



Original Article

## Integrating Digital Literacy and Competency-Based Curriculum in Higher Education: A Framework for 21st Century Entrepreneurship Education in Kenya

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This study explores the integration of digital literacy within competency-based curriculum (CBC) frameworks in higher education, with a specific emphasis on entrepreneurship education in Kenya. Employing an integrative literature review methodology, the paper synthesizes empirical studies, theoretical models, and policy documents to evaluate how digital competencies can be effectively embedded in CBC to enhance entrepreneurship training outcomes. CBC emphasizes demonstrable skills such as creativity, critical thinking, communication, and digital literacy over content memorization. Digital literacy, positioned as a core enabler of 21st-century entrepreneurship education, encompasses technical, informational, collaborative, and problem-solving skills necessary for digital innovation and global market engagement. However, integration is constrained by limited teacher preparedness, resource scarcity, infrastructure deficits, and misaligned assessment strategies. The study proposes a structured digital literacy integration framework, alongside recommendations for ongoing professional development, infrastructure investment, and performance-based assessment. Findings indicate that digital literacy not only supports other CBC competencies but also strengthens entrepreneurship education by equipping students with the tools to innovate, adapt, and thrive in a competitive digital economy.

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## INTRODUCTION

The rapid evolution of global economies and technological advancement has necessitated a fundamental shift in educational paradigms, particularly in higher education, where students must be prepared for an increasingly digital and entrepreneurial workforce (European Commission, 2016). Traditional content-based education has proven inadequate in equipping learners with the dynamic and cross-cutting competencies required for success in the 21st century (Lans et al., 2014). In response, educational systems globally are adopting competency-based curriculum (CBC) frameworks that emphasize what learners can do with their knowledge prioritizing practical skills, creativity, and adaptability over rote memorization (Kenya Institute of Curriculum Development, 2017).

In line with this shift, Kenya launched CBC reforms in 2017 to develop seven core competencies: communication and collaboration, critical thinking and problem-solving, creativity and imagination, citizenship, digital literacy, learning to learn, and self-efficacy. This marked a major departure from the traditional 8-4-4 system. However, the implementation process has faced notable challenges, including teacher unpreparedness, limited technological infrastructure, and inconsistent integration of digital literacy across institutions (Ogembo, 2021). These challenges are especially pressing in entrepreneurship education, where digital competencies are essential for students to innovate, access global markets, and build competitive ventures.

At the same time, digital literacy has emerged as a critical enabler of both academic and entrepreneurial success. Defined by the American Library Association (2013) as the ability to use

information and communication technologies to locate, evaluate, create, and communicate information, digital literacy spans technical, informational, creative, and ethical dimensions. In entrepreneurship education, these competencies support critical business functions such as digital innovation, data-driven decision-making, e-commerce, and strategic communication (European Commission, 2016).

Despite the recognized importance of digital literacy, there remains a significant gap in the literature and practice regarding how it can be systematically and effectively integrated within CBC frameworks in the context of higher education in Kenya particularly in entrepreneurship training. While global models such as *EntreComp* and *DigCompEdu* offer guidance, there is limited evidence on how these frameworks can be localized, operationalized, and scaled within Kenyan institutions facing resource constraints and varying levels of digital readiness.

## PROBLEM STATEMENT

In an ideal CBC implementation, digital literacy would be seamlessly integrated across all levels of instruction, particularly in entrepreneurship education. Learners would acquire and demonstrate digital competencies such as data analysis, online collaboration, digital marketing, and content creation as part of their entrepreneurial training. Educators would be well-equipped to embed these skills within CBC-aligned instructional strategies, and assessment tools would be designed to evaluate both practical digital capabilities and entrepreneurial outcomes. This integration would empower graduates to become adaptive, innovative, and globally competitive in a digital-first economy. However, the current status quo in Kenya’s higher

education institutions falls short of this vision. Despite digital literacy being listed as a core CBC competency, its implementation in entrepreneurship education is inconsistent and largely underdeveloped. Many lecturers lack the training to integrate digital tools into their instruction. Institutions face infrastructural limitations such as unreliable internet, limited access to devices, and insufficient digital content. Assessments often remain traditional, measuring rote knowledge rather than applied digital or entrepreneurial competencies. These systemic gaps hinder the capacity of higher education to produce graduates who are both digitally fluent and competent in entrepreneurship. Given this disparity, there is a clear need for a structured, context-sensitive framework to guide the integration of digital literacy within CBC-based entrepreneurship education in Kenya. Existing global models, while useful, are not tailored to Kenya's educational realities. This study addresses that gap by examining local implementation challenges, analyzing relevant frameworks, and proposing a model that can inform curriculum design, policy development, and institutional planning.

## RESEARCH OBJECTIVE

This study aims to examine how digital literacy can be effectively integrated within competency-based curriculum frameworks in higher education, with a specific focus on entrepreneurship education in Kenya. It seeks to identify current barriers, explore global and local frameworks, and propose a structured model that aligns digital competencies with entrepreneurial learning outcomes.

## LITERATURE REVIEW

### Competency-Based Curriculum: Theoretical Foundations and Implementation

Competency-based education (CBE) represents a global paradigm shift from traditional models, emphasizing what learners can demonstrate rather than merely what they know (Kenya Institute of Curriculum Development, 2017). Internationally,

CBE is underpinned by constructivist theories such as Vygotsky's socio-cultural theory, Gardner's multiple intelligences, and Dewey's experiential learning, which support learner-centred and skill-driven approaches (Vygotsky, 1978; Gardner, 1983).

Global studies have supported CBC as a progressive educational approach. Lans et al. (2014) showed that competence-based models in entrepreneurship education help learners identify key entrepreneurial skills. Similarly, Mulder (2014) emphasized that competency-based education frameworks offer high flexibility and adaptability for various disciplines, especially when integrated with real-life tasks. The European Commission's EntreComp framework (2016) furthers this by defining entrepreneurship as acting upon opportunities and turning them into value emphasizing competencies over academic knowledge.

Regionally, CBC adoption in Africa is gaining traction but remains constrained by infrastructural and policy challenges. Wawire and Kiru (2021) note that African countries often struggle with context-sensitive implementation, particularly in integrating digital literacy. Msweli and Mkhize (2020) highlighted the misalignment between competency definitions in curricula and their application in higher education institutions across Southern Africa.

Locally, Kenya introduced CBC in 2017 to shift away from the 8-4-4 model, focusing on competencies such as creativity, communication, digital literacy, and self-efficacy. However, its adoption in higher education has been inconsistent, partly due to limited training, resources, and assessment alignment (Ogembo, 2021; Republic of Kenya, 2016).

### Digital Literacy in Higher Education

Globally, digital literacy has evolved from basic ICT proficiency to encompassing media literacy, information evaluation, and responsible digital

behaviour. Belshaw (2011) categorizes it into multiple dimensions, including critical thinking and digital citizenship. The American Library Association (2013) defines it as the ability to use ICTs to find, evaluate, create, and communicate information by blending technical and cognitive skills.

Wulan et al. (2022) propose a four-dimensional model of digital competence: communication and digital security, content management, content creation, and digital empathy. Ng (2012) emphasizes the role of digital literacy in shaping students' engagement, identity, and participation in digital learning environments. The European DigCompEdu framework (2017) builds on this by outlining six domains for educators: professional engagement, digital resources, teaching and learning, assessment, learner empowerment, and facilitation of learners' digital competence.

In sub-Saharan Africa, however, digital literacy integration into higher education faces structural and capacity-based challenges. Many institutions operate with limited access to digital tools, and digital pedagogy is often underdeveloped. Studies by Makokha and Mutisya (2016) show that online and blended learning initiatives in Kenyan universities face low uptake due to limited digital infrastructure and low digital readiness among faculty. In Kenya, these issues are compounded by the slow translation of policy into practice and the lack of a localized framework for digital literacy integration within entrepreneurship curricula (Ogembo, 2021).

### **Integration Challenges and Opportunities**

Globally, challenges in CBC and digital literacy integration include teacher training gaps, resistance to change, and inconsistent assessment frameworks (European Commission, 2017). Professional development remains a critical enabler. The European Commission advocates for sustained, modular training models to help educators stay current with digital tools. Voogt et al. (2015) further

argue that sustainable technology integration depends on long-term investment in teacher competencies and institutional support.

In the African context, challenges include limited infrastructure, cultural resistance, and a lack of digital content aligned to CBC. Studies in Nigeria and South Africa (Olaniran & Babalola, 2020; Mtsweni, 2021) show that even when digital tools are available, instructors often lack the pedagogical knowledge to integrate them meaningfully. In Kenya, Ogembo (2021) reports that CBC implementation is hindered by insufficient professional development, outdated infrastructure, and fragmented policy interpretation. Despite the inclusion of digital literacy in the CBC framework, there is no standardized guide for its integration into entrepreneurship education. This has created a gap between policy and classroom practice, especially at the tertiary level.

### **Assessment and Evaluation in Competency-Based Education**

Effective assessment in CBC involves frequent, diverse, and learner-centred approaches that evaluate the real-world application of knowledge (Van Laar et al., 2017). Globally, there is a shift toward performance-based and technology-enhanced assessment methods. These include e-portfolios, simulations, rubric-based evaluations, and interactive online assessments (Ribble, 2015).

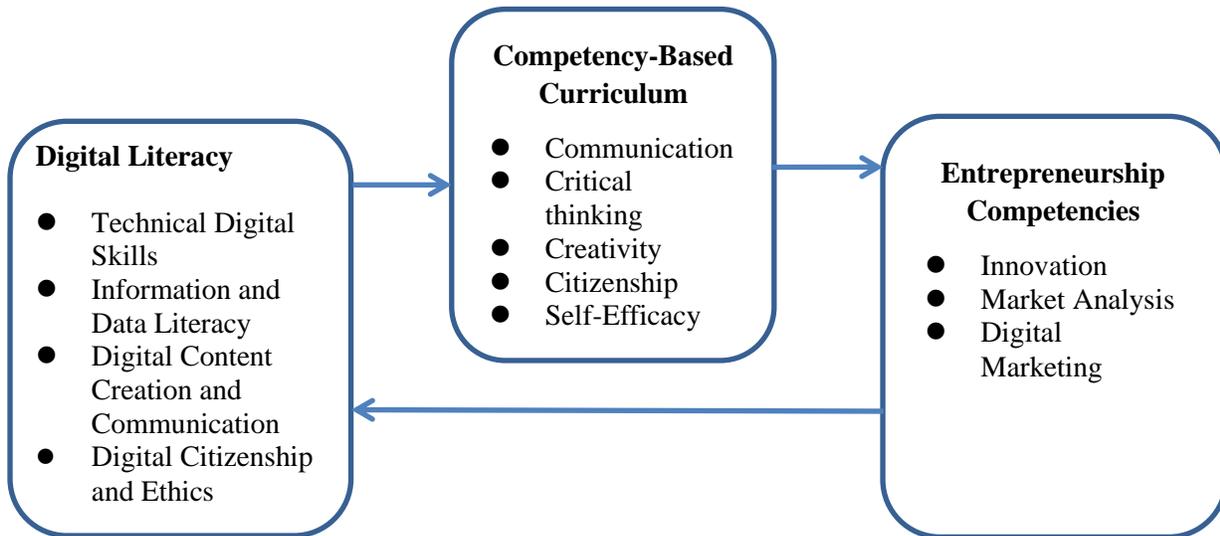
In the European context, frameworks like DigCompEdu and EntreComp emphasize that assessments must be aligned to digital and entrepreneurial competencies. These models stress feedback-rich and flexible tools that assess both technical and soft skills. Voogt and Roblin (2012) also note that 21st-century assessment must move beyond academic knowledge to capture complex competencies using digital tools.

Locally, however, assessments in CBC settings in Kenya remain largely summative and content-driven. Educators report difficulty aligning

traditional assessments with CBC goals, particularly when evaluating digital skills in business and innovation contexts (Ogembo, 2021; Republic of Kenya, 2016).

**Conceptual Framework**

**Figure 1: Conceptual Model Linking Digital Literacy, CBC & Entrepreneurial Competencies**



**Research Gaps**

Globally, there is robust support for integrating digital literacy within CBC frameworks, especially in entrepreneurship education. However, much of the existing literature remains conceptual or policy-driven, lacking empirical grounding in real institutional settings. While models like EntreComp and DigCompEdu provide structure, their adaptation to specific entrepreneurial learning environments particularly in developing countries has not been comprehensively studied. There is also little consensus on best practices for contextualizing global frameworks in resource-limited higher education systems, where local realities such as infrastructure, training, and digital access vary widely.

Regionally, within the African context, most research has concentrated on primary and secondary education. Studies often fail to explore the complex interactions between CBC, digital literacy, and entrepreneurship education at the tertiary level. Furthermore, the few regional studies that do exist

tend to treat these themes in isolation, limiting their usefulness for developing integrated instructional or policy models.

In Kenya specifically, the situation is compounded by fragmented CBC implementation across institutions, lack of standardized digital competency assessment tools, and insufficient training in digital pedagogy. Although CBC highlights digital literacy as a core skill, its integration into entrepreneurship education is inconsistent and uncoordinated. There is also limited empirical evidence on how digital literacy contributes to the achievement of entrepreneurship competencies within the CBC framework.

To address these gaps, this study seeks to develop a structured and context-specific framework for integrating digital literacy into CBC-aligned entrepreneurship education in Kenyan higher education. Its core objective is to investigate existing implementation barriers, synthesize international and local best practices, and propose an actionable model that aligns teaching strategies,

curriculum design, and assessment with both CBC outcomes and digital competency goals. The study aims to bridge the divide between policy and practice while contributing practical insights for educators and institutional leaders and expanding the theoretical understanding of digital-literacy-driven entrepreneurship education in emerging contexts.

## METHODOLOGY

This paper employs a qualitative, integrative literature review design to synthesize scholarly and policy literature on digital literacy and CBC in entrepreneurship education. Data sources included peer-reviewed journals, national policy reports, and global frameworks published between 2010 and 2024. Selection criteria prioritized relevance to higher education, CBC implementation, and digital competency integration. A thematic analysis was conducted to categorize findings into conceptual domains aligned with the study's objectives. This approach enabled the development of a conceptual integration framework and policy-aligned recommendations.

## RESULTS AND DISCUSSION

### Current State of CBC Implementation

Analysis of the literature reveals that CBC implementation in Kenya faces significant systemic challenges that impact digital literacy integration. Research findings indicate that 84% of stakeholders support CBC's potential for self-employment development, while 85% believe it enhances creativity and 86% support its role in developing innovative skills (Kenya Institute of Curriculum Development, 2017). However, implementation challenges persist across multiple dimensions and are consistent with broader regional and global trends.

### Teacher Preparedness and Training

Inadequate teacher training remains a primary barrier to effective CBC implementation (Ogembo,

2021). Educators report feeling ill-equipped to deliver CBC effectively, particularly when integrating digital literacy components (Wawire & Kiru, 2021). This aligns with findings by the European Commission (2017), which noted similar gaps in teacher digital competence in EU countries. Conversely, studies in Finland and Singapore highlight that strategic investment in teacher professional development correlates with smoother CBC transitions (Voogt et al., 2015). The proposed digital literacy framework helps address this disparity by embedding structured, scalable teacher development practices tailored to local capacity.

### Resource and Infrastructure Constraints

Kenya's CBC implementation faces resource constraints typical of developing economies. Research reveals critical shortages of digital tools, internet access, and physical infrastructure, especially in rural settings (Republic of Kenya, 2016; Ogembo, 2021). These findings are echoed in studies from South Africa and Uganda, which also cite underinvestment and digital divides as key impediments (Mtsweni, 2021; Edegoh et al., 2020). In contrast, countries like Mauritius have achieved better outcomes through targeted ICT investments and public-private partnerships. The technical skills and content creation components of the framework offer feasible alternatives for Kenya such as low-bandwidth platforms and mobile-first learning solutions.

### Stakeholder Engagement and Change Management

Stakeholder resistance among educators, parents, and students remains a significant hurdle (Ogembo, 2021). While studies in Kenya attribute this to insufficient awareness and fear of academic decline (Wawire & Kiru, 2021), research in the Netherlands and Australia shows that clear communication and early involvement of stakeholders in reform processes significantly enhance CBC adoption (Voogt & Roblin, 2012; Ng, 2012). The framework's digital citizenship and communication

components aim to foster stakeholder trust, transparency, and engagement through collaborative digital tools and ethical practices.

### Digital Literacy Integration Framework

The framework developed in this study comprises four interconnected dimensions that respond directly to the above challenges:

**Technical Digital Skills:** These foundational skills (device operation, application use, and troubleshooting) empower educators and students to adopt digital tools efficiently. When integrated into CBC training, they reduce the digital skill gap and enhance confidence in technology use (Hague & Payton, 2010; Van Laar et al., 2017).

**Information and Data Literacy:** Enables students and educators to critically evaluate digital information, manage data, and promote academic integrity. These competencies help address content credibility concerns and foster more responsible use of technology (American Library Association, 2013; Belshaw, 2011).

**Digital Content Creation and Communication:** Encourages creativity through digital storytelling, multimedia tools, and collaboration platforms (Wulan et al., 2022). This directly supports CBC goals like creativity, critical thinking, and communication (European Commission, 2017).

**Digital Citizenship and Ethics:** Reinforces safe, ethical, and inclusive online practices. This dimension is particularly relevant in promoting accountability, digital trust, and ethical behaviour in educational spaces (Ribble, 2015; Hague & Payton, 2010).

The coherence of these dimensions strengthens the framework's relevance in addressing Kenya's CBC implementation challenges. Importantly, the framework reflects lessons from global best practices while remaining flexible for local adaptation.

### Entrepreneurship Education Integration

The integration of digital literacy into entrepreneurship education offers practical and theoretical value:

**Digital Innovation and Creativity:** Empirical studies (European Commission, 2016; Van Laar et al., 2017) show that digital skills boost entrepreneurial ideation and problem-solving. This supports CBC objectives such as self-efficacy and value creation.

**Digital Business Skills:** Research by Lans et al. (2014) and Wulan et al. (2022) underscores the link between digital competence and entrepreneurial success, particularly in digital marketing, online business management, and analytics.

**Global Market Access:** Kenyan learners, equipped with digital tools, can overcome local market limitations and tap into international opportunities. Countries like India have successfully leveraged digital education platforms to democratize access to entrepreneurial knowledge (World Bank, 2020). Kenya can emulate such strategies by embedding cross-border digital collaboration in entrepreneurship training.

Although many countries face challenges integrating CBC and digital literacy, Kenya's case is intensified by infrastructural inequities and sporadic policy enforcement. Rwanda and Mauritius, in contrast, have demonstrated notable progress through consistent investments in digital infrastructure, teacher digital training, and curriculum reform. Kenya can draw from these models by localizing their strategies, for instance, emphasizing mobile-accessible content or incentivizing digital mentorship programs within universities.

### Study Limitations

This study is primarily based on secondary data and conceptual analysis. Although the framework is grounded in current literature and best practices, it

has not yet been empirically tested. Its regional focus on Kenya may limit generalizability to other contexts without further adaptation. Future research should include empirical validation, using field data to test the effectiveness of the proposed model in live teaching and curriculum design environments.

## CONCLUSIONS

This study affirms that integrating digital literacy into competency-based curriculum (CBC) frameworks is both essential and complex in higher education settings. While CBC offers a robust structure for nurturing 21st-century competencies, the success of its implementation is significantly influenced by systemic challenges, including inadequate teacher training, resource limitations, and resistance from stakeholders. Addressing these factors is imperative for effective curriculum delivery and for achieving the goals of entrepreneurship education in a digital age.

A key finding is that digital literacy is not merely one among many CBC competencies, but rather a foundational enabler that amplifies others such as critical thinking, creativity, collaboration, and self-efficacy. In entrepreneurship education specifically, digital literacy empowers learners to innovate, manage information, communicate effectively, and access global markets. The study also establishes that traditional teaching and assessment methods fall short in measuring digital and entrepreneurial competencies, underscoring the need for adaptive, performance-based, and technology-enabled assessment models.

A significant contribution of this study lies in the development of a contextualized framework that links four dimensions of digital literacy technical skills, information literacy, content creation, and digital citizenship with entrepreneurship competencies in CBC-aligned learning environments. This model addresses Kenya's specific implementation challenges while drawing on best practices globally, offering a scalable and flexible roadmap for digital integration in resource-

constrained contexts. Looking forward, the study recommends prioritizing structured, ongoing teacher professional development programs focused on digital pedagogy. Investment in ICT infrastructure and stakeholder capacity-building is also crucial. Policy frameworks should support cross-sector partnerships, innovation-friendly curriculum reform, and institutional accountability.

Future research should empirically test and refine the proposed framework across diverse institutional contexts. Longitudinal studies are especially needed to assess the long-term impact of integrated digital literacy on student outcomes, entrepreneurial success, and the sustainability of CBC reforms. By aligning digital literacy with entrepreneurship education through a competency-based approach, this study offers practical strategies and theoretical insights for transforming higher education to meet the demands of a dynamic, digitally driven world.

## RECOMMENDATIONS

To support the successful integration of digital literacy in CBC-aligned entrepreneurship education, this study proposes a series of practical and prioritized recommendations across six key domains: institutional development, faculty capacity, infrastructure, assessment, stakeholder engagement, and ongoing research. First, institutions should develop comprehensive digital literacy frameworks that align with CBC and entrepreneurship goals. This includes defining competency standards (American Library Association, 2013), establishing digital skills pathways (Van Laar et al., 2017), embedding digital literacy in curricula (European Commission, 2017), and aligning assessments with competency outcomes (Ribble, 2015).

Second, faculty development must be prioritized through continuous digital pedagogy training (European Commission, 2017), peer learning networks (Wawire & Kiru, 2021), access to teaching technologies (Republic of Kenya, 2016), and incentive structures for innovation (Hague &

Payton, 2010). Third, infrastructure improvements are vital: institutions should invest in internet and computing access (Republic of Kenya, 2016), develop localized digital resources (Kenya Institute of Curriculum Development, 2017), partner with tech providers (European Commission, 2017), and secure long-term technology funding (Wawire & Kiru, 2021).

Fourth, assessment systems must evolve to match CBC goals by incorporating performance-based evaluation (Ribble, 2015), portfolios (American Library Association, 2013), technology-enabled tools (European Commission, 2017), and transparent rubrics (Belshaw, 2011). Fifth, stakeholder engagement should be strengthened through communication campaigns (Wawire & Kiru, 2021), community training (Kenya Institute of Curriculum Development, 2017), feedback loops (Republic of Kenya, 2016), and industry collaboration (European Commission, 2016).

Finally, continuous research is essential to refine implementation. Longitudinal studies (Wulan et al., 2022), pedagogical investigations (European Commission, 2017), impact evaluations (Lans et al., 2014), and evidence-based policy guidance (Hague & Payton, 2010) will help improve scalability and contextual relevance.

By following these recommendations in a phased, coordinated manner, higher education institutions can significantly improve the quality and effectiveness of CBC delivery while equipping students for digital-age entrepreneurship and lifelong learning. These recommendations in a phased, well-coordinated manner, higher education institutions can significantly improve the quality and effectiveness of CBC delivery while preparing graduates for success in a technology-driven global economy.

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