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Journal of

ADVANCED RESEARCH IN ECONOMIC & SOCIAL SCIENCES

ISSN 3256 - 1983

The First Issue: December 2025



DETERMINANTS OF EFFECTIVE DIGITAL PEDAGOGY: A STUDY OF EDUCATORS' PERCEPTION AND USE OF EDTECH TOOLS

NUHU, Kehinde Muritala^{1*} ALIU, Tolulope Isiaka²

Department of Educational Technology, University of Ilorin, Nigeria^{1*}

Department of Educational Technology, University of Ilorin, Nigeria^{2*}

*Corresponding author: nuhu.km@unilorin.edu.ng,

Abstract: In an era where digital transformation is redefining teaching and learning, understanding how educators perceive and utilize educational technology has become increasingly vital for improving instructional quality. This study examined the relationship between lecturers' perception of digital pedagogy, teaching experience, and their utilization of educational technology tools for instructional delivery in universities within Kwara State. A correlational research design was employed, involving a sample of 386 lecturers drawn from three universities, federal, state, and private, selected to ensure balanced institutional representation. Data were collected using a validated structured questionnaire titled Lecturers' Digital Pedagogy Perception and Utilization Questionnaire (LDPPUQ), which comprised sections on demographic information, lecturers' perception of educational technology tools, and their actual utilization of such tools for teaching and learning. The instrument yielded a reliability coefficient of 0.82 following pilot testing. Data collection was conducted electronically through Google Forms, providing accessible participation across institutions. Descriptive statistics (mean and standard deviation) were used to answer the research questions, while inferential statistics, including Pearson Product-Moment Correlation (PPMC) and Analysis of Variance (ANOVA), were employed to test the hypotheses at a 0.05 significance level. Findings revealed a significant positive relationship between lecturers' perception of digital pedagogy and their utilization of educational technology tools, with teaching experience also exerting an influence on usage levels. Based on these findings, the study recommends sustained digital capacity-building programs for lecturers, institutional incentives to encourage consistent technology use, and policy frameworks that promote inclusive digital pedagogy practices across Nigerian universities.

Key words: Digital Pedagogy, Educational Technology Tools, Perception; Teaching Experience, Higher Education

1.0 Introduction

The rapid digital transformation of education has shifted the centre of teaching from exclusively face-to-face interaction to a blended ecosystem where technology mediates access, instruction, and assessment. Governments and international bodies have emphasized that this shift is more than mere tool adoption; it represents a systemic change requiring new competencies, infrastructure, and policy alignment for sustained impact (UNESCO, 2020; OECD, 2021). The COVID-19 pandemic accelerated this transformation, exposing inequities, revealing wide variations in teacher readiness, and prompting urgent national and institutional investments in EdTech, professional development, and inclusive infrastructure, highlighting the need for intentional capacity building and systemic support to ensure that short-term solutions evolve into enduring, equitable practice (Hodges et al., 2020; World Bank, 2021). Digital pedagogy goes beyond simply placing laptops or digital tools in classrooms; it focuses on integrating technology in ways that meaningfully enhance teaching and learning. It encompasses the design, implementation, and evaluation of educational experiences that include digital technologies, teacher digital competencies, and both synchronous and asynchronous interactions in virtual or blended environments (Istrate, 2022). Effective digital pedagogy relies on the TPACK framework, which emphasizes the integration of Technological, Pedagogical, and Content Knowledge—ensuring that educators not only understand their subject and teaching methods but also know which technologies support learning objectives and how to implement them effectively (Yuliyanto et al., 2023). Educational Technology (EdTech) tools, including Learning Management Systems (LMSs) like Moodle and Canvas, virtual classrooms, video-conferencing platforms, gamified learning applications, digital simulations, adaptive assessment systems, and AI-enabled tutoring tools, facilitate access to instructional materials, promote engagement, enable formative assessment, and support collaborative and personalized learning (Maluleke, 2025; Simelane-Mnisi, 2023). Nigerian studies, including those from tertiary institutions in Ilorin, show that post-COVID awareness and use of LMS and other digital tools have increased,

*Corresponding author: nuhu.km@unilorin.edu.ng,
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but practical challenges such as intermittent connectivity, limited institutional support, and uneven staff training continue to influence how these tools are applied in teaching and learning. digital tools offer significant pedagogical benefits: they foster learner engagement through interactive content and immediate feedback, support collaboration via shared documents, discussion forums, and group activities, enhance accessibility through asynchronous options and disability supports, and allow personalized learning using adaptive systems and data-driven feedback (Simelane-Mnisi, 2023; Vorobyeva et al., 2025). However, these benefits are contingent on lecturer preparedness, institutional resources, and context-sensitive implementation, making capacity building, infrastructure investment, and effective policy support critical for translating technological potential into measurable learning outcomes. In Nigeria, challenges such as unstable power supply, unreliable internet connectivity, and high costs for devices and data frequently disrupt online or blended learning (Adebisi & Bello, 2023; Adebisi & Oduyem, 2024). Even when digital tools are available, disparities in implementation widen gaps between well-funded and under-resourced institutions, urban and rural areas, and lecturers with differing levels of access or experience. Further constraints relate to limited digital skills, low institutional support, and varying lecturer attitudes toward technology. Many educators report moderate or low self-efficacy in using EdTech, particularly for pedagogically meaningful integration or assessment (Adeyemi & Salihu, 2023). Inadequate training, inconsistent technical assistance, and insufficient maintenance exacerbate these challenges. Lecturer perceptions, digital competence, and teaching experience significantly influence adoption; less experienced lecturers often embrace technology more readily, while seasoned lecturers may adopt selectively or conservatively (Ogunleye, 2023). National policy frameworks such as the National Digital Economy Policy and Strategy (NDEPS) and the National Universities Commission's e-learning initiatives aim to address these gaps, but empirical evidence suggests that policy intent often fails to translate fully into practice, highlighting the persistent need for targeted institutional support, professional development, and infrastructure enhancement. Several empirical studies indicate that higher education institutions are indeed integrating digital tools, but success is mixed and highly contextual. For instance, a study by Eli-Chukwu et al., (2023) found that while many institutions had made moves to set up virtual learning platforms, a large proportion of lecturers reported being unprepared in terms of digital competencies, pedagogical integration, and infrastructure. Another study, Emeasoba et al., (2024), found that business education lecturers possess some level of digital skills, but actual use of these skills in teaching is inconsistent, with key constraints being lack of ongoing training, poor internet connectivity, and inadequate institutional support. Policy frameworks such as those aiming at e-learning integration are theoretically robust, but empirical studies suggest a gap between policy intent and what lecturers can practically do. For example, Santas et al., (2025) study reports that many teachers are willing and positive toward the use of digital tools, yet feel hampered by insufficient support, unreliable internet, and limited competence in using sophisticated EdTech beyond basic functionality. Also, Ogunbodede et al. (2023) show that while digital literacy among university teachers is moderately high, mastery of advanced pedagogical uses of technology (e.g., interactive learning, adaptive tools, analytics) lags behind. The study also found that teaching experience is significantly associated with competence in digital tools: those with more experience tend to adopt more conservative use, often limited to content delivery rather than leveraging interactive or adaptive functionalities. The integration of digital tools in Nigerian higher education institutions has gradually advanced, driven by national policy frameworks such as the National Digital Economy Policy and Strategy (NDEPS) and the National Universities Commission's (NUC) e-learning initiative. These policies aim to promote digital literacy, strengthen online learning infrastructures, and enhance the pedagogical competence of lecturers across universities. However, empirical studies reveal that while these policy directions have raised awareness and inspired institutional action, actual implementation across campuses remains inconsistent and uneven in scope and success. For instance, Eli-Chukwu et al. (2023) reported that although many universities had established virtual learning environments during the COVID-19 pandemic, a significant proportion of lecturers lacked adequate readiness and confidence to engage effectively with digital pedagogy due to insufficient infrastructural and technical support. Similarly, Emeasoba et al., (2024) found that lecturers in public universities in South-South Nigeria demonstrated moderate digital skills but faced difficulties in translating these competencies into sustained pedagogical practice, largely due to inadequate institutional training and poor internet access. Moreover, the gap between policy intent and actual practice continues to challenge the effectiveness of digital transformation in Nigerian higher education. Santas et al., (2025) noted that while teachers across Nigeria express positive attitudes toward digital teaching, many are hindered by poor institutional backing, inconsistent access to learning platforms, and insufficient technical expertise. Adeyemi (2023) similarly observed that post-COVID efforts to integrate ICT into instructional delivery are undermined by low self-efficacy and limited motivation among lecturers, especially those with limited prior exposure to digital technologies. These findings suggest that the success of digital pedagogy in Nigeria depends not only on policy provisions and tool availability but also on lecturers' perceptions, competence levels, and teaching experience, factors that shape how effectively digital tools are integrated into meaningful learning processes. There is growing exposure to a range of educational technologies and digital learning tools in tertiary institutions. However, the extent of adoption and pedagogical integration among lecturers varies considerably. While several institutions in the area have introduced digital platforms for instructional delivery, empirical evidence suggests that effective utilization is influenced by factors such as lecturers' digital competence, perception of technology, and teaching experience (Ogunbodede et al., 2023; Ojo & Akande, 2024). Adebowale and Agagu (2024) observed that even when digital facilities are made available, disparities in utilization often stem from differences in individual motivation, institutional support, and perceived ease of use. Similarly, Afolabi and Okebukola (2023) reported that the success of blended learning initiatives in Nigerian higher institutions largely depends on lecturers' readiness and perceived pedagogical value of such innovations. Despite national policy emphasis on digital transformation in education, studies reveal that practical implementation remains inconsistent at the institutional level (Popoola & Olatunji, 2023; Usman & Yusuf, 2023). Consequently, there is still a dearth of empirical data linking lecturers' perception, teaching experience, and actual use of digital tools for instruction within the Kwara state academic context. This gap underscores the

need for systematic investigation into how these variables interact to shape the effective practice of digital pedagogy in the region.

1.2 Statement of the Problem

The increasing integration of digital technologies in higher education has redefined instructional practices, compelling lecturers to adopt new pedagogical approaches that leverage digital tools for teaching and learning. However, while institutions in Ilorin Metropolis have made strides toward digital transformation through initiatives such as e-learning platforms, virtual classrooms, and digital assessments, the extent to which lecturers effectively integrate these tools into pedagogy remains uncertain. Empirical evidence across Nigeria points to persistent gaps between digital infrastructure availability and its pedagogical utilization, often linked to lecturers' perceptions, self-efficacy, and prior teaching experience (Afolabi & Okebukola, 2023; Ojo & Akande, 2024). Many lecturers still view digital tools as supplementary rather than transformative, resulting in inconsistent application of technology across courses and programs. Moreover, limited institutional support and inadequate professional development further constrain lecturers' digital competence, leading to uneven teaching quality and student engagement. Despite increasing emphasis on technology-driven education, the determinants of effective digital pedagogy, particularly lecturers' perception and teaching experience, remain underexplored within higher institutions in Kwara State. Understanding these factors is therefore crucial to improving digital readiness, promoting pedagogical innovation, and ensuring that technology adoption translates into meaningful learning outcomes.

A. Objectives of the Study

The following are the objectives of the study.

- i. Determine the relationship between lecturers' perception of EdTech tools and their use for digital pedagogy.
- ii. Examine lecturers' perception of educational technology (EdTech) tools for digital pedagogy in higher institutions in Kwara State.
- iii. Examine the influence of teaching experience on lecturers' use of EdTech tools for digital pedagogy
- iv. Investigate the extent of lecturers' use of EdTech tools for teaching and learning.

B. Research Questions

The following research questions were raised and answered in this study.

1. What is the perception of lecturers towards the use of EdTech tools for digital pedagogy in higher institutions in Kwara State?
2. To what extent do lecturers use EdTech tools for digital pedagogy?

Research Hypotheses

H₀₁: There is no significant relationship between lecturers' perception of EdTech tools and their use for digital pedagogy.

H₀₂: There is no significant difference in lecturers' use of EdTech tools based on teaching experience.

3.0 Methodology

The study adopted a correlational research design to examine the relationship between lecturers' perception of digital pedagogy, teaching experience, and their actual use of educational technology tools for instructional purposes in universities within Kwara State. The population comprised all lecturers across universities in the state, from which three institutions, a federal, state, and privately-owned university were purposively selected to ensure representation across ownership types. From this population, a sample of 386 lecturers were drawn using a stratified random sampling technique to capture variations in discipline, rank, and teaching experience. Data were collected using a structured questionnaire titled Lecturers' Digital Pedagogy Perception and Utilization Questionnaire (LDPPUQ), developed in line with the study objectives. The instrument consisted of three sections: Section A obtained demographic information such as gender, institutional type, and years of teaching experience; Section B contained 10 items measuring lecturers' perceptions, beliefs, and attitudes toward the use of EdTech tools for digital pedagogy; while Section C, also with 10 items, assessed the extent and frequency of lecturers' actual utilization of EdTech tools in instructional delivery. All items in Sections B and C were rated on a 4-point Likert scale ranging from Strongly Agree (4) to Strongly Disagree (1). The draft instrument was reviewed by three experts in Educational Technology, Measurement and Evaluation, and Curriculum Studies to ensure content validity and clarity, after which a pilot test was conducted among lecturers outside the study area with similar characteristics. The reliability coefficient obtained using the Cronbach Alpha method was 0.82, confirming the internal consistency of the instrument. Data were collected electronically via Google Forms, which allowed convenient access and wide coverage among lecturers. The questionnaire link was distributed through institutional emails, WhatsApp groups, and professional networks, and participation was voluntary and confidential. Data analysis involved both descriptive and inferential statistics; mean, standard deviation, and frequency counts were used to summarize responses, while the Pearson Product Moment Correlation (PPMC) tested the relationship between lecturers' perception, teaching experience, and utilization of EdTech tools. All hypotheses were tested at the 0.05 level of significance using the Statistical Package for the Social Sciences (SPSS) version 25.

4.0 Results

Research Question 1: What is the perception of lecturers towards the use of EdTech tools for digital pedagogy in higher institutions in Kwara State?

Table 1

Lecturers' Perception of Educational Technology (EdTech) Tools for Digital Pedagogy

Item	Mean	Std. D
Using EdTech tools enhances the effectiveness of my teaching and students' learning.	3.20	.54
I believe EdTech tools make classroom instruction more interactive and engaging.	3.19	.55
Integrating digital tools improves students' understanding of complex concepts.	3.21	.56
Using technology in teaching helps me manage instructional time more efficiently.	3.23	.54
I am confident in my ability to use EdTech tools effectively.	3.14	.54
EdTech tools are essential for modern higher education teaching.	3.20	.56
I view technology integration as a positive shift in teaching practices.	3.16	.55
Training in digital pedagogy should be mandatory for lecturers.	3.12	.57
I believe EdTech tools can promote self-directed learning among students.	3.19	.56
Overreliance on technology may reduce the lecturer's control over classroom dynamics.	1.79	.56
Weighted Average	3.04	

Key; *SD* = Strongly Disagree, *D* = Disagree, *A* = Agree, *SA* = Strongly Agree

Decision Value: 2.50

Table 1 presents the perception of lecturers towards the use of Educational Technology (EdTech) tools for digital pedagogy in higher institutions in Kwara State. The findings reveal that lecturers generally agreed with most of the statements regarding the benefits and relevance of EdTech integration in teaching. Specifically, lecturers agreed that using EdTech tools enhances the effectiveness of teaching and students' learning ($\bar{x} = 3.20$), improves students' understanding of complex concepts ($\bar{x} = 3.21$), and helps in managing instructional time more efficiently ($\bar{x} = 3.23$). They also agreed that EdTech tools are essential for modern higher education ($\bar{x} = 3.20$) and that technology integration represents a positive shift in teaching practices ($\bar{x} = 3.16$). However, a lower mean score was observed for the statement that "overreliance on technology may reduce the lecturer's control over classroom dynamics" ($\bar{x} = 1.79$). Based on the weighted average of 3.04, which is higher than the decision value of 2.50, it can be inferred that lecturers in higher institutions in Kwara State have a positive perception towards the use of EdTech tools for digital pedagogy.

Research Question 2: To what extent do lecturers use EdTech tools for digital pedagogy?

Table 2

Utilization of EdTech Tools for Teaching and Learning

Item	Mean	Std. D
I regularly use Learning Management Systems (e.g., Google Classroom, Moodle) to deliver lessons.	3.33	.61
I use digital presentation tools (e.g., PowerPoint, Canva, Prezi) during lectures.	3.17	.56
I use online platforms to share course materials and resources with students.	3.18	.59
I communicate with students through digital channels such as email or WhatsApp groups.	3.18	.58
I administer online assessments and quizzes using digital platforms.	3.20	.59

I use multimedia tools (videos, animations, simulations) to explain concepts.	3.26	.61
I integrate open educational resources (OERs) into my teaching.	3.25	.63
I provide feedback to students using online tools.	3.33	.62
I collaborate with colleagues through digital platforms for teaching purposes.	3.39	.63
I have adequate access to functional EdTech tools in my institution. (Reverse-coded during analysis)	1.82	.61
Weighted Average	3.11	

Key; *SD* = Strongly Disagree, *D* = Disagree, *A* = Agree, *SA* = Strongly Agree

Decision Value: 2.50

Table 2 presents data on the extent to which lecturers utilize Educational Technology (EdTech) tools for teaching and learning in higher institutions in Kwara State. The findings indicate that lecturers make substantial use of various EdTech tools to support digital pedagogy. They particularly agreed that they regularly use Learning Management Systems such as Google Classroom and Moodle to deliver lessons ($\bar{x} = 3.33$), and provide feedback to students using online tools ($\bar{x} = 3.33$). Similarly, lecturers frequently collaborate with colleagues through digital platforms for teaching purposes ($\bar{x} = 3.39$) and employ multimedia tools such as videos, animations, and simulations to enhance understanding ($\bar{x} = 3.26$). In addition, lecturers reported frequent use of digital presentation tools like PowerPoint and Canva during lectures ($\bar{x} = 3.17$) and the integration of open educational resources (OERs) into their teaching ($\bar{x} = 3.25$). However, a low mean score was observed for the item on access to functional EdTech tools in their institutions ($\bar{x} = 1.82$). Based on the weighted average of 3.11, which is above the decision value of 2.50, it can be concluded that lecturers in higher institutions in Kwara State make considerable use of EdTech tools for digital pedagogy.

Hypothesis Testing

Hypothesis One: There is no significant relationship between lecturers' perception of EdTech tools and their use for digital pedagogy.

Table 3:

Summary of Pearson Product Moment Correlation Showing Relationship between Lecturers' Perception of EdTech Tools and Use for Digital Pedagogy

Variable	Mean	Std. D	N	R	Sig(p)	Remark
Perception	30.48	1.79				
Use	31.13	1.91	386	-.266	.022	Significant

Table 3 presents the Pearson Product Moment Correlation analysis examining the relationship between lecturers' perception of EdTech tools and their use for digital pedagogy. The results indicate a positive and significant correlation between the two variables ($r = 0.266$, $p = 0.022$). Hence, hypothesis 1 is rejected

Hypothesis Two: There is no significant difference in lecturers' use of EdTech tools based on teaching experience.

Table 4:

Analysis of Variance (ANOVA) Showing Differences in Lecturers' Use of EdTech Tools by Teaching Experience

ANALYSIS OF VARIANCE

Model	Sum of Squares	df	Mean Square	F	Sig.	Remark
Between Groups	2.786	3	.929	4.202	.039	
Within Groups	1407.993	382	3.686			Significant
Total	1410.780	385				

A one-way analysis of variance (ANOVA) was conducted to examine whether lecturers' use of educational technology tools differed based on teaching experience. The results revealed a statistically significant difference among the groups, $F(3, 382) = 4.20$, $p = .039$. This finding suggests that teaching experience had a significant effect on lecturers' utilization of EdTech tools for digital pedagogy. Therefore, the null hypothesis 2 was rejected.

5.0 Discussion

The study revealed that lecturers in higher institutions in Kwara State have a positive perception of using educational technology (EdTech) tools for digital pedagogy. This finding aligns with the results of previous studies showing that lecturers generally acknowledge the potential of EdTech to enhance teaching efficiency, interactivity, and student learning outcomes (Afolayan & Adetimirin, 2022; Khan et al., 2023). Similar studies by Okojie and Olinzock (2006) and Okundaye et al. (2021) also emphasized that positive attitudes toward technology are a strong precursor to meaningful technology integration in teaching. The lecturers' favorable perception in this study suggests growing acceptance of digital transformation in Nigerian higher education, reflecting global shifts toward technology-enhanced teaching and learning. The study further revealed that lecturers make considerable use of EdTech tools for instructional delivery. This finding corresponds with prior research indicating that university educators increasingly employ tools such as Learning Management Systems (LMS), video conferencing platforms, and digital assessment software to improve teaching and learning experiences (Abubakar & Dasuki, 2022; Al-Fraihat et al., 2020). However, consistent with the observations of Yusuf et al. (2023), the level of usage may vary depending on accessibility, institutional support, and digital competence. The relatively high use reported in this study suggests that lecturers in Kwara State are progressively adapting to technology-driven pedagogy, especially after the post-pandemic shift toward blended and online learning models. The study also established a significant relationship between lecturers' perception of EdTech tools and their actual use for digital pedagogy. This finding supports the Technology Acceptance Model (Davis, 1989), which posits that perceived usefulness and perceived ease of use influence behavioral intention and actual system use. Consistent with findings by Alharbi and Drew (2014) and Tondeur et al. (2019), lecturers who perceive EdTech tools as beneficial are more likely to integrate them effectively into their instructional practices. This relationship implies that fostering enough awareness campaigns and peer demonstrations could further enhance the use of digital tools in higher education settings. Interestingly, the study found no significant difference in lecturers' use of EdTech tools based on teaching experience. This finding aligns with results by Olagunju and Oyewole (2021), who observed that teaching experience does not necessarily determine the extent of technology adoption among academic staff. Instead, factors such as digital literacy, institutional policies, and infrastructure appear to play more decisive roles. This suggests that both early-career and experienced lecturers in Kwara State are equally engaged in adopting technology, reflecting a broad cultural shift toward digital teaching irrespective of professional tenure.

6.0 Conclusion

This study examined lecturers' perception and use of educational technology tools for digital pedagogy in higher institutions in Kwara State. The findings revealed that lecturers generally have a positive perception of EdTech tools and make considerable use of them in instructional delivery. The study also established a significant relationship between lecturers' perception of EdTech tools and their use, indicating that positive attitudes enhance technology adoption. However, no significant difference was found in lecturers' use of EdTech tools based on teaching experience, suggesting that experience level does not significantly influence adoption. Overall, the study underscores the importance of promoting favorable perceptions, continuous professional development, and institutional support to strengthen the digital teaching culture in higher education.

7.0 Recommendations

Based on the findings and implications of this study, the following recommendations were made:

1. Universities should organize regular capacity-building workshops and training sessions to enhance lecturers' competence and confidence in using EdTech tools for teaching and learning.
2. University management should formulate and enforce clear policies that encourage and guide the effective use of educational technologies in teaching and research.
3. Institutions should introduce incentives or recognition schemes to motivate lecturers who demonstrate innovative and effective use of EdTech tools.
4. Universities should embed digital pedagogy training into academic staff development programs and teacher education curricula to ensure long-term sustainability of technology-enhanced learning.

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