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Evolving Landscape of Micro-Credentialing in the Digital Age

JAMMO Editorial Chief, Prof. Dr. Paul Silva Interviews Prof. Dr. Ilona Buchem Professor of Communication and Media Studies, Head of the Communication Laboratory, Department of Economics and Social Sciences, Berlin University of Technology

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Abstract

The educational landscape is undergoing a rapid transformation due to advancements in digital technologies and evolving labour market demands. This article presents an in-depth interview with Prof. Dr. Ilona Buchem, Professor of Communication and Media Studies at Berlin University of Technology, on the role of micro-credentialing in reshaping education. Micro-credentials, supported by frameworks such as Germany's Vocational Training Validation and Digitisation Act, provide flexible, accessible pathways for validating non-formal qualifications and facilitating sector transitions. The article explores the integration of micro-credentials into traditional educational frameworks, the relationship between theoretical knowledge and practical professional experience, and how digital solutions, such as data wallets, are revolutionising the validation and management of skills. The discussion also highlights the global implications of micro-credentialing, particularly in addressing educational inequalities and promoting lifelong learning. Through this dialogue, Prof. Buchem provides insights into how digital credentialing is contributing to more inclusive, competency-based education systems.

Keywords: Micro-Credentials, Digital Verification, Lifelong Learning, Vocational Training, Competency-Based Education, Qualification Frameworks

Methodology

This article is based on a qualitative interview conducted with Prof. Dr. Ilona Buchem, an expert in digital education and micro-credentialing, to gather expert insights into the evolving landscape of digital credentialing. The interview format was semi-structured, allowing for flexibility while ensuring that key themes—such as the role of micro-credentials in lifelong learning, their integration with traditional education systems, and the impact of digital transformation—were thoroughly explored.

In addition to the primary data gathered from the interview, a literature review was conducted to contextualise the findings within the broader framework of global educational reforms and the digitisation of vocational training. Sources included McGreal and Olcott Jr.'s (2022) work on micro-credentials for higher education leaders, as well as UNESCO's reports on educational equity and access to digital platforms. Recent articles have also been incorporated to support the discussion, such as Buckley and Caple (2022), Ahsan et al. (2023), and Oxley and van Rooyen (2021), which examine the role of micro-credentials in higher education and their impact on workplace learning. The analysis focused on understanding how digital tools, such as data wallets and micro-credentials, are influencing education policy and practice, particularly in bridging the gap between formal and informal learning. The article also examines Germany's Vocational Training Validation and

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Digitisation Act as a case study to explore the practical applications of these concepts in a real-world setting (Rossiter & Tynan, 2019).

One of the objectives of the methodology is to ensure a comprehensive understanding of the subject by combining theoretical analysis with practical examples and expert opinion, thereby permitting a nuanced exploration of the potential of micro-credentialing in addressing current and future educational challenges.

1. Introduction

In the contemporary educational landscape, credentialing is undergoing a profound transformation, driven by the increasing adoption of digital technologies and innovative learning solutions. Micro-credentialing has emerged as a significant player in this evolving ecosystem, particularly in response to the demand for reliable technical methods of certification and skills validation. The Vocational Training Validation and Digitisation Act plays a pivotal role in formalising these efforts, particularly in vocational training sectors where non-formal qualifications and digitised training courses have become critical (Buchem, 2024, p. 6; Abeywardena & Balasubramaniam, 2021; Rossiter & Tynan, 2019).

This article reviews the insights provided by McGreal and Olcott Jr. (2022) and explores the challenges and opportunities presented by micro-credentials in higher education, alongside recent findings from Che Ahmat, Bashir, and Razali (2021), which address the implications of micro-credentials for educational institutions. The examination also includes studies by Buckley and Caple (2022) and Ahsan et al. (2023) that highlight the impact of micro-credentials on workforce learning. Additionally, we delve into how vocational digitisation efforts are reshaping the recognition of non-formal qualifications, facilitating sector transitions, and contributing to lifelong learning. Insights from Prof. Dr. Ilona Buchem on the future of digital credentialing further illuminate the potential of these systems in promoting inclusive educational practices.

2. Transition from Paper-Based to Digital Certification / Addressing Non-Formal Qualifications through Micro-Credentials

Micro-credentials and the Vocational Training Validation and Digitisation Act are revolutionising traditional paper-based certification systems. Digital platforms like the National Education Platform aim to make educational certificates more accessible and verifiable in real time. As McGreal and Olcott Jr. (2022) explain, institutions like the

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University of California-Irvine and Germany's efforts through the Berufsbildungsvalidierungs- und Digitalisierungs-Gesetz (BVaDiG) have adopted secure, digital verification systems that enable graduates to manage and control their credentials independently. These digital records offer tamper-proof, verifiable evidence of competencies that align with industry demands for accessible and secure credentialing methods (McGreal & Olcott Jr., 2022, p. 5). This transition not only enhances reliability but also aligns with ongoing digitisation reforms, including the federal government's focus on inclusive training for individuals with disabilities (Buchem, 2024, p. 6; Rossiter & Tynan, 2019).

The Vocational Training Validation and Digitisation Act emphasises the need to validate non-formal qualifications, particularly for individuals without formal vocational training. Micro-credentials are integral to this process, offering targeted, short-term training programmes that allow individuals to demonstrate competencies. The law aims to digitise vocational training programmes and ensure they are accessible to marginalised groups, including people with disabilities. This mirrors McGreal and Olcott Jr.'s (2022) point that micro-credentials provide a "quick impact" approach for individuals to demonstrate specific skills without needing full degrees (p. 5). The digitisation of such programmes enhances the ability of non-formally trained workers to access the formal workforce more easily (Buchem, 2024; Ahsan et al., 2023).

3. Supporting Career Transitions with Micro-Credentials / Digital Solutions for Lifelong Learning and Workforce Needs

For professionals transitioning between sectors, the flexibility provided by digital credentials is key. The Vocational Training Validation and Digitisation Act supports these transitions by enabling workers to upskill through digital, sector-specific programmes. McGreal and Olcott Jr. (2022) note that micro-credentials allow individuals to gain and demonstrate new skills, facilitating smoother transitions between industries. Furthermore, the Act ensures these credentials are recognised across industries and within government sectors, thereby providing verifiable evidence for employers (Buchem, 2024, p. 7; Oxley & van Rooyen, 2021). The portability of these credentials, especially through secure data wallets, further eases sector transitions (Buchem, 2024).

Both the Vocational Training Validation and Digitisation Act and micro-credentials emphasise the convergence of digital solutions with workforce needs. According to Buchem (2024), digitised certification systems and micro-credentials address the growing

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demand for real-time documentation and management of skills (p. 6). As noted by McGreal and Olcott Jr. (2022), digital solutions such as data wallets offer professionals control over their achievements and verifiable proof of their competencies, which enhances credibility in the job market (p. 5; Ahsan et al., 2023). The Act expands this by making vocational certifications accessible to marginalised communities, thus promoting lifelong learning across diverse populations (Buchem, 2024; Stoddard et al., 2023).

4. The Relationship Between Theoretical Knowledge and Professional Experience / Impact of Micro-Credentials on Lifelong Learning

In today's job market, there is increasing emphasis on integrating theoretical knowledge with professional experience. The Vocational Training Validation and Digitisation Act facilitates this integration by recognising professional experience through public certifications, which are now being made more inclusive for people without formal qualifications (Buchem, 2024, p. 6; Ahsan et al., 2023). This reflects McGreal and Olcott Jr.'s (2022) argument that micro-credentials bridge the gap between academia and industry by offering professionals opportunities to gain relevant skills that align with workforce demands (p. 6; Oxley & van Rooyen, 2021). Together, these approaches enhance employability by offering flexible, skills-based learning pathways (Buchem, 2024; Rossiter & Tynan, 2019).

The Act's provisions for lifelong learning highlight the importance of flexible, skill-based qualifications. As noted in both McGreal and Olcott Jr. (2022) and Buchem (2024), these credentials are stackable, allowing individuals to accumulate them over time and apply them toward larger qualifications. The Act furthers this by ensuring that training is accessible and de-bureaucratised, particularly for individuals with disabilities, making lifelong learning more attainable (Buchem, 2024, p. 6; Stoddard et al., 2023).

5. Challenges in Integrating Informal Learning into Formal Education Systems / Traditional Approaches and Their Future

Both McGreal and Olcott Jr. (2022) and Buchem (2024) acknowledge that challenges persist in integrating informal learning into formal education systems. The Vocational Training Validation and Digitisation Act addresses these challenges by standardising how non-formal skills are validated and recognised, particularly through digital means. However, traditional institutions remain reluctant to fully integrate these credentials due to concerns about academic rigor (McGreal & Olcott Jr., 2022, p. 17; Ahsan et al., 2023). The

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Act mitigates these concerns by aligning digital qualifications with national frameworks, allowing for smoother transitions from informal to formal education (Buchem, 2024; Rossiter & Tynan, 2019).

The rise of micro-credentials and digital transformation has not rendered traditional education obsolete. As noted by McGreal and Olcott Jr. (2022), traditional in-class teaching and online learning can coexist, offering complementary pathways. The Vocational Training Validation and Digitisation Act similarly supports a hybrid approach, where digital training complements traditional vocational programmes. This alignment between digital credentials and formal education systems offers students more flexibility while preserving the rigor of traditional learning (Buchem, 2024, p. 5; Oxley & van Rooyen, 2021).

6. Integration of Micro-Credentials with Traditional Education / Global Impact and Educational Dynamics

Buchem's article *Securing - Validating - Recognising Skilled Workers (2024) and the European Approach to Micro-Credentials* (2021) emphasise the need for clear, standardised definitions of micro-credentials. The European Approach states that the absence of shared terminology and frameworks limits wider acceptance across educational systems (European Commission, 2021, p. 10). Similarly, Buchem (2024) emphasises the importance of secure, transparent digital verification systems, such as Germany's Vocational Training Validation and Digitisation Act (BVaDiG), to ensure that micro-credentials are trusted and recognised universally (p. 6). Standardisation is identified as a critical step in integrating micro-credentials into formal education and industry recognition frameworks.

The issue of portability and secure verification of micro-credentials across different contexts is also emphasised in both discussions. The European Approach advocates for digital solutions that enable credentials to be portable across national borders through platforms like the Europass Digital Credentials Infrastructure (EDCI) (European Commission, 2021, p. 20). Similarly, Buchem (2024) highlights Germany's use of secure data wallets, which allow individuals to store and share verifiable evidence of their skills and qualifications with employers and educational institutions (p. 7). The role of digital infrastructure in ensuring micro-credentials are easily accessible and trusted in a globalised education and labour market is central to both analyses.

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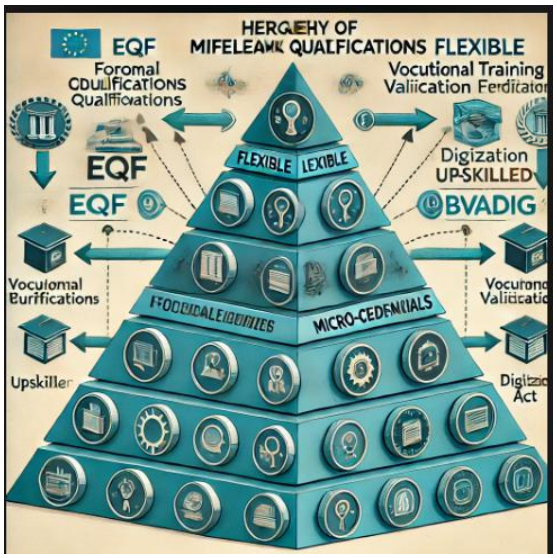
The alignment of micro-credentials with national and European qualifications frameworks is another key theme. The European Approach stresses the importance of linking micro-credentials with the European Qualifications Framework (EQF) to foster recognition and ensure value in various educational and professional settings (European Commission, 2021, p. 11). Buchem (2024) echoes this, noting how the BVaDiG integrates micro-credentials into Germany's formal vocational training system, ensuring recognition across industries (p. 6). Both perspectives support the seamless integration of micro-credentials into existing qualification frameworks to enhance their legitimacy and portability.

Furthermore, recent studies by Oxley and van Rooyen (2021) have shown that aligning micro-credentials with industry needs can significantly improve employability outcomes for graduates. This alignment is crucial in ensuring that educational institutions remain relevant in an ever-evolving job market (Ahsan et al., 2023).

Figure 1: Pyramid chart depicting the hierarchy of traditional education qualifications and micro-credentials.



ChatGPT (AI Model). (2024). Pyramid chart depicting the hierarchy of traditional education qualifications and micro-credentials. Generated by OpenAI's DALL·E, September 2024.

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7. Standardisation, Portability, and Alignment with Qualifications Frameworks

Buchem's article *Securing - Validating - Recognising Skilled Workers* (2024) and the *European Approach to Micro-Credentials* (2021) emphasise the need for clear, standardised definitions of micro-credentials. The European Approach states that the absence of shared terminology and frameworks limits wider acceptance across educational systems (European Commission, 2021, p. 10). Similarly, Buchem (2024) emphasises the importance of secure, transparent digital verification systems, such as Germany's Vocational Training Validation and Digitisation Act (BVaDiG), to ensure that micro-credentials are trusted and recognised universally (p. 6). Standardisation is identified as a critical step in integrating micro-credentials into formal education and industry recognition frameworks.

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The alignment of micro-credentials with national and European qualifications frameworks is another key theme. The European Approach stresses the importance of linking micro-credentials with the European Qualifications Framework (EQF) to foster recognition and ensure value in various educational and professional settings (European Commission, 2021, p. 11). Buchem (2024) echoes this, noting how the BVaDiG integrates micro-credentials into Germany's formal vocational training system, ensuring recognition across industries (p. 6). Both perspectives support the seamless integration of micro-credentials into existing qualification frameworks to enhance their legitimacy and portability.

Furthermore, the systematic literature review by Ahsan et al. (2023) reinforces the argument for aligning micro-credentials with established frameworks to ensure quality assurance and acceptance among stakeholders. The need for rigorous standards is also echoed by Oxley and van Rooyen (2021), who suggest that a clear framework can significantly enhance the credibility of micro-credentials in the job market.

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8. Lifelong Learning and Inclusivity

Both texts emphasise the promotion of lifelong learning and the accessibility of education through micro-credentials. The European Approach highlights that micro-credentials offer flexible, modular learning opportunities, supporting upskilling and reskilling throughout one's career, thereby fostering lifelong learning (European Commission, 2021, p. 6). Similarly, Buchem (2024) underscores how the BVaDiG aims to make vocational training more inclusive, especially for marginalised communities and individuals with disabilities (p. 6). Both texts advocate for the democratization of education through micro-credentials, allowing individuals from diverse backgrounds to access formal and informal learning opportunities.

The challenge of integrating non-formal learning into formal education systems is also a shared concern. The European Approach highlights that varying quality assurance practices and differing levels of recognition present obstacles (European Commission, 2021, p. 7). Likewise, Buchem (2024) addresses the hesitancy of traditional educational institutions to accept micro-credentials as equivalent to formal qualifications due to concerns about academic rigor (p. 7). To address these challenges, the European Approach recommends clear quality assurance mechanisms and alignment with frameworks such as the EQF. Buchem (2024) suggests that the BVaDiG addresses these concerns by establishing standardised systems for certifying competencies gained through both formal and informal education (p. 7).

Moreover, the systematic literature review by Ahsan et al. (2023) highlights the importance of inclusivity in micro-credential frameworks, suggesting that well-designed micro-credential systems can play a crucial role in widening access to lifelong learning opportunities. This aligns with Oxley and van Rooyen's (2021) assertion that micro-credentials can serve as a valuable tool for addressing educational disparities, particularly for learners from disadvantaged backgrounds.

9. Quality Assurance and Digital Platforms

Quality assurance is a recurring theme in both the European Approach and Buchem's article. The European Approach emphasises the need for robust quality assurance mechanisms to ensure micro-credentials are trusted and recognised by employers, educational institutions, and learners (European Commission, 2021, p. 14). Buchem (2024) supports this, noting that Germany's BVaDiG includes systems for certifying skills and

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competencies with clear quality controls (p. 6). Both documents highlight the importance of transparent, reliable processes to strengthen the credibility and utility of micro-credentials in global markets.

The role of digital platforms in supporting micro-credentials is another key connection. The European Approach discusses the importance of digital platforms for issuing, storing, and verifying credentials, arguing that these platforms can streamline credentialing across Europe (European Commission, 2021, p. 21). Similarly, Buchem (2024) emphasises the National Education Platform in Germany, which facilitates the management and verification of digital credentials, promoting their broader use across sectors (p. 6). Both documents agree that accessible and user-friendly digital solutions are essential for the success and scalability of micro-credentials.

Examples of Effective Quality Assurance and Digital Platforms

Open Badges: Open Badges is a widely adopted framework that provides a way to earn and display digital credentials. Developed by the Mozilla Foundation, this standard allows educational institutions and employers to issue badges that represent verified skills or achievements. Each badge contains metadata, including the issuing organisation, criteria for earning the badge, and evidence of achievement, making it a robust tool for quality assurance.

Credly: As a leading platform for digital credentialing, Credly allows institutions to create, manage, and share micro-credentials securely. It ensures that the credentials are verifiable and can be linked to various professional and educational contexts, which supports the portability of skills across different sectors and geographic regions.

Badgr: Similar to Credly, Badgr provides an infrastructure for issuing, managing, and sharing digital badges. This platform integrates with Learning Management Systems (LMS) to provide a seamless experience for both learners and educators, thereby ensuring the quality and recognisability of credentials.

E-Learning Platforms: Platforms like FutureLearn and edX offer micro-credentials as part of their course offerings. These platforms provide rigorous quality assurance processes that include course design standards, peer reviews, and student feedback mechanisms to maintain high educational quality. For instance, FutureLearn's micro-credentials are

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designed in collaboration with universities and industry experts, ensuring that they meet the needs of learners and employers alike.

European Digital Credentials Infrastructure: The European Commission's initiative aims to create a secure digital environment where credentials can be stored and shared across borders. This system is designed to enhance trust in digital credentials through standardised verification processes, thereby facilitating cross-border recognition and mobility for learners and professionals.

Furthermore, Rossiter and Tynan (2019) provide practical insights into designing and implementing micro-credentials, underscoring the necessity for quality assurance processes to enhance the credibility of these offerings in higher education. Their guidance aligns with the European Commission's recommendations, advocating for systematic approaches that integrate quality assurance at all stages of micro-credential development.

10. JAMMO's Editor-in-Chief Interviews Prof. Dr. Ilona Buchem

PS: You make the case that reliable technical methods are required to move from paper-based to digital certification. You also suggest that for experienced people without formal qualifications and qualified people changing from one sector to another, there is a need to provide evidence of competence. Can digital solutions such as micro-credentials and data wallets meet that need?

IB: Yes, I think digital solutions such as digital credentials and data wallets can meet the need for flexible, evidence-based certification, particularly for certifying competencies and qualifications from informal and non-formal contexts. Solutions such as digital education credentials, open badges, and micro-credentials may help learners and job seekers, especially first-time applicants, career changers, freelance workers, and anyone transitioning between educational and occupational fields. Digital credentials, especially those based on the W3C Verifiable Credential Data Model (VC), can be used to issue portable, verifiable digitally-signed certificates that acknowledge specific skills, competencies, and experiences. They are particularly useful for professionals looking to highlight their expertise beyond traditional qualifications.

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Data wallets enhance this process by allowing users to store, manage, and share their credentials with stakeholders such as employers and educational institutions. These tools offer flexibility and accessibility, allowing individuals to document and communicate their skills in a personalised manner (Buchem, 2024, p. 7; Rossiter & Tynan, 2019). When combined, digital credentials and data wallets provide comprehensive solutions for capturing, managing, and communicating competencies, particularly in a labour market increasingly shaped by technological transformation (Buchem, 2024, p. 8).

11. The Relationship Between Theoretical Knowledge and Practical Professional Experience

PS: How would you summarise the relationship between theoretical knowledge and practical professional experience concerning today's job market requirements?

IB: The relationship between theoretical knowledge and practical experience is complementary and crucial for both education and employment. In recent years, higher education has increasingly focused on combining theoretical knowledge with application-oriented, practical experiences. This dual approach, especially prominent in universities of applied sciences, helps bridge the gap between academic concepts and real-world applications. Curriculum changes, such as the inclusion of project-based learning and partnerships with industry, allow students to apply theoretical concepts in practical settings, preparing them for the workplace (Buchem, 2024, p. 8; Schreurs & Montalvo, 2022).

Practical experience provides essential opportunities for individuals to develop specific skills linked to their roles and tasks. Employers increasingly value candidates who can apply theoretical knowledge in practice to solve real-world problems. Thus, both educational institutions and employers are moving towards competency-based models where theoretical foundations are applied to specific tasks, creating a more engaging and meaningful learning experience (Buchem, 2024, p. 8; Buckley & Caple, 2022).

As the labour market continues to evolve, integrating theoretical knowledge with practical experience becomes increasingly important. This integration not only enhances employability but also ensures that graduates are better equipped to navigate the complexities of modern work environments. By fostering partnerships between academia and industry, educational institutions can better prepare students for the demands of the job market, ensuring that they possess both the necessary theoretical foundations and practical skills to succeed (Abeywardena & Balasubramaniam, 2021; Petridis et al., 2023).

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12. The Impact of Digital Transformation in Education on Lifelong Learning

PS: How have current trends in micro-credentials shaped the landscape of lifelong learning, and what challenges do these trends pose for traditional education systems seeking to integrate informal learning experiences?

IB: The digital transformation of education has fundamentally changed the way individuals acquire knowledge. With the rise of AI-related skills and online resources like MOOCs and open educational resources (OERs), learners increasingly rely on non-formal sources for continuous education. Micro-credentials, which recognise specific skills gained through these informal learning processes, have reshaped lifelong learning by offering modular, stackable credentials that align with job market demands. However, traditional education systems have yet to fully integrate these credentials into formal credit systems. Partnerships between educational institutions and digital platforms could help bridge this gap, providing learners with more personalised and flexible pathways to education (Buchem, 2024, p. 9; Schreurs & Montalvo, 2022).

The challenge lies in creating policies that recognise micro-credentials' value while maintaining the rigor of formal qualifications. Investments in academic advising and support systems will be necessary to guide learners through these new pathways. Moreover, micro-credentials must be aligned with national qualification frameworks to ensure consistency and quality (Buckley & Caple, 2022; Abeywardena & Balasubramaniam, 2021).

By addressing these challenges, educational systems can better prepare individuals for lifelong learning, equipping them with the skills necessary to thrive in a rapidly evolving job market.

13. The Future of Traditional Learning Approaches

PS: Do you think traditional approaches to learning, such as in-class teaching at higher education institutions, are on the way out?

IB: No, I believe traditional in-class learning will continue to play a significant role, but it will increasingly be supplemented by digital learning methods. The European Council's recommendation on micro-credentials underscores their role as complementary to traditional qualifications. Micro-credentials provide flexible learning opportunities that align

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with labour market needs while fostering lifelong learning. The future of education lies in creating pathways that combine traditional degrees with micro-credentials, offering learners a mix of theoretical knowledge and practical skills. These combined pathways will ensure that students can meet the evolving demands of the job market while maintaining the quality and rigor of traditional academic education (Buchem, 2024; McGreal & Olcott Jr., 2022).

In essence, traditional educational approaches need to evolve rather than disappear. By embracing digital tools and integrating them into existing curricula, institutions can enhance learning experiences and better prepare students for future challenges. This evolution is vital for developing a more adaptable and resilient workforce capable of responding to the changing dynamics of the global economy (Petridis et al., 2023; Schreurs & Montalvo, 2022).

14. Formalising Micro-Credentials into Academic Credit Systems

PS: Bringing micro-credentials into the mainstream in terms of formalizing academic credit considerations, how do you envision the relationship between traditional education systems and digital platforms evolving due to the increasing digital transformation in education?

IB: The integration of micro-credentials into formal education systems is a significant development. In Europe, frameworks like the European Qualifications Framework (EQF) and the Digital Education Action Plan highlight the importance of incorporating micro-credentials into academic credit systems. In the future, I believe we will see more flexible, personalised pathways where learners can combine traditional credits and micro-credentials. This approach will allow for faster adaptation to societal changes and job market demands, ensuring that learners have access to diverse learning opportunities (Buchem, 2024).

Moreover, partnerships between educational institutions and digital platforms will continue to evolve, creating synergies that enhance the value of both traditional degrees and micro-credentials. This could lead to a more global recognition of digital credentials, improving access to education and job opportunities across borders (Buchem, 2024).

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Table 1: Adapting Curricula and Assessment Practices and Innovative Approaches to Micro-Credentialing:

Key Aspect	Traditional Approaches	Innovative Approaches (Micro-Credentialing)	Examples/Approaches (Sources)
Curriculum Adaptation	Focused on structured, long-term academic programs	Flexible, short-term programs that validate specific competencies through micro-credentials	Germany's Vocational Training Validation and Digitization Act (Buchem, 2024); Stackable NanoDegrees (Schreurs & Montalvo, 2022)
Assessment Methods	Standardised exams and coursework assessments	Competency-based assessments; peer-reviewed or third-party verified assessments	Credly for third-party verification; peer-reviewed assessments (Buchem, 2024; Schreurs & Montalvo, 2022)
Accreditation Mechanisms	Traditional accreditation by degree-granting institutions	New mechanisms such as digital platforms and national qualification frameworks recognizing micro-credentials	Aligned with European Qualifications Framework (EQF) (Buchem, 2024; McGreal & Olcott Jr., 2022). Platforms like edX (Petridis et al., 2023)
Recognition of Non-Formal Learning	Limited, formal education-centric	Broad recognition of non-formal and workplace learning, validated through micro-credentials	Platforms like FutureLearn and edX (McGreal & Olcott Jr., 2022; Buckley & Caple, 2022); Germany's BVaDiG (Buchem, 2024)
Global Scaling and Portability	Qualifications recognised mostly within national systems	Digital solutions like data wallets and platforms enabling cross-border recognition and portability	Europass Digital Credentials Infrastructure (European Approach, 2020); Data wallets (Buchem, 2024)
Lifelong Learning & Upskilling	Primarily academic progression-focused	Modular, stackable micro-credentials enable continuous learning and upskilling throughout careers	Stackable MicroMasters, Stackable MicroMasters, NanoDegrees (McGreal & Olcott Jr., 2022); FutureLearn (Schreurs & Montalvo, 2022)
Inclusivity & Accessibility	Accessible primarily through formal institutions	Focus on inclusivity, ensuring access to marginalized groups via digital platforms and micro-credentials	Emphasis on marginalised groups (Buchem, 2024; UNESCO, 2023); Lifelong Learning (Buckley & Caple, 2022)

Table 1 compares traditional educational approaches with the innovative methods introduced by micro-credentialing, highlighting key features such as curriculum adaptation, assessment practices, and inclusivity, along with concrete examples from the literature.

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15. Bridging Informal and Formal Learning Experiences

PS: How can traditional educational institutions adapt their curriculum and assessment practices to recognise and validate skills acquired through non-traditional pathways?

IB: Traditional educational institutions must implement competency-based education models that focus on assessing skills rather than workload. Institutions should develop policies to evaluate and issue micro-credentials in collaboration with digital platforms, thereby creating a formal framework for recognising informal learning experiences. Support systems, including career counselling and academic advising, will also be critical in helping students navigate the new landscape of digital credentialing (Buchem, 2024).

In conducting an intertextual analysis between Prof. Dr. Ilona Buchem's article, Securing - Validating - Recognising Skilled Workers (2024), and the European Approach to Micro-Credentials report (2020) for this article, Evolving Landscape of Micro-Credentialing in the Digital Age: JAMMO Editorial Chief, Prof. Dr. Paul Silva Interviews Prof. Dr. Ilona Buchem, several significant themes and connections emerge, highlighting the alignment between the two sources in terms of the development, standardisation, and implementation of micro-credentials in the European context.

16. Standardisation, Portability, and Alignment with Qualifications Frameworks

Buchem's article, *Securing - Validating - Recognising Skilled Workers* (2024), and the *European Approach to Micro-Credentials* (2021) emphasise the need for clear, standardised definitions of micro-credentials. The European Commission (2021) highlights the critical importance of establishing shared terminology and frameworks to facilitate wider acceptance and integration across various educational systems (European Commission, 2021, p. 10). Similarly, Buchem (2024) underscores the significance of secure, transparent digital verification systems, such as Germany's Vocational Training Validation and Digitisation Act (BVaDiG), which ensure that micro-credentials are trusted and universally recognised (p. 6). Standardisation is thus identified as a vital step towards incorporating micro-credentials into formal education and industry recognition frameworks.

Both sources emphasise the portability and secure verification of micro-credentials across different contexts. The European Commission (2021) stresses the need for standardisation and alignment with the European Qualifications Framework (EQF), which facilitates the recognition of micro-credentials across various national education systems. The Europass

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Digital Credentials Infrastructure (EDCI), for example, is advocated as a digital solution that supports the portability of credentials across borders (European Commission, 2021, p. 20). In parallel, Buchem (2024) highlights Germany's use of secure data wallets, enabling individuals to store and share verifiable evidence of their skills and qualifications with employers and educational institutions (p. 7). Both analyses underline the central role of digital infrastructure in ensuring that micro-credentials are easily accessible and trusted in a globalised education and labour market.

Another key theme is the alignment of micro-credentials with national and European qualifications frameworks. The European Commission (2021) stresses the importance of linking micro-credentials with the EQF to ensure their recognition and value across educational and professional settings (European Commission, 2021, p. 11). Buchem (2024) echoes this, noting how the BVaDiG integrates micro-credentials into Germany's formal vocational training system, ensuring recognition across industries (p. 6). Both perspectives support the seamless integration of micro-credentials into existing qualification frameworks, thereby enhancing their legitimacy and portability.

17. Lifelong Learning, Accessibility, and Integration of Non-Formal Learning

Both texts emphasise the promotion of lifelong learning and the accessibility of education through micro-credentials. The European Approach highlights that micro-credentials offer flexible, modular learning opportunities, supporting upskilling and reskilling throughout one's career, thereby fostering lifelong learning (European Commission, 2021, p. 6). Similarly, Buchem (2024) underscores how the BVaDiG aims to make vocational training more inclusive, especially for marginalised communities and individuals with disabilities (p. 6). Both texts advocate for the democratisation of education through micro-credentials, allowing individuals from diverse backgrounds to access formal and informal learning opportunities.

The challenge of integrating non-formal learning into formal education systems is also a shared concern. The European Approach highlights that varying quality assurance practices and differing levels of recognition present obstacles (European Commission, 2021, p. 7). Likewise, Buchem (2024) addresses the hesitancy of traditional educational institutions to accept micro-credentials as equivalent to formal qualifications due to concerns about academic rigour (p. 7). To address these challenges, the European Approach recommends clear quality assurance mechanisms and alignment with frameworks such as the EQF. Buchem (2024) suggests that the BVaDiG addresses these

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concerns by establishing standardised systems for certifying competencies gained through both formal and informal education (p. 7).

18. Quality Assurance and Digital Platforms

Quality assurance is a recurring theme in both the European Approach and Buchem's article. The European Approach emphasises the need for robust quality assurance mechanisms to ensure micro-credentials are trusted and recognised by employers, educational institutions, and learners (European Commission, 2021, p. 14). Buchem (2024) supports this, noting that Germany's BVaDiG includes systems for certifying skills and competencies with clear quality controls (p. 6). Both documents highlight the importance of transparent, reliable processes to strengthen the credibility and utility of micro-credentials in global markets.

The role of digital platforms in supporting micro-credentials is another key connection. The European Approach discusses the importance of digital platforms for issuing, storing, and verifying credentials, arguing that these platforms can streamline credentialing across Europe (European Commission, 2021, p. 21). Similarly, Buchem (2024) emphasises the National Education Platform in Germany, which facilitates the management and verification of digital credentials, promoting their broader use across sectors (p. 6). Both documents agree that accessible and user-friendly digital solutions are essential for the success and scalability of micro-credentials.

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Key Themes in Bridging Informal and Formal Learning

Table 2: Key Themes in Bridging Informal and Formal Learning Through Micro-Credentials

Key Aspect	Challenges	Innovative Approaches	Examples (Sources)
Curriculum Adaptation	Traditional curricula focused on formal, time-based education	Competency-based models emphasise skills over time spent in formal settings.	Germany's Vocational Training Validation and Digitisation Act (BVaDiG) (Buchem, 2024, p. 6)
Assessment Practices	Hesitancy to accept informal learning for academic credit	Policies developed to evaluate and issue micro-credentials for non-formal learning via digital platforms.	Credly and peer-reviewed assessments for skills certification (Buchem, 2024, p. 7)
Standardisation of Micro-Credentials	Lack of shared terminology and framework definitions across systems	Alignment of micro-credentials with the European Qualifications Framework (EQF) and national frameworks.	Integration into EQF for cross-border recognition (European Commission, 2021, p. 10)
Portability of Credentials	Difficulty in recognising qualifications across borders or industries	Secure digital verification systems such as Europass Digital Credentials Infrastructure (EDCI) ensure portability.	Use of data wallets for cross-industry credential sharing (Buchem, 2024, p. 7)
Recognition of Non-Formal Learning	Reluctance to recognise non-formal learning due to concerns about academic rigor	Creation of formal frameworks to certify competencies acquired through informal learning pathways.	Germany's BVaDiG integrates non-formal learning into vocational training (Buchem, 2024, p. 7)
Lifelong Learning and Inclusivity	Limited access to education for marginalised communities	Flexible micro-credentialing systems promote continuous upskilling and reskilling opportunities for all learners.	BVaDiG ensures inclusivity for marginalised groups, including people with disabilities (Buchem, 2024, p. 6)
Quality Assurance	Varying quality assurance practices across education systems	Development of standardised quality assurance mechanisms for micro-credential recognition by employers and institutions.	BVaDiG certifies skills with standardised quality controls (Buchem, 2024, p. 6)
Digital Platforms for Credentialing	Limited use of digital infrastructure to issue, store, and verify credentials	National and European digital platforms streamline micro-credential issuance and storage for cross-sector recognition.	Germany’s National Education Platform for managing digital credentials (Buchem, 2024, p. 6)

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Table 2 outlines the key challenges and innovative approaches in bridging informal and formal learning, emphasizing the role of micro-credentials, digital platforms, and quality assurance in transforming educational and vocational training systems.

18. Conclusion

The integration of micro-credentials and digital credentials into formal education is transforming the landscape of lifelong learning and vocational training. As Prof. Dr. Ilona Buchem highlights, these digital tools offer flexible, accessible pathways for individuals transitioning between sectors or seeking to document skills acquired through non-traditional learning (Buchem, 2024). Moving forward, educational institutions must adapt by aligning curricula with competency-based models and forming partnerships with digital platforms to meet the evolving needs of today's learners (Ahsan et al., 2023; Oxley & van Rooyen, 2021).

Both the article Securing - Validating - Recognising Skilled Workers (2024) and the European Approach to Micro-Credentials report emphasise the need for standardisation, portability, quality assurance, and digital infrastructure in the implementation of micro-credentials (European Commission, 2021). These elements are crucial for ensuring that micro-credentials are recognised across national and European qualification frameworks, allowing credentials to be accepted across borders and by multiple industries. Each document also underscores the importance of inclusivity, advocating for more accessible and flexible learning opportunities that bridge formal and non-formal education, thus promoting lifelong learning (Buckley & Caple, 2022).

A brief comparison of the German and French approaches to credentialing highlights their shared emphasis on the validation of non-formal learning. In Germany, the Vocational Training Validation and Digitisation Act (BVaDiG) focuses on standardising and digitising the recognition of skills, ensuring that individuals from diverse educational backgrounds can validate their competencies (Abeywardena & Balasubramaniam, 2021). Similarly, France's Validation des Acquis de l'Expérience (VAE) provides an innovative framework that allows individuals to obtain formal qualifications based on professional experience, regardless of age, education level, or status (Ministry of National Education and Youth, n.d.). This socio-cultural revolution has opened new pathways for professional development and mobility by officially recognising skills acquired in the workplace.

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In both countries, these policies reflect a commitment to expanding access to qualifications through the recognition of practical experience, aligning with the European vision for micro-credentials (European Commission, 2021). The shared focus on integrating non-formal and formal education systems underlines the potential for micro-credentials to reshape education and workforce development globally, offering more inclusive and adaptable learning and career pathways.

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