

This segment deals with foundational comprehension of micro-credentials within every framework which focuses on scope, duration and learning outcomes which explains about its utility and recognition within the different borders at national level. This analysis is important for understanding the approach of each nation about the integration of micro-credentials into its academic perspective with respect to evidence-based approach with the help of blockchain

technologies (Kiiskilä et al., 2023; Hemairy et al., 2024).

Various frameworks define micro-credentials as any short form learning experience while it is observed that other framework regulates strict aspect with respect to formal process of accreditation aligned with National Qualification Framework (OECD, 2023).

National Micro-credentials Framework in Australia states micro-credentials as an assessment of learning process which can be recognized by both learners and recruiters with greater portability (Desmarchelier & Cary, 2022). The European Commission focuses on universal standardized definition of micro-credentials and for proper implementation, quality assurance as one of the important aspects across the members of states (Ngo et al., 2023).

UNESCO's Global Convention focuses on global adoption of different educational courses which also includes short term courses such as micro-credentials to harmonize and synchronize different learning experiences (Mhichil et al., 2023).

Variations in definition s marks a significant challenge upon the acceptance of standards universally across different borders (Brown et al., 2021; Mhichil et al., 2023).

The International Scientific Committee of the World Alliance for Micro-credentials focus on widespread adoption of micro-credentials which targets issues related to quality assurance, portability of credits, transparent accreditation to encourage this initiative (Costello et al., 2024).

European Commission demands for universal perspectives with respect to micro-credentials across the members of states within European i.e., common definition and guidelines which assemble with high rates of employability among learners (Ebner et al., 2023).

Mechanism of Quality Assurance

It is found difficult to incorporate micro-credentials-based guidelines into existing educational policies. To address this concern with respect to quality assurance it is important to

frame new framework which governs the potential of micro-credentials. For instance, Netherlands, institutions demand for a new potential framework for micro-credentials (Ahsan et al., 2023). Also, in Australia, absence of Standardized framework disturbs the establishment of quality assured micro-credentials and its implementation as well (Desmarchelier & Cary, 2022). Hence it is found that in Australia the micro-credentials are found to be embedded within the national framework (Bean et al., 2023).

In the region of Australasia, 88% of the Universities go through different adoption level which later on focuses on systematic credentialing to get integrated into conventional system of education (Huber et al., 2023). Also, the Estonian Quality Agency for Education addresses the demerits of institutions-based quality evaluation mechanism which result in area specific approach of quality mechanism for better learning opportunities with respect to context for learners (OECD, 2023).

Micro-credentials, in future seeks for global level standardized frameworks which addresses the distress of maintenance of academic complexity and to highlight the modularity of micro-credential to manage the needs of job market (Ngo et al., 2023).

Moreover, quality assurance bodies in Spain are experimenting with pilot programs in order to test various different arrangements for micro-credentials to review quality assurance (OECD, 2023). This initiative allows to maintain and improve the quality based on practical issues which enable policies and guidelines to work efficiently.

It has been noted that approach at institution-level accreditation in Catalan University quality assurance agency has pulled the enhanced growth of micro-credential meanwhile administrative burden has increased at the program level (OECD, 2023).

In Malaysia, program framing, designing, focusing on learning outcomes with respect to job market, incorporating internal and external mechanism for quality assurance helped in better

implementation of micro-credentials (Gamage & Dehideniya, 2025). Micro-credentials within European Higher Education Area were supposed to get integrated while focusing to promote lifelong learning with standard quality assured framework proposed by European commission to maintain global recognition (Antonaci et al., 2021). Moreover, for MOOCS the European common micro-credentials framework and also, short-term learning programme provided standardized features which ensure to achieve learning objectives, recognition, credibility, quality assurance (Antonaci et al., 2021). Meanwhile in United Kingdom, the quality assurance agency is working on guidelines to direct framework for micro-credentials which will help to implement such programs within existing higher education system (Osborne, 2023; Halim et al., 2023).

Policy and Regulatory bodies

This aspect analyzes policies and regulatory ecosystems which governs micro-credentials and develops framework with respect to quality assurance, credibility, recognition, portability of credits, common definitions which leads to make learners to meet the future within the existing educational system. This analysis will provide an idea about the frameworks needed to be coordinated in reference to main educational regulatory bodies to implement micro-credentials (Ngo et al., 2023).

For example: In Europe, the strategy was made to focus on guidelines, designing of micro-credential programs and implementation framework which align with other state members (Farias-Gaytan et al., 2023). United States follow a segmented perspective which has different policies governing states and institutional bodies to adopt micro-credentials. In addition to it, nations in middle east area and in Africa, still lacks standardized policies as it is in budding stage to develop clear approach towards learning, entrepreneurial skills and career progression (Alasmari & Al-Zahrani, 2024). Additionally, micro-credential framework was developed by the Canadian Ministry of Advanced Education and Skill Training to implement quality assured

and credible framework. Guidelines to Good practices was provided by Malaysia's qualifications agency for micro-credentials to be included in national qualification framework (OECD, 2023). While in Hungary and Spain, a direct approach governed by government have been regulated to integrate micro-credentials to their formal setting as wider range of guidelines have been implemented with the help of legislature integration (OECD, 2023). Furthermore, OECD nations, public funding mechanism is offered by government to offer micro-credentials to provide learners with lifelong learning (OECD, 2023).

MicroCreds, The Human Capital Initiative in Ireland, to frame national micro-credential system for various universities has been offered funding of over €12 million which focused on proper guidelines to implement such programs properly (Brown et al., 2022; OECD, 2023).

The lack of proper policies and practices is a barrier to widespread acceptance of micro-credentials which creates a wide gap within higher education system and actual workplace (Varadarajan et al., 2023). The efficient regulations and implementation of micro-credentials demand institutional readiness, sufficient technological resources and better logistics, mastered faculty and stakeholders (Ahsan et al., 2023; Unravelling Challenges of Higher Education Institutions in Implementing Effective Micro-Credentials: A Multi-Stakeholder Qualitative Study, 2024).

Conclusion

The analysis of different micro-credential framework of different regions at global level portrays the rising potential of emerging standards and policies which have the ability to offer personalized learning outcomes that align with workforce dynamics. This analysis focused on the development of unified standardized framework which ensures the originality and verified porting of credits for those who have lost the paper-based documentations with the help of blockchain technologies which lead to wider learning opportunities. This study dealt with growth of different implementation strategies

with respect to micro-credentials framework as its mechanism involves learners, educators, recruiters, stakeholders, policy makers, leaders from various backgrounds in context of socio-economic status, culture, communities etc., to provide widespread adoption. The study of influence of societal background identifies the local needs and context which provide the comprehensive understanding about maximizing

the implementation of micro-credentials framework in accordance to societal background for lifelong learning and workforce development.

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