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Digital Entrepreneurship Education for the Gig Economy: A Systematic Review and Integrative Framework

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Abstract

Purpose – The accelerating expansion of the gig economy, enabled by platform-based digital infrastructures and algorithmic labour coordination, is fundamentally reshaping the nature of work, careers, and entrepreneurial activity. This structural shift demands a comprehensive reconceptualization of entrepreneurship education, particularly in relation to how individuals are prepared for sustainable, autonomous, and ethically grounded participation in digitally mediated labour markets. This systematic literature review critically examines the role of Digital Entrepreneurship Education (DEE) and skill-based learning paradigms in equipping learners for gig-based entrepreneurial careers. Specifically, it evaluates the extent to which prevailing educational models align with the complex entrepreneurial competencies required to navigate volatile, uncertain, complex, and ambiguous (VUCA) labour environments characterized by precarity, rapid technological change, and evolving institutional norms.

Methodology – Guided by the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol, this review synthesizes evidence from 87 peer-reviewed journal articles published between 2010 and 2024, retrieved from Scopus, Web of Science, and EBSCOhost databases. A rigorous screening and quality appraisal process was applied to ensure conceptual relevance and methodological robustness. Search strings incorporated key terms such as digital entrepreneurship education, micro-credentials, skill-based learning, gig economy, platform work, and related pedagogical, competency-based, and labour market constructs. Thematic analysis was employed to identify recurring patterns, tensions, and gaps across disciplinary perspectives including education, management, labour studies, and digital sociology.

Findings – The review identifies four interrelated thematic fault lines shaping contemporary DEE discourse. First, a skill–transaction paradox emerges, wherein short-cycle, market-oriented technical skill acquisition is privileged over higher-order entrepreneurial competencies such as adaptability, resilience, ethical leadership, and opportunity recognition skills essential for long-term career sustainability. Second, a pedagogical dichotomy is evident between experiential, practice-based entrepreneurship education and increasingly transactional, content-driven digital delivery models. Third, the literature highlights a growing tension between credential accumulation through micro-certifications and the development of integrated, transferable entrepreneurial competencies that support identity formation and strategic agency. Fourth, an institutional hybridity gap persists, reflecting systemic challenges in effectively integrating scalable digital learning platforms with mentorship-rich, experiential educational ecosystems.

Originality/Value – This study advances the literature by moving beyond instrumental narratives that frame digital learning as inherently beneficial. Instead, it offers a critical, integrative synthesis that exposes structural and pedagogical limitations within prevailing DEE models. In response, the paper proposes the Integrative Digital–Experiential Learning (IDEL) Framework, a novel conceptual model that intentionally bridges modular digital skill acquisition with experiential learning, reflective practice, and entrepreneurial identity development. The IDEL framework reframes scholarly and policy discourse from

a narrow focus on whether digital entrepreneurship education is effective to a more consequential question: how DEE must be designed to cultivate sustainable entrepreneurial capability in future labour markets.

Practical Implications – For educators, platform designers, and policymakers, the findings underscore the need to co-create hybrid learning architectures that combine digital scalability with mentorship, peer learning, ethical reflection, and real-world entrepreneurial experimentation. Higher education institutions are encouraged to develop stackable, market-recognised micro-credentials aligned with entrepreneurial competency frameworks, facilitated through strategic partnerships with gig platforms, industry bodies, and public agencies. Such models can enhance learner agency while preserving educational depth and coherence.

Research Implications- The review highlights the need for longitudinal and comparative research examining career sustainability, income stability, entrepreneurial self-efficacy, and professional identity formation among learners engaged in digital micro-credential pathways versus traditional entrepreneurship education programs. Future studies should also explore contextual variations across regions, platforms, and regulatory environments.

Social Implications, when intentionally designed, Digital Entrepreneurship Education has the potential to promote equity, inclusion, and career autonomy, particularly for marginalized and non-traditional learners seeking access to entrepreneurial opportunities. However, the continued reliance on transactional, skills-only educational models risks reinforcing labour precarity, deepening workforce stratification, and exacerbating social fragmentation within the gig economy. A shift toward integrative, competency-driven DEE is therefore both an educational and societal imperative.

1. Introduction

The accelerating convergence of the digital economy and the gig economy is profoundly reshaping the architecture of global labour markets. Traditional models of stable, linear employment are increasingly being displaced by flexible, project-based, and platform-mediated forms of work. This transformation has given rise to a future of work characterized by heightened volatility, uncertainty, complexity, and ambiguity (VUCA), wherein workers are required to continuously reconfigure their skills, identities, and career trajectories. In such an environment, economic participation is no longer solely defined by occupational roles within organizations but increasingly by individuals' capacity to operate as autonomous economic agents within digitally mediated ecosystems.

Within this evolving landscape, entrepreneurial mindsets and behaviours are no longer confined to business founders or start-up contexts. Instead, they have become essential competencies for a broad spectrum of workers navigating precarious and fragmented labour arrangements. Gig workers, freelancers, and platform-based professionals must routinely identify opportunities, manage risk, build reputational capital, and adapt to algorithmically governed marketplaces. Consequently, the capacity for

self-direction, innovation, and opportunity recognition hallmarks of entrepreneurship has become a critical determinant of employability and career sustainability in digital labour markets.

In response to these shifts, Digital Entrepreneurship Education (DEE) has emerged as a prominent pedagogical and policy-driven intervention. DEE seeks to equip learners with the knowledge, skills, and dispositions required to create value, innovate, and engage productively in digital and platform-based markets. Parallel to this development, skill-based learning models, frequently delivered through online platforms, micro-credentials, and short-cycle certification programs, have gained considerable traction. These models promise flexibility, rapid skill acquisition, and alignment with evolving market demands, positioning themselves as efficient solutions for workforce upskilling and reskilling in the gig economy.

Despite their widespread adoption and institutional endorsement, critical questions remain regarding the pedagogical depth and long-term effectiveness of these digital learning modalities. While micro-credentials and modular courses excel in delivering discrete technical skills, concerns persist about their ability to cultivate holistic entrepreneurial competencies, such as strategic thinking, resilience, ethical judgment, opportunity recognition, and adaptive learning. The prevailing emphasis on transactional skill acquisition risks reducing entrepreneurship education to a narrow, instrumental function, potentially neglecting the integrative and reflective dimensions necessary for sustainable career development in uncertain labour markets.

Against this backdrop, this systematic literature review (SLR) aims to synthesise and critically evaluate existing scholarship at the intersection of Digital Entrepreneurship Education, skill-based learning, and the gig economy. Rather than offering a normative endorsement of digital learning technologies, the review adopts a critical lens to examine how effectively current DEE practices bridge the gap between short-term skill acquisition and the development of integrated entrepreneurial competence. By mapping dominant themes, tensions, and gaps within the literature, this study seeks to clarify the extent to which digital education models support long-term professional resilience, adaptability, and agency in VUCA labour markets.

Accordingly, the review is guided by the following central research question:

How effectively does contemporary digital entrepreneurship education integrate skill-based learning with the development of holistic entrepreneurial competencies required for sustainable participation in the future of work?

By addressing this question, the study contributes to ongoing debates on the design, purpose, and societal implications of digital education, offering insights for educators, institutions, platform designers, and policymakers seeking to align entrepreneurship education with the realities of an increasingly digital and gig-oriented economy.

2. Literature Review & Theoretical Background

2.1 The Gig Economy and the Demand for New Competencies

The gig economy, enabled by digital platforms and algorithmic intermediation, represents a structural reconfiguration of employment relations. Rather than long-term organizational attachment, work is increasingly organized around short-term contracts, task-based assignments, and reputation-driven marketplaces. While this model promises flexibility, autonomy, and access to global opportunities, it simultaneously introduces heightened precarity in the form of income volatility, limited social protections, opaque algorithmic governance, and intensified global competition.

Scholars increasingly argue that success in such environments cannot be sustained through technical proficiency alone. Instead, gig work demands a broadened set of entrepreneurial competencies, including opportunity recognition, self-marketing, resource orchestration, strategic decision-making under uncertainty, resilience, and ethical judgment. Gig workers must function as micro-entrepreneurs, continuously managing risk, building legitimacy, and adapting to shifting platform rules and market signals. This reconceptualization positions entrepreneurship not as an exceptional activity, but as a generalized labour competency necessary for navigating VUCA labour markets.

2.2 Digital Entrepreneurship Education (DEE): Evolution and Promise

Digital Entrepreneurship Education (DEE) extends traditional entrepreneurship education into digitally mediated contexts, focusing on venture creation, innovation, and value generation within online and platform-based environments. DEE encompasses a wide spectrum of educational interventions, including online venture labs, platform-based incubators, virtual mentorship, and AI-supported entrepreneurial simulations. Its appeal lies in its scalability, flexibility, and capacity to offer context-specific learning aligned with rapidly evolving digital markets.

The theoretical foundations of DEE are commonly drawn from experiential learning theory, constructivist pedagogy, and human capital theory. These frameworks posit that investment in entrepreneurial knowledge and skills particularly those relevant to digital contexts enhances individual productivity, innovation capacity, and economic outcomes. However, while DEE aspires to replicate the richness of experiential entrepreneurship education, scholars question whether digital delivery modes can fully support the reflective, relational, and identity-forming dimensions essential to entrepreneurial development.

2.3 The Micro-Credential and Skill-Based Learning Revolution

The proliferation of skill-based learning models, often operationalized through micro-credentials, digital badges, and short-cycle certifications, represents a paradigmatic shift in contemporary education. Platforms such as Coursera, Udacity, edX, and LinkedIn Learning have popularized modular, competency-focused learning pathways that promise rapid upskilling, labour market alignment, and lifelong learning accessibility.

From a policy and industry perspective, micro-credentials are celebrated for their responsiveness to skills shortages and their potential to democratize access to education. However, critics argue that these models are underpinned by transactional conceptions of learning, wherein education is reduced to discrete, marketable competencies detached from broader developmental goals. While effective for updating technical skills, micro-credentials often lack integration, reflective depth, and mechanisms for cultivating entrepreneurial judgment, ethical reasoning, and adaptive identity formation capabilities essential for sustainable gig work.

2.4 Identifying the Research Gap

Despite growing scholarly attention to the gig economy, digital entrepreneurship, and skill-based education, the literature remains fragmented. Existing studies frequently examine DEE and micro-credentialing as distinct phenomena, overlooking their growing convergence in practice. Moreover, prior reviews tend to emphasize adoption, access, and technological affordances, while underexamining the pedagogical coherence and competency alignment of digital entrepreneurship education in VUCA labour contexts.

Crucially, there is a lack of systematic synthesis that interrogates the tension between modular skill acquisition and the integrated entrepreneurial competencies required for long-term resilience, agency, and ethical participation in platform-based work. This systematic literature review addresses this gap by critically examining how DEE and skill-based learning intersect and where they diverge in preparing individuals for sustainable engagement in the gig economy.

2.5 Theoretical Framing: Competing Paradigms in Digital Entrepreneurship Education

The evolution of Digital Entrepreneurship Education is not merely a pedagogical or technological shift; it reflects a deeper contestation between competing theoretical paradigms regarding the purpose of education, the nature of learning, and the role of the learner in digital economies. This review is anchored in three interrelated theoretical frameworks that illuminate these tensions.

2.5.1 Human Capital Theory and Transactional Learning Models

Human Capital Theory (Becker, 1964) provides the dominant economic rationale underpinning micro-credentialing and skill-based learning platforms. Within this paradigm, education is conceptualized as an investment that enhances individual productivity and employability. Learning is modularized, quantified, and directly linked to labour market returns, rendering skills as tradable assets in competitive marketplaces.

Digital platforms operationalize this logic by decomposing entrepreneurial competence into discrete, certifiable skills optimized for algorithmic matching and employer demand. While this approach enables efficiency and scalability, it reduces education to a private economic good and frames learners as homo economicus, optimizing skill portfolios rather than developing holistic entrepreneurial agency. This

transactional orientation marginalizes the social, ethical, and transformative dimensions of entrepreneurship education.

2.5.2 Experiential Learning Theory and Constructivist Pedagogy

In contrast, traditional entrepreneurship education is deeply grounded in Experiential Learning Theory (ELT) (Kolb, 2014) and social constructivism. ELT conceptualizes learning as an iterative cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation. This framework supports pedagogies such as venture simulations, mentorship, reflective journals, and project-based learning, which emphasize sensemaking, judgment, and identity formation.

From this perspective, entrepreneurship education is formative rather than transactional, aiming to cultivate adaptability, ethical reasoning, and the capacity to act under uncertainty. Critiques of digital skill platforms frequently stem from their inability to sustain these reflective and relational processes, raising concerns about superficial engagement and instrumentalized learning.

2.5.3 Connectivism and Critical Platform Studies

Emerging from digital learning theory, connectivism (Siemens, 2005) conceptualizes learning as the capacity to navigate and construct knowledge networks across distributed digital environments. In principle, this framework aligns with the collaborative, peer-driven potential of online platforms and entrepreneurial ecosystems.

However, insights from critical platform studies (Srnicek, 2016; Langley & Leyshon, 2017) complicate this narrative by revealing how platform architectures shaped by data extraction, algorithmic governance, and venture capital imperatives structure learning experiences. Rather than fostering deep connectivity, many platforms privilege engagement metrics, behavioral nudging, and content consumption, constraining critical reflection and learner autonomy.

2.6 Synthesizing the Theoretical Tension

This review is conceptually framed by the unresolved tension between human capital-driven transactional learning models and experiential, constructivist approaches to entrepreneurship education, mediated by the connective yet commercially constrained reality of digital platforms. The thematic findings identified in this study such as the skill transaction paradox, pedagogical dichotomy, and institutional hybridity gap are interpreted as manifestations of this deeper theoretical conflict.

In response, the proposed Integrative Digital Experiential Learning (IDEL) Framework, introduced in Section 5, is positioned as a theoretical synthesis. IDEL seeks to reconcile scalability with depth by embedding experiential, reflective, and ethical learning processes within digitally mediated educational architectures. In doing so, it aims to re-center entrepreneurial agency, adaptability, and sustainability at the core of digital entrepreneurship education for the gig economy.

3. Research Methodology

This study adopts a systematic literature review (SLR) methodology, guided by the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework, to ensure methodological rigor, transparency, and replicability. The PRISMA protocol was selected due to its widespread acceptance in interdisciplinary research and its capacity to support structured evidence synthesis across education, entrepreneurship, and labour studies.

3.1 Search Strategy

A comprehensive and systematic search was conducted across three leading academic databases—Scopus, Web of Science, and EBSCOhost—to capture a broad and multidisciplinary body of literature. These databases were selected for their extensive coverage of peer-reviewed research in education, management, social sciences, and digital innovation. The search encompassed publications from 2010 to 2024, reflecting the period during which digital entrepreneurship education, micro-credentials, and platform-based labour have gained scholarly prominence.

To enhance coverage and minimize publication bias, reference lists of selected articles were also manually scanned to identify additional relevant studies that may not have been captured through database searches alone.

3.2 Keywords and Boolean Operators

The search strategy employed a structured combination of keywords and Boolean operators to ensure conceptual precision and thematic relevance. The final search string was as follows:

(“digital entrepreneurship education” OR “online entrepreneurship training”)
AND (“micro-credential” OR “digital badge” OR “skill-based learning”)
AND (“gig economy” OR “platform work” OR “future of work”)
AND (“competency*” OR “pedagogy”)

Truncation (*) was used to capture variations of key terms, while Boolean operators ensured the inclusion of literature intersecting digital education, entrepreneurship, and gig-based labour contexts.

3.3 Inclusion and Exclusion Criteria

Clear inclusion and exclusion criteria were established a priori to enhance objectivity and consistency during the screening process.

Inclusion Criteria:

Peer-reviewed journal articles and conference proceedings published in English

Empirical, conceptual, or review studies addressing Digital Entrepreneurship Education, skill-based learning, or micro-credentials

Studies explicitly linked to the gig economy, platform work, or future-of-work contexts

Research engaging with competencies, pedagogical models, or educational outcomes

Exclusion Criteria:

Non-peer-reviewed publications, editorials, opinion pieces, books, and book chapters

Studies lacking a clear educational or training focus

Articles not explicitly connected to digital or gig-based work environments

Publications with insufficient methodological transparency or theoretical grounding

3.4 Screening and Selection Process

The initial database search yielded 1,247 records. Following the removal of duplicates (n = 312), 935 unique articles remained for screening. Titles and abstracts were independently reviewed to assess relevance against the predefined inclusion criteria, resulting in the exclusion of 782 articles that did not meet the study's scope.

The remaining full-text articles were assessed for eligibility in accordance with PRISMA guidelines. Following this rigorous screening and quality appraisal process, a final sample of 87 peer-reviewed studies, published between 2010 and 2024, was retained for in-depth analysis. A PRISMA flow diagram was used to document each stage of the selection process, ensuring transparency and traceability.

3.5 Data Extraction and Analytical Procedure

A standardized data extraction form was developed to systematically capture key characteristics of the selected studies, including authorship, year of publication, disciplinary focus, research design, methodological approach, theoretical frameworks, and principal findings. This structured approach facilitated comparability across studies and reduced the risk of selective reporting.

The extracted data were analysed using thematic analysis, following an iterative and inductive coding process. Initial open coding was employed to identify recurring concepts and patterns, which were subsequently refined into higher-order themes through constant comparison and analytical abstraction. This process enabled the identification of dominant narratives, conceptual tensions, and gaps within the literature, forming the basis for the thematic findings discussed in subsequent sections.

To enhance analytical rigor, themes were continuously cross-checked against the theoretical frameworks outlined in Section 2, ensuring coherence between empirical insights and conceptual interpretation.

PRISMA Inclusion/Exclusion Criteria Table

Criteria	Inclusion	Exclusion
Publication Type	Peer-reviewed articles, conference proceedings	Editorials, books, non-peer-reviewed
Time Frame	2010–2024	Pre-2010
Language	English	Non-English
Focus	DEE, skill-based learning, gig economy	Unrelated to digital/gig work
Methodology	Empirical, theoretical, review studies	Opinion pieces, case studies without analysis

4. Findings and Discussion

The systematic synthesis of the reviewed literature reveals four central and interrelated themes that collectively capture the dominant patterns, contradictions, and structural tensions shaping Digital Entrepreneurship Education (DEE) and skill-based learning models within the gig economy. Rather than operating as isolated issues, these themes reflect deeper ideological, pedagogical, and institutional logics that influence how entrepreneurial competence is conceptualized, delivered, and evaluated in digitally mediated labour markets. An overview of these themes is presented in Table 1, followed by an in-depth critical discussion of each.

4.1 The Skill–Transaction Paradox: Commodification of Learning

Digital learning platforms demonstrate exceptional efficiency in deconstructing complex professional domains into discrete, teachable, and assessable technical skills, such as coding, search engine optimization, platform analytics, and digital marketing. This transactional learning model is highly responsive to short-term labour market signals and enables rapid upskilling aligned with platform demand. However, across the reviewed studies, a consistent deficit emerges in the cultivation of higher-order entrepreneurial competencies that are critical for long-term sustainability in the gig economy.

Specifically, competencies such as resilience under algorithmic management, adaptive problem-solving in uncertain markets, ethical judgment, strategic self-positioning, and professional identity formation are largely marginalized or entirely absent from platform-based curricula. As a result, learners may acquire technical proficiency while remaining ill-equipped to navigate the structural vulnerabilities and power asymmetries inherent in platform-mediated work.

Critical Analysis.
This paradox is not pedagogically incidental but reflects the broader commodification of learning under platform capitalism (Srnicek, 2016). By privileging immediately monetizable technical skills, digital platforms reinforce what has been described as a labour precarity trap (Wood et al., 2019), wherein

workers are compelled to engage in continuous, narrowly defined upskilling without developing the critical agency necessary to challenge opaque algorithmic governance, negotiate fair compensation, or envision alternative economic arrangements. This process resembles a form of pedagogical Taylorism, fragmenting holistic entrepreneurial competence into standardized micro-tasks optimized for efficient delivery, assessment, and data extraction. In doing so, learning architectures increasingly serve platform logics of scalability and profitability rather than learner empowerment and emancipation.

4.2 Pedagogical Dichotomy: Neoliberal Logic versus Transformative Aims

A pronounced pedagogical divide emerges between traditional entrepreneurship education and the instructional models dominant in digital skill platforms. Conventional entrepreneurship education, grounded in experiential and constructivist traditions, emphasizes reflective practice, mentorship, peer interaction, and real-world experimentation as mechanisms for cultivating judgment, creativity, and entrepreneurial identity. In contrast, many digital platforms rely heavily on content-delivery pedagogies, such as video lectures, standardized assessments, and automated feedback systems, which prioritize information transmission over transformative learning.

Critical Analysis.
This dichotomy is deeply ideological rather than merely methodological. Transactional digital pedagogy aligns with a neoliberal educational logic that frames learners as individual consumers, skills as private commodities, and education as a service optimized for employability metrics. Within this paradigm, responsibility for career risk is individualized, while structural constraints remain unaddressed. Conversely, experiential entrepreneurship education aspires to more transformative aims but often remains institutionally bounded, resource-intensive, and inaccessible to many gig workers.

The literature increasingly calls for the development of a critical digital pedagogy (Morris & Stommel, 2018) tailored to the gig economy—one that harnesses digital tools not for passive content consumption, but for critical reflection, collaborative knowledge production, and collective agency building. Such an approach would position gig workers not merely as recipients of skills, but as co-creators of learning environments and active agents capable of reshaping the conditions of their work.

4.3 Credentials versus Competency: The New Digital Credentialism

The rapid proliferation of micro-credentials and digital badges has generated significant debate regarding their signalling value and long-term legitimacy. While these credentials offer flexibility and immediate recognition, the literature identifies an emerging pattern of credential accumulation without competency integration. Learners often collect multiple badges across platforms without embedding these skills into a coherent entrepreneurial capability framework, leading to skepticism among employers and clients regarding their substantive value.

Critical Analysis.
This phenomenon signals the emergence of a new form of digital credentialism, wherein symbolic

indicators of competence increasingly substitute for demonstrable, integrated capability. Access to this credential economy is uneven, privileging individuals with higher levels of digital literacy, discretionary time, and financial resources. Consequently, micro-credentialing risks exacerbating existing inequalities and contributing to the formation of a digital credential caste system, where platform-issued badges circulate value within specific ecosystems but lack portability across traditional labour markets (Brown et al., 2011).

More broadly, this shift reflects a societal movement away from education as formation (Bildung) toward education as signaling, where the appearance of skill acquisition often eclipses its meaningful application. Without integrative pedagogical design, micro-credentials may function as market tokens rather than foundations for sustainable entrepreneurial practice.

4.4 The Institutional Hybridity Gap: Clash of Logics

While scholars increasingly advocate for hybrid models that combine the scalability of digital platforms with the depth of experiential entrepreneurship education, the literature reveals a notable scarcity of robust, operationalized frameworks for achieving such integration. Universities face structural and cultural challenges in partnering with commercial platforms, while platforms often lack the capacity or incentive to provide high-touch mentorship, ethical oversight, and reflective learning spaces.

Critical Analysis.
This hybridity gap stems from a fundamental clash of institutional logics. Higher education institutions operate under logics of credentialing, knowledge creation, and—at least normatively—the pursuit of the public good. In contrast, digital platforms are driven by imperatives of scalability, data extraction, network effects, and shareholder value. As a result, many partnerships devolve into extractive alliances, wherein educational institutions adopt platform technologies without reciprocal enhancement of pedagogical depth or adequate safeguards for learner data sovereignty.

True hybridity requires more than technological integration; it demands critical co-design frameworks that foreground pedagogical integrity, ethical governance, learner agency, and equitable access. Without such intentional design, hybrid initiatives risk reproducing the limitations of both systems rather than realizing their complementary strengths.

Summary of Central Themes in Digital Entrepreneurship Education for the Gig Economy-

Theme	Core Finding	Key Issues Identified	Supporting Citations from Reviewed Literature
1. The Skill-Transaction Paradox	Digital platforms excel at delivering technical and operational skills but largely neglect higher-order entrepreneurial competencies.	• Oversupply of "hard" skills (coding, SEO, data analytics) • Deficiency in "soft" skills (resilience, adaptability, ethical leadership) • Learners become task-skilled but lack holistic career agency	• Brown et al. (2011) – skills mismatch in global labour markets • Deloitte Insights (2022) – shift toward skills-based organizations • Wood et al. (2019) – algorithmic control and worker autonomy • Neck & Corbett (2018) – entrepreneurial mind-set development
2. Pedagogical Dichotomy	A stark contrast exists between experiential pedagogies in traditional entrepreneurship education and transactional content-delivery models in digital platforms.	• Traditional: experiential, reflective, social learning (simulations, mentorship) • Digital: content-delivery, video lectures, automated quizzes • Limited capacity for deep, integrative learning in digital formats	• Kolb (2014) – experiential learning theory • Boud et al. (2013) – reflective practice in learning • Lehner & Harrer (2019) – MOOCs and digital entrepreneurship education • Huang et al. (2019) – educational technology limitations
3. Credentials vs. Competency	The proliferation of micro-credentials has led to "badge accumulation" rather than integrated competency development, raising concerns about signalling value.	• Credential inflation and employer scepticism • Emphasis on quantity over demonstrable mastery • Lack of coherence in skill integration • Weak alignment with real-world entrepreneurial processes	• Allen & Hurd (2021) – micro-credential landscape challenges • Lapointe & Gendreau (2022) – credentialing chaos in tech industry • Gallagher (2018) – future of university credentials • Van Winkle et al. (2016) – literature review on micro-credentials
4. The Institutional Hybridity Gap	There is a lack of robust theoretical and practical models for integrating scalable digital learning with experiential, institutionally-grounded education.	• Universities struggle to partner effectively with platforms • Platforms lack infrastructure for mentorship and reflection • Absence of hybrid curricular frameworks	• Morris et al. (2013) – entrepreneurship programs and universities • Parker et al. (2016) – platform revolution and networked markets • Kuratko (2005) – evolution of entrepreneurship

Theme	Core Finding	Key Issues Identified	Supporting Citations from Reviewed Literature
		• Barrier to scalable yet pedagogically profound DEE ecosystems	education • Colombelli et al. (2019) – governance in entrepreneurial ecosystems

5. The Integrative Digital-Experiential Learning (IDEL) Framework

In direct response to the structural, pedagogical, and institutional gaps identified in the preceding analysis, this study proposes the Integrative Digital–Experiential Learning (IDEL) Framework as an original and theoretically grounded model for reimagining Digital Entrepreneurship Education (DEE) in the context of the gig economy. The IDEL Framework moves beyond transactional skill acquisition by explicitly integrating technical proficiency, experiential learning, reflective sense-making, and human mentorship into a coherent pedagogical architecture. Its central premise is that sustainable digital entrepreneurship cannot be cultivated through isolated micro-skills alone, but requires iterative engagement with real-world practice, critical reflection, and socially embedded learning processes.

The IDEL Framework provides a structured design logic for educators, platforms, and policymakers seeking to bridge the persistent divide between scalable digital delivery and deep competency development. Rather than rejecting platform-based learning, IDEL strategically repurposes digital infrastructures to support transformative entrepreneurial learning outcomes.

5.1 Pillar One: Structured Experiential Integration

The first pillar of the IDEL Framework emphasizes the intentional integration of experiential learning within digitally delivered skill modules. In this model, digital micro-credentials are not treated as self-contained endpoints, but as gateways to applied entrepreneurial practice. Each technical module is explicitly linked to a contextualized, real-world task that mirrors the complexities of gig-based work.

For instance, a micro-credential in Digital Marketing would culminate in the design, execution, and evaluation of a live marketing campaign for a real or simulated gig-based venture. Assessment within this pillar prioritizes strategic decision-making, adaptability, and outcome evaluation, rather than reliance on automated quizzes or static assignments. By embedding skill acquisition within authentic problem contexts, this pillar fosters the transfer of knowledge from instructional settings to dynamic market environments, thereby strengthening entrepreneurial competence.

5.2 Pillar Two: Embedded Reflective Practice

The second pillar addresses the critical absence of reflection in many digital learning environments. The IDEL Framework embeds systematic reflective practice as a mandatory and assessed component of the

learning process. Reflection functions as the mechanism through which learners synthesize technical skills with personal values, ethical reasoning, and evolving professional identities.

Digital platforms implementing IDEL would incorporate structured reflective tools such as guided learning journals, peer discussion forums, reflective video diaries, and narrative-based prompts. These mechanisms encourage learners to critically examine their decision-making processes, confront challenges related to algorithmic management and precarity, and articulate their long-term entrepreneurial aspirations. By foregrounding reflective sense-making, this pillar supports the development of metacognitive awareness and ethical judgment, transforming skill training into meaningful entrepreneurial learning.

5.3 Pillar Three: Scalable Human Interaction

The third pillar recognizes that human interaction remains indispensable for entrepreneurial development, even within digitally mediated learning systems. Rather than positioning technology as a replacement for mentorship, the IDEL Framework advocates for its use as a tool to scale meaningful human engagement.

This includes AI-enabled mentor–mentee matching systems that connect learners with experienced gig entrepreneurs and industry professionals, structured peer-review mechanisms that facilitate collaborative learning, and synchronous online “entrepreneurial clinics” where learners present real challenges encountered in their gig work. Such interactions provide contextual feedback, emotional support, and social validation—elements that are largely absent in purely automated platforms. Through this pillar, IDEL reintroduces the social and relational dimensions of entrepreneurship education in a scalable and accessible manner.

5.4 Institutional Positioning and Credential Architecture

Beyond its pedagogical dimensions, the IDEL Framework redefines the role of educational institutions within digital learning ecosystems. Universities and accredited training bodies are positioned as curators, integrators, and validators of learning, rather than sole content providers. In partnership with digital platforms, institutions can offer stackable hybrid credentials that combine verified technical skill badges with experiential portfolios, reflective artefacts, and mentor evaluations.

Such credentials function as richer and more trustworthy signals of entrepreneurial competence to employers, clients, and investors. By emphasizing demonstrated capability over mere badge accumulation, the IDEL Framework addresses the credibility deficit associated with micro-credentials and enhances their portability across both platform-based and traditional labour markets.

6. Implications

6.1 Practical Implications

For Educators & Institutions: Adopt design principles from the IDEL Framework. Develop strategic partnerships with ed-tech platforms to co-create hybrid programs. Shift focus from being sole content providers to being curators of experiential learning journeys and validators of integrated competency.

For Platform Designers: Move beyond content libraries to design learning environments that facilitate application, reflection, and connection. Integrate project workspaces, reflective tools, and mentor/peer networking features directly into the learning pathway.

For Policymakers: Fund initiatives that pilot hybrid DEE models. Develop quality assurance standards for micro-credentials that evaluate experiential and reflective components, not just content mastery. Foster industry-education collaborations to align credentials with real competency needs.

6.2 Social Implications

Well-designed DEE, following an integrative model like IDEL, has the potential to democratize opportunity, empowering gig workers with greater career agency and resilience. It can promote more equitable participation in the digital economy. Conversely, failure to address the "skill-transaction paradox" risks exacerbating inequalities, creating a two-tier workforce where only those with access to holistic, often expensive, traditional education develop true entrepreneurial agency. Embedding **ethical leadership** and **social sustainability** into DEE curricula is crucial for shaping a responsible digital economy. Ultimately, building social trust in new credentialing systems is essential for fostering a more adaptable and cohesive society.

6.3 Critical and Ethical Implications

Beyond practical design and policy, the findings of this review raise profound critical and ethical questions for the future of DEE and work.

Datafication and Pedagogical Surveillance: Digital learning platforms are potent sites of data extraction, tracking keystrokes, time-on-task, and social interactions. This **pedagogical surveillance** (Williamson, 2017) can be used for predictive analytics that nudge learners down standardized, platform-preferred pathways, potentially stifling creativity and critical divergence. The IDEL Framework and similar initiatives must incorporate **ethical data principles**, transparent algorithms, and strong guarantees of **learner data sovereignty**.

Equity and the Reproduction of Divides: DEE risks exacerbating inequality if access to the high-quality experiential and mentoring components of integrative models requires significant financial, social, or technological capital. Moving beyond **access-oriented inclusion** to **pedagogical justice** requires intentionally designing for the realities of diverse gig workers—including those in informal economies, rural areas, and the Global South—ensuring DEE empowers rather than further marginalizes.

Labour Rights and Collective Agency: Predominant DEE narratives focus on individual upskilling and personal brand building, aligning with the "entrepreneur-of-the-self" ideology. This obscures the collective nature of work and the need for **solidarity and bargaining power**. A critically-oriented DEE should therefore include literacies on **digital labour rights**, the formation of **platform cooperatives**, and strategies for collective action and advocacy as valid entrepreneurial pathways.

Environmental Sustainability: The digital infrastructure of online learning has a carbon footprint, and the "always-on," rapid-credentialing culture may promote a disposable mind-set toward skills. An ecologically conscious DEE would integrate **eco pedagogical considerations**, promoting digital sustainability, teaching skills for the green economy, and fostering a long-term, stewardship-oriented entrepreneurial mind-set.

7. Conclusion, Limitations, and Future Research

This systematic literature review has offered a critical and integrative synthesis of the rapidly evolving landscape of Digital Entrepreneurship Education (DEE) and skill-based learning within the context of the gig economy. Drawing on interdisciplinary scholarship across entrepreneurship, education, platform studies, and labor economics, the review demonstrates that while digital learning platforms have dramatically expanded access to entrepreneurial skills, they have not yet delivered on the promise of cultivating holistic entrepreneurial competence. The prevailing emphasis on discrete, modular, and market-aligned technical skills has resulted in a persistent disconnect between what is efficiently taught and what is ultimately required for sustainable participation and advancement in gig-based work.

The findings underscore that success in the gig economy is not solely contingent upon technical proficiency, but rather upon a complex constellation of capabilities that include adaptability, ethical judgment, reflective decision-making, identity formation, and resilience in the face of algorithmic governance and labor precarity. Current transactional models of skill-based learning, while valuable for short-term employability, often fail to foster these deeper capacities. In response to this gap, the Integrative Digital–Experiential Learning (IDEL) Framework was proposed as a theoretically grounded and practice-oriented pathway forward. By embedding experiential application, reflective practice, and scalable human interaction into digital learning architectures, the IDEL Framework repositions DEE as a formative process rather than a mere mechanism for skill delivery.

At a conceptual level, this review contributes to the literature by reframing the debate around micro-credentials and digital platforms from one of access and efficiency to one of pedagogical integrity and learner agency. It highlights that the future viability of DEE depends not on abandoning digital platforms, but on critically redesigning them to support experiential depth, ethical awareness, and social learning. In doing so, the review advances a more balanced and human-centered vision of digital entrepreneurship education suited to the realities of a VUCA-driven future of work.

7.1 Limitations

Despite its contributions, this review is subject to several limitations that must be acknowledged. First, the analysis was restricted to peer-reviewed journal articles and conference proceedings published in English, which may have excluded relevant insights from grey literature, policy reports, practitioner-oriented studies, or non-English scholarship—particularly from Global South contexts where gig work is highly prevalent. Second, as a systematic review, the study synthesizes existing research rather than generating primary empirical data, which limits its ability to make causal claims about the effectiveness of specific pedagogical models.

Additionally, the field of digital entrepreneurship education is evolving at a rapid pace, shaped by ongoing technological innovation, regulatory shifts, and labor market transformations. As such, some emerging platform practices, AI-driven learning tools, or experimental institutional partnerships may not yet be fully captured within the reviewed literature. These limitations point not to weaknesses in the review, but to the dynamic and still-maturing nature of the research domain.

7.2 Directions for Future Research

Building on the insights generated by this review, several promising avenues for future research emerge. First, there is a pressing need for empirical validation of the IDEL Framework and similar integrative models through longitudinal, mixed-method, and experimental research designs. Such studies could assess learning outcomes, entrepreneurial self-efficacy, and adaptive capacity across different learner populations and institutional contexts.

Second, comparative research should examine the long-term career trajectories and well-being outcomes of individuals trained through purely transactional, skill-based platforms versus those participating in integrated DEE programs that incorporate experiential and reflective components. This would help determine whether integrative models translate into greater resilience, income stability, and professional mobility over time.

Third, future studies should explore the role of artificial intelligence and learning analytics not only in personalizing content delivery, but also in supporting experiential pathways, mentor matching, and reflective feedback systems. Understanding how AI can be ethically and pedagogically aligned with human-centered learning remains a critical challenge.

Finally, there is a strong need for critical political economy analyses of micro-credentials and platform-based education. Such research should interrogate issues of data ownership, algorithmic governance, labor rights, credential portability, and educational equity, particularly in relation to how platform power shapes learning opportunities and constrains learner agency.

7.3 Concluding Remarks

The future of work demands a fundamental rethinking of how entrepreneurial capacity is cultivated in digitally mediated environments. Moving beyond the narrow “skill-transaction” model toward integrative, experiential, and reflective digital learning is not merely a pedagogical choice, but a social and ethical imperative. By aligning technological scalability with human development, educators, policymakers, and platform designers can collaboratively build an educational ecosystem that equips individuals not only to survive the gig economy, but to actively shape it with competence, resilience, and agency.

Research Area	Key Questions	Methodological Approach
IDEL Framework Efficacy	Does IDEL improve entrepreneurial outcomes?	Longitudinal experimental studies
Long-term Career Impact	How do transactional vs. integrated DEE affect 5-year outcomes?	Cohort tracking, longitudinal surveys
AI in Mentorship	Can AI effectively match learners with mentors?	Algorithm testing, A/B testing
Equity & Access	Who benefits from hybrid credentials?	Critical discourse analysis, equity audits

References

1. **Acemoglu, D., & Restrepo, P. (2019).** Automation and new tasks: How technology displaces and reinstates labor. *Journal of Economic Perspectives, 33*(2), 3-30.
2. **Allen, T., & Hurd, N. (2021).** The micro-credential landscape: A map of the space and its challenges. *Educause Review*.
3. **Bacigalupo, M., Kampylis, P., Punie, Y., & Van den Brande, G. (2016).** *EntreComp: The Entrepreneurship Competence Framework*. Publication Office of the European Union.
4. **Bennett, D. (2019).** The gig economy and the future of work: A case for portable benefits. *Brookings Institution Report*.
5. **Boud, D., Keogh, R., & Walker, D. (Eds.). (2013).** *Reflection: Turning experience into learning*. Routledge.
6. **Brown, P., Lauder, H., & Ashton, D. (2011).** *The global auction: The broken promises of education, jobs, and incomes*. Oxford University Press.
7. **Castaño, M. S., Méndez, M. T., & Galindo, M. Á. (2015).** The effect of social, cultural, and economic factors on entrepreneurship. *Journal of Business Research, 68*(7), 1496-1500.
8. **Choudhury, P., Foroughi, C., & Larson, B. (2021).** Work-from-anywhere: The productivity effects of geographic flexibility. *Strategic Management Journal, 42*(4), 655-683.
9. **Colombelli, A., Paolucci, E., & Ughetto, E. (2019).** Hierarchical and relational governance and the life cycle of entrepreneurial ecosystems. *Small Business Economics, 52*(2), 505-521.
10. **Danaher, K. (2019).** *The future of work: Robots, AI, and automation*. Brookings Institution Press.

11. **Deloitte Insights. (2022).** *The skills-based organization: A new operating model for work and the workforce*. Deloitte Development LLC.
12. **Fayolle, A., & Gailly, B. (2015).** The impact of entrepreneurship education on entrepreneurial attitudes and intention: Hysteresis and persistence. *Journal of Small Business Management, 53*(1), 75-93.
13. **Friedman, G. (2014).** Workers without employers: shadow corporations and the rise of the gig economy. *Review of Keynesian Economics, 2*(2), 171-188.
14. **Gallagher, S. R. (2018).** *The future of university credentials: New developments at the intersection of higher education and hiring*. Harvard Education Press.
15. **Ghezzi, A. (2019).** Digital startups and the adoption and implementation of Lean Startup Approaches: A systematic literature review. *Technological Forecasting and Social Change, 146*, 1-12.
16. **Giones, F., & Brem, A. (2017).** Digital technology entrepreneurship: A definition and research agenda. *Technology Innovation Management Review, 7*(5), 44-51.
17. **Huang, R., Spector, J. M., & Yang, J. (2019).** *Educational technology: A primer for the 21st century*. Springer.
18. **Katz, L. F., & Krueger, A. B. (2019).** The rise and nature of alternative work arrangements in the United States, 1995-2015. *ILR Review, 72*(2), 382-416.
19. **Kickul, J., Gundry, L. K., Mitra, P., & Berçot, L. (2018).** Designing with purpose: Advocating innovation, impact, sustainability, and scale in social entrepreneurship education. *Entrepreneurship Education and Pedagogy, 1*(2), 205-221.
20. **Kolb, D. A. (2014).** *Experiential learning: Experience as the source of learning and development*. FT press.
21. **Kuratko, D. F. (2005).** The emergence of entrepreneurship education: Development, trends, and challenges. *Entrepreneurship theory and practice, 29*(5), 577-597.
22. **Lackéus, M. (2020).** *Entrepreneurship in education: What, why, when, how*. OECD Publishing.
23. **Lapointe, P., & Gendreau, D. (2022).** The Credentialing Chaos: A Critical Look at Micro-Credentials in the Tech Industry. *Journal of Higher Education Theory and Practice, 22*(6).
24. **Lehner, O. M., & Harrer, T. (2019).** Digital entrepreneurship education: the role of MOOCs. *International Journal of Entrepreneurial Venturing, 11*(3), 243-263.
25. **Manyika, J., Lund, S., Chui, M., Bughin, J., Woetzel, J., Batra, P., ... & Sanghvi, S. (2017).** *Jobs lost, jobs gained: Workforce transitions in a time of automation*. McKinsey Global Institute.
26. **Morris, M. H., Kuratko, D. F., & Cornwall, J. R. (2013).** *Entrepreneurship programs and the modern university*. Edward Elgar Publishing.
27. **Neck, H. M., & Corbett, A. C. (2018).** The scholarship of teaching and learning entrepreneurship. *Entrepreneurship Education and Pedagogy, 1*(1), 8-41.
28. **Nambisan, S. (2017).** Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. *Entrepreneurship theory and practice, 41*(6), 1029-1055.
29. **OECD. (2019).** *OECD Skills Outlook 2019: Thriving in a Digital World*. OECD Publishing.

30. **Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... & Moher, D. (2021).** The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ, 372*.
31. **Parker, G. G., Van Alstyne, M. W., & Choudary, S. P. (2016).** *Platform revolution: How networked markets are transforming the economy and how to make them work for you*. WW Norton & Company.
32. **Ratten, V. (2020).** Coronavirus (Covid-19) and the entrepreneurship education community. *Journal of Enterprising Communities: People and Places in the Global Economy, 14*(5), 753-764.
33. **Rey-Marti, A., Mohedano-Suanes, A., & Simon-Moya, V. (2019).** A systematic review of the use of social networks for entrepreneurship. *Sustainability, 11*(14), 4050.
34. **Schwab, K. (2017).** *The fourth industrial revolution*. Currency.
35. **Selingo, J. J. (2017).** *There is life after college: What parents and students should know about navigating school to prepare for the jobs of tomorrow*. William Morrow.
36. **Siemens, G. (2005).** Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning, 2*(1), 3-10.
37. **Susskind, D. (2020).** *A world without work: Technology, automation, and how we should respond*. Metropolitan Books.
38. **Susskind, R., & Susskind, D. (2015).** *The future of the professions: How technology will transform the work of human experts*. Oxford University Press.
39. **The World Economic Forum. (2020).** *The Future of Jobs Report 2020*. World Economic Forum.
40. **Thomas, D. R. (2006).** A general inductive approach for analyzing qualitative evaluation data. *American journal of evaluation, 27*(2), 237-246.
41. **Tull, S. (2019).** The rise of the gig economy and its implications for management education. *Journal of Management Education, 43*(3), 273-280.
42. **Van der Heijden, B. I., & de Vos, A. (2015).** Sustainable careers: Introductory chapter. In *Handbook of research on sustainable careers*. Edward Elgar Publishing.
43. **Van Winkle, B., Cairns, L., & Kimmins, L. (2016).** Micro-credentials and digital badges: A review of the literature. *Journal of Teaching and Learning with Technology, 5*(1), 1-8.
44. **WEF. (2023).** *Future of Jobs Report 2023*. World Economic Forum.
45. **Wei, J., & Lowry, P. B. (2020).** The impact of the gig economy on entrepreneurial intention: The role of psychological capital. *Journal of Small Business Management*.
46. **Wood, A. J., Graham, M., Lehdonvirta, V., & Hjorth, I. (2019).** Good gig, bad gig: Autonomy and algorithmic control in the global gig economy. *Work, Employment and Society, 33*(1), 56-75.
47. **Zhao, Y., & Zhu, Q. (2014).** Evaluation on crowdsourcing research: Current status and future direction. *Information Systems Frontiers, 16*(3), 417-434.