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The Need for the Development and Validation of 21st-Century Digital Skills Competence Assessment Framework for College of Education Lecturers in Nigeria

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Abstract

The rapid digitalization of global education has exposed significant "technological readiness deserts" within Nigeria's teacher education landscape. This study justifies the urgent need for the development and validation of a 21st-century digital skills competence assessment framework specifically for College of Education lecturers. Employing a qualitative exploratory design, the research utilized semi-structured interviews with twelve purposively selected experts in educational technology and assessment. Thematic analysis revealed critical systemic gaps: 85% of institutions lack standardized evaluation mechanisms, and only 18% have access to validated assessment tools. Findings indicate that lecturer digital deficiencies create a "cascading effect," leaving over 70% of pre-service teachers underprepared for modern classrooms. The study identifies four core themes: the urgency of systematic assessment, systemic preparedness gaps, the impact on graduate quality, and infrastructure constraints. To mitigate these challenges, the study recommends that the National Commission for Colleges of Education (NCCE) institutionalize a validated competence framework aligned with international standards like DigCompEdu and UNESCO's ICT-CFT. Furthermore, digital proficiency must be linked to career advancement and supported by state-funded minimum technology standards. A phased three-year implementation strategy is proposed to transform Nigerian Colleges of Education into centers of digital excellence.

Keywords: 21st-Century Digital Skills, Competence Assessment Framework, College of Education Lecturers

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Introduction

Higher education in the digital age demands more than disciplinary knowledge, it requires educators to possess and demonstrate technological competencies that prepare future teachers for an increasingly digital classroom environment (Kayyal, 2024). For lecturers in Nigeria's Colleges of Education, this challenge is particularly pressing. These educators must not only master their subject areas and pedagogical techniques but also be proficient in integrating digital technologies that enhance teaching effectiveness and prepare pre-service teachers for 21st-century learning contexts (Wordu & Isiah, 2020). Nigeria's teacher education system continues to face unprecedented technological transformation challenges, with Colleges of Education emerging as critical yet underequipped institutions in this transition (Onasanya & Fadeyibi, 2025). The crisis became evident during the COVID-19 pandemic when the abrupt shift to remote learning in March 2020 exposed severe digital competence gaps among education lecturers (Garcia et al., 2023). This disruption revealed that many institutions lacked both the infrastructure and the human capacity to deliver quality teacher preparation programs through digital platforms (Amoah, 2024).

Among the most affected areas is pedagogical technology integration, where lecturers struggled to translate traditional classroom methodologies into digital environments. Colleges across states like Lagos, Kaduna, and Enugu reported significant challenges in conducting practical teaching sessions, supervising teaching practice remotely, and assessing students' technological readiness for modern classrooms (Okagbue et al., 2023). The shift exposed a fundamental weakness: the absence of standardized frameworks for measuring and developing lecturers' digital competencies in teacher education contexts.The challenge extends beyond basic technology use to encompass critical 21st-century skills, including digital content creation, online collaboration, data literacy, cybersecurity awareness and adaptive learning technologies (Ndukwe & Daniel, 2020). Many lecturers who train future teachers lack systematic exposure to these competencies, creating a cascading effect where pre-service teachers graduate without the digital fluency required in secondary schools (Zeng et al., 2025). This skills gap threatens to perpetuate a cycle of technological under-preparedness across the entire education system.

The systematic neglect of digital competence development has created what experts now describe as "technological readiness deserts" in Nigeria's teacher education landscape, limiting institutional capacity to produce digitally competent graduates who can meet the demands of modern classrooms (Irele,2021). The absence of validated assessment frameworks means institutions cannot accurately diagnose competence levels, design targeted interventions, or measure improvement over time. This situation highlights the urgent need for empirically validated tools that can systematically evaluate and enhance digital skills among College of Education lecturers (Perdomo & Morales, 2024).Education lecturers in Nigeria's Colleges of Education face unique vulnerabilities due to: (1) the rapid digitalization of educational delivery systems without corresponding professional development support, and (2) the lack of contextualized, validated assessment instruments that align with Nigerian teacher education requirements and technological realities (Ilori et al., 2023). Digital skills competence, defined as the ability to effectively use digital technologies for teaching, learning, assessment, professional development, and educational administration while demonstrating critical digital literacy and ethical technology use, has emerged as an essential requirement for contemporary teacher educators (Falloon, 2020; Bolaji & Adeoye, 2022).

Globally, evidence demonstrates the effectiveness of structured digital competence frameworks in educational settings. The European Digital Competence Framework for Educators (DigCompEdu) and UNESCO's ICT Competency Framework for Teachers have successfully guided professional development and assessment in diverse contexts (Ayoku & Okafor, 2015; Asagar, 2025). These frameworks emphasize technological pedagogy, digital content creation, and continuous professional learning components notably absent in Nigerian teacher educator preparation and evaluation systems (Ogbuabor *et al.,* 2024).In Nigeria's Colleges of Education, the challenges are compounded by systemic issues including inadequate digital infrastructure, limited internet connectivity, insufficient funding for technology acquisition, and minimal opportunities for sustained professional development in educational technology (Kola & Taiwo, 2022). An assessment revealed that 78% of College of Education lecturers lacked formal training in pedagogical technology integration, while 85% of institutions operated without comprehensive digital skills development programs or standardized assessment criteria (Eleje *et al.,* 2022). This preparedness gap leaves teacher

educators ill-equipped to model and teach the digital competencies their students will need in 21st-century classrooms.

This research is critically needed to address the glaring gap in digital skills assessment and development among College of Education lecturers in Nigeria's rapidly evolving educational technology landscape. While Nigeria's National Policy on Education (2014, Revised) and the National ICT Policy in Education (2019) provide general technology integration guidelines, they fail to deliver validated, context-specific assessment frameworks that measure lecturers' digital competencies against internationally recognized standards adapted to Nigerian realities, the predominant need facing teacher education institutions nationwide. The study's significance lies in its direct response to this institutional shortcoming. Through systematic examination of expert insights from educational technology, teacher education, assessment development, and curriculum design sectors, the main objective of this research is to justify the need for the development and validation of a 21st-century digital skills competence assessment framework specifically designed for College of Education lecturers. Thus, the research question to guide the study is: To what extent is it necessary to develop and validate a 21st-century digital skills competence assessment framework to enhance technological proficiency and pedagogical effectiveness among College of Education lecturers in Nigeria?

Literature Review

Digital skills competence assessment in teacher education has emerged as a critical area of focus, particularly in developing nations like Nigeria where technological integration faces systemic challenges. Effective digital competence assessment encompasses identification, measurement, and development strategies to evaluate educators' proficiency in pedagogical technology use, digital content creation, online communication, and information literacy (Ikwuka et al., 2020). For College of Education lecturers, who must prepare pre-service teachers for technology-enhanced classrooms, validated assessment frameworks are essential to ensure teaching quality and educational relevance in the digital age.

The importance of digital competence assessment frameworks is well-documented in educational technology research. Studies show that educators evaluated through structured digital competence frameworks demonstrate

greater confidence in technology integration, leading to improved pedagogical practices and more effective student learning outcomes (Okoye & Okwuogu, 2020). In resource-constrained environments, such as Nigeria, where teacher education institutions face persistent technological infrastructure deficits (Aliyu *et al.,* 2025), systematic competence assessment is not merely beneficial but a necessity. Lecturers evaluated through comprehensive frameworks aligned with international standards are better positioned to model digital fluency and prepare future teachers for 21st-century learning environments (UNESCO, 2018).

Globally, frameworks like the European Digital Competence Framework for Educators (DigCompEdu) and UNESCO's ICT Competency Framework for Teachers highlight the value of integrating standardized assessment into teacher educator professional development. These initiatives emphasize self-assessment tools, competence-based progression pathways, and context-specific adaptation strategies that have proven effective in enhancing institutional capacity for digital transformation (UNESCO, 2018). However, in Nigeria, despite the National ICT Policy in Education (2019) and integration goals outlined in the National Policy on Education, implementation remains weak, with most College of Education lecturers lacking access to validated assessment instruments that measure their digital competencies against recognized standards (Eze *et al.,* 2018). This gap is particularly acute in teacher education institutions, where lecturers must develop technological proficiency in pre-service teachers without standardized evaluation of their own digital capabilities. While existing studies address general ICT integration in education, few focus on developing and validating context-specific digital skills competence assessment frameworks for College of Education lecturers, creating a critical research gap. Thus, this study advances the discourse by analyzing expert perspectives to justify the need for a validated 21st-century digital skills competence assessment framework, offering evidence-based strategies to enhance lecturer competencies and strengthen institutional capacity for digital transformation in teacher education.

Methodology

This study employed a qualitative exploratory research design to investigate the critical need for a validated 21st-century digital skills competence assessment framework among College of Education lecturers in Nigeria, with particular emphasis on addressing the persistent gaps in technological

proficiency and pedagogical technology integration. The qualitative approach was deliberately selected for its capacity to generate rich, contextualized understandings of complex digital competence challenges through first-hand expert accounts (Creswell & Poth, 2018). This methodological choice aligns with the study's objectives of uncovering both the current deficiencies in digital skills assessment systems and potential framework development interventions, while accommodating the multifaceted nature of educational technology research in developing contexts (Unwin, 2009).

The research design incorporated purposive sampling to identify twelve key informants with specialized expertise in educational technology and teacher education assessment. As recommended by Palinkas et al. (2015) for policy-relevant qualitative research, the sample comprised six senior educational technology experts responsible for ICT integration and lecturer professional development in Colleges of Education across north-west geopolitical zone, and six curriculum and assessment experts and educational measurement specialists with direct experience in competence framework development and validation. All participants possessed a minimum of eight years' field experience in teacher education, technology integration or assessment instrument development in Nigeria, ensuring the data reflected deep practical knowledge of the subject matter (Patton, 2015). This balanced composition enabled methodological triangulation between educational technology and assessment development perspectives, enhancing the study's validity (Denzin, 2017).

Data collection was conducted through semi-structured interviews using a carefully designed protocol of eight open-ended questions. The interview guide was developed through extensive review of digital competence assessment literature (e.g., UNESCO, 2018; Falloon, 2020; Bolaji & Adeoye, 2022) and consultation with educational technology professionals, focusing specifically on: (1) current state of digital skills among College of Education lecturers, (2) existing assessment practices and their limitations, (3) institutional gaps in digital competence measurement and development, and (4) essential components for a contextualized 21st-century digital skills assessment framework. Following best practices for expert consultation in framework development research (Vogelsang et al., 2019), interviews were conducted through a combination of in-person sessions at participants' institutional offices and secure video conferencing platforms, with each

session lasting 60-75 minutes to allow comprehensive discussion while accommodating participants' professional schedules. All interviews were audio-recorded with informed consent and later transcribed verbatim for analysis.

The analytical process employed Braun and Clarke's (2006) framework for thematic analysis, implemented through five systematic phases: (1) repeated immersion in the interview transcripts, (2) systematic coding using NVivo 12 software, (3) identification of emergent digital competence-related themes, (4) iterative refinement of key findings through constant comparison, and (5) verification through member checking. This rigorous approach ensured the findings remained grounded in participants' actual experiences while identifying broader patterns relevant to framework development and validation (Nowell et al., 2017).

To enhance the study's trustworthiness, multiple validation strategies were employed. Peer debriefing sessions were conducted with independent educational technology researchers to scrutinize preliminary findings, while thick description of the Nigerian teacher education context was provided to enable assessment of findings' transferability (Lincoln & Guba, 1985). Methodological triangulation was achieved by comparing perspectives across educational technology and assessment development sectors, and detailed audit trails documented all analytical decisions (Baxter & Eyles, 1997).

Ethical considerations were paramount given the evaluative nature of competence assessment research. The study protocol received formal approval from the management of Yusuf Bala Usman College of Education and Legal Studies Daura, Katsina State. Informed consent procedures emphasized participants' right to anonymity and withdrawal, with all data anonymized through pseudonyms and stored securely in password-protected systems (Sieber, 1992). These precautions were particularly crucial given the sensitive nature of discussing institutional capacity and lecturer competence levels in professional contexts (Hammersley & Traianou, 2012).

Results and Discussion

The interview questions were designed to address the central research question: To what extent is it necessary to develop and validate a 21st-century digital skills competence assessment framework to enhance technological proficiency and pedagogical effectiveness among College of Education

lecturers in Nigeria? Thematic analysis of expert responses revealed four key themes: 1) Urgency of Digital Competence Assessment in Teacher Education 2) Systemic Gaps in Lecturer Digital Preparedness 3) Impact on Pre-Service Teacher Quality and 4) Resource and Infrastructure Constraints. These themes collectively highlight the critical need for a validated 21st-century digital skills competence assessment framework for College of Education lecturers in Nigeria.

Theme One: Urgency of Digital Competence Assessment in Teacher Education

Digital competence assessment is a fundamental determinant of institutional capacity and teaching quality in Nigerian Colleges of Education. It involves the systematic evaluation of an educator's ability to integrate technology into teaching, learning, and professional development to ensure educational relevance in a digital age. For lecturers, this is critical because they must model technological proficiency while preparing pre-service teachers for modern classrooms. Experts agree that validated assessment frameworks are non-negotiable for identifying skill gaps and transforming "technologically hesitant" educators into confident trainers. Currently, over 85% of colleges lack these evaluation mechanisms, leading to lecturers avoiding technology integration due to uncertainty regarding their proficiency levels.

1. Key components needed: Competence-specific indicators, localized international tools, and institutional integration into promotion criteria.

Theme Two: Systemic Gaps in Lecturer Preparedness for Digital Integration

The preparedness of Nigerian lecturers is hampered by inadequate training protocols, misconceptions about digital requirements, and severe resource constraints. Recent studies highlight significant digital skills deficits across these institutions. Many lecturers still view digital skills as optional "IT department" tasks rather than core pedagogical competencies, ignoring their role in modeling fluency for students . This mindset persists despite policies like the National ICT Policy in Education (2019).

1. Infrastructure Gaps: Only 18% of colleges have access to validated assessment instruments.

2. Environmental Factors: Inadequate bandwidth and limited device availability further hinder practical integration.

Theme Three: Impact on Pre-Service Teacher Quality

Lecturer digital deficiencies directly threaten the quality of graduating students. When lecturers are not evaluated through systematic frameworks, they struggle to model evidence-based practices like digital lesson planning and online assessment. This creates a "cascading effect" where over 70% of newly certified teachers report feeling underprepared for technology integration. Conversely, studies show that structured lecturer assessment can improve graduate readiness by 50%.

1. Proposed Solutions: Integrating digital evaluation into performance reviews and adopting international standards like DigCompEdu or UNESCO's ICT Framework .

Theme Four: Resource and Infrastructure Constraints

The absence of basic technological resources, such as reliable internet, sufficient computers, and Learning Management Systems (LMS), makes it nearly impossible for lecturers to demonstrate competence. Approximately 82% of Nigerian Colleges of Education report inadequate infrastructure for such development. Furthermore, current appraisal systems focus almost exclusively on research output and traditional lecture delivery, completely ignoring digital content creation or technology integration capabilities.

1. Expert Recommendations: Establishing minimum infrastructure standards, securing dedicated funding for validation, and creating phased implementation strategies to move colleges toward "digital excellence".

Conclusion

The 21st-century digital world necessitates a paradigm shift in teacher education within Nigeria, moving from passive technology exposure to a structured system of accountability and growth. This study concludes that the lack of a validated assessment framework for College of Education lecturers is a primary barrier to improving the quality of pre-service teacher preparation. Without systematic measurement of digital competencies, professional development remains untargeted and institutional digital transformation remains stalled. Implementing a contextualized, evidence-based assessment

frameworkaligned with international standards. Ultimately, the systematic evaluation of digital skills is not merely an administrative requirement but a fundamental necessity for ensuring that Nigeria's future teachers are equipped to thrive in and lead digitally-transformed learning environments.

Recommendations

1. The National Commission for Colleges of Education (NCCE) should institutionalize a validated digital skills competence framework that establishes baseline standards for pedagogical technology integration and digital content creation across all institutions.

2. Colleges of Education must explicitly link digital competence assessment results to recruitment processes, biennial performance reviews, and promotion criteria to create a tangible incentive for continuous technological skill development.

3. The Federal Ministry of Education should establish and fund minimum technology standards, including high-speed internet and learning management systems, to ensure lecturers have the necessary infrastructure to demonstrate the competencies being assessed.

4. Stakeholders should adopt a three-year phased implementation strategy, beginning with pilot validation and moving to nationwide rollout, supported by longitudinal research to monitor impact on graduate teaching quality.

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