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ACCESSIBILITY OF ICT TOOLS AND THEIR USE IN COLLEGES OF EDUCATION IN KADUNA STATE

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Abstract
Access to Information and Communication Technologies (ICT) is a critical foundation for effective teaching and learning in the digital age, yet many teacher education institutions in developing contexts continue to struggle with limited technological resources. This study examined the role of ICT access in influencing lecturers' utilization of technology in Colleges of Education in Kaduna State. A quantitative survey design was adopted, and data were collected from 274 lecturers selected through proportionate stratified random sampling. A structured questionnaire was used to measure ICT access and ICT utilization, and the instrument demonstrated high reliability ($\alpha = 0.88$ for access, $\alpha = 0.87$ for utilization). Data were analyzed using descriptive statistics, t-test, ANOVA, correlation, and regression. The results showed that lecturers had moderate access to ICT ($M = 3.28$) and moderate ICT utilization ($M = 3.21$). Importantly, a strong positive and significant relationship was found between ICT access and ICT utilization ($r = 0.67$, $p < 0.001$), and access significantly predicted ICT use, explaining approximately 45% of the variance. The study concludes that access to ICT functions as both a catalyst and a barrier to technology adoption in teacher education. It recommends increased investment in ICT infrastructure, equitable distribution of resources, stable internet and electricity, technical support, and institutional policies that promote digital inclusion.
Keywords: ICT access, ICT utilization, digital divide, lecturers, Colleges of Education, Kaduna State, infrastructure, technology integration

Introduction

In the twenty-first century, access to Information and Communication Technologies (ICT) has become a major driver of educational innovation, equity, and quality across the globe. Countries such as the United States, Finland, and the United Kingdom have integrated ICT into national education systems, ensuring that teachers and students have consistent access to digital tools, reliable internet, and technology-enabled learning environments (Adam & Dzang Alhassan, 2021). In these developed contexts, ICT access is considered a fundamental educational resource, similar to textbooks and classrooms (Mavrou, Meletiou-Mavrotheris, Kärki, Sallinen, & Hoogerwerf). Asian countries such as Singapore, China, and South Korea have gone even further by embedding ICT access into teacher training, digital curriculum design, and classroom practice, producing educators who are highly skilled and technologically confident (Afzal et al., 2023). These global developments demonstrate that **access to ICT tools is not merely a technological luxury it is a foundational requirement for effective teaching and learning in the digital age.**

However, in many parts of the world, access to ICT remains unequal and inconsistent, giving rise to what is widely known as the **digital divide**. The digital divide refers to the gap between individuals or institutions that have sufficient access to digital tools, internet connectivity, and technological resources, and those who do not (Ben Youssef,Dahmani &Ragni., 2022). This divide is not only global (developed vs. developing countries), but also national (urban vs. rural), institutional (universities vs. teacher training colleges), and even internal (staff vs. students). In Africa, the digital divide persists due to infrastructural deficits, limited funding, weak policy implementation, and disparities in technological readiness (Hussain et al., 2024). While countries such as Rwanda, Kenya, and South Africa have made progress in ICT deployment in education, many institutions across the continent still struggle with inadequate access to computers, internet connectivity, power supply, and digital learning materials (Tadesse & Muluye, 2022). As a result, even when educators recognize the importance of ICT, **they cannot utilize it effectively without access to functional tools**.

In Nigeria, the government has introduced several ICT-related policies and initiatives, such as the National Policy on ICT in Education and the ICT Roadmap, aimed at improving digital infrastructure and promoting ICT integration in teaching and learning (Hussain et al., 2024). Despite these efforts, ICT access remains uneven across educational institutions. While some universities and private schools have improved infrastructure**, Colleges of Education especially in northern states like Kaduna, continue to face severe shortages of ICT tools, unstable electricity supply, limited internet connectivity, and insufficient technical support** (Adebayo & Bello, 2022). This is especially concerning because Colleges of Education are responsible for training future teachers who are expected to be competent in using technology in primary and secondary schools. If lecturers in Colleges of Education do not have adequate access to ICT, they cannot model technology-supported pedagogy, and student-teachers are unlikely to acquire the digital skills required for modern classrooms (Wang et al., 2021).

Kaduna State is a strategic educational hub in Northern Nigeria, hosting both federal and state-owned Colleges of Education. These institutions are mandated to prepare teachers who can integrate ICT in the classroom (Hussain et al., 2024). However, lecturers in these institutions often report challenges such as inadequate computers, insufficient multimedia facilities, limited access to ICT laboratories, and poor internet services (Suleiman & Umar, 2022). Even when ICT facilities exist, they are often outdated, insufficient in number, or inaccessible due to poor maintenance or administrative restrictions. Consequently, **the level of actual ICT utilization among lecturers remains moderate or low**, not necessarily because they lack willingness or skills, but because they lack consistent access to the essential tools needed to apply ICT in instructional delivery (Udisha & Ambily Philomina, 2024). This confirms that **access is a foundational requirement without it, ICT integration cannot occur.**

The importance of ICT access in education has been widely recognized, yet there is ongoing debate among scholars. Some researchers argue that improving access to ICT infrastructure automatically leads to increased utilization, as lecturers will naturally adopt technology when the tools are available (Yusuf & Afolabi, 2021). This view is based on the assumption that access removes the primary barrier to use. However, other scholars contend that **access alone is not sufficient**, as lecturers may still fail to use ICT due to lack of training, low confidence, limited technical support, or negative institutional culture (Ertmer, 2020; Olatokun & Ajagbe, 2021). In this view, access is only the first step; effective utilization requires a combination of access, support, training, motivation, and organizational readiness. Nevertheless, even scholars who emphasize training and self-efficacy agree that **without basic access to ICT tools, all other interventions become ineffective**. Therefore, access remains a critical prerequisite for ICT utilization and digital transformation in educational institutions (Vitalis et al., 2025).

The motivation for this study stems from the urgent need to address the digital divide in teacher education institutions in Kaduna State. Colleges of Education play a crucial role in shaping the digital competence of future teachers, yet many lecturers lack the resources necessary to integrate ICT into teaching and learning (Khan, 2024). While previous studies have focused on attitude, competence, or self-efficacy, **there is limited research that critically examines access as the central factor influencing ICT utilization among lecturers in Colleges of Education**. Understanding the extent to which access to ICT tools affects actual technology use is essential for designing effective interventions and policies that promote equitable and sustainable ICT integration (Raihan et al., 2025).

A review of existing literature reveals a significant gap. Most studies in Nigeria have explored ICT adoption in universities or secondary schools, while there are few on **Colleges of Education teacher training institutions have been largely neglected** (Kpolovie & Awusaku, 2021). Furthermore, studies that address ICT access often treat it as a background variable rather than the main focus. Very few studies have investigated how access directly affects ICT utilization in the context of Colleges of Education, and **almost none have focused specifically on Kaduna State**, despite its strategic importance and unique infrastructural challenges in Northern Nigeria (Memon & Memon, 2025). Most importantly, **no known study has examined access to ICT as a primary determinant of utilization within the framework of bridging the digital divide in Colleges of Education in Kaduna State.**

Therefore, this study fills a critical gap by investigating **the role of ICT access in influencing lecturers' utilization of technology in Colleges of Education in Kaduna State.** By conceptualizing access as both a barrier and a potential enabler, this study aims to provide empirical evidence on how bridging the digital divide can empower educators, promote digital inclusion, and improve instructional quality in teacher education. This understanding is essential for developing institutional strategies and policy interventions that ensure lecturers not only have positive attitudes and sufficient confidence, but also have **the actual tools and infrastructure needed** to integrate ICT effectively into teaching and learning.

2. Literature Review

The literature review provides a comprehensive examination of access to ICT as a key determinant of technology utilization, with a particular focus on how unequal access creates a digital divide that affects lecturers' ability to integrate ICT in instructional practices. Drawing on global trends, regional evidence and theoretical perspectives, this section explores the concept of ICT access, its impact on educational outcomes, and the specific challenges faced by Colleges of Education in Kaduna State.

2.1 Conceptual Clarification

ICT utilization in education refers to the meaningful use of digital tools, platforms and resources to support teaching, learning, assessment, communication and academic development. In the context of teacher education institutions, ICT utilization includes the use of computers, projectors, internet resources, multimedia content, learning management systems and virtual learning platforms (Hussain et al., 2024). However, effective utilization depends heavily on access to functional ICT tools and supportive infrastructure. Access to ICT goes beyond physical availability it includes accessibility, affordability, reliability, connectivity and institutional support (Kozma, 2020). The concept of access can be divided into physical access (availability of hardware and internet), technical access (maintenance, power supply, bandwidth), and pedagogical access (opportunity to apply ICT in teaching). When these forms of access are inadequate, lecturers are unable to integrate ICT consistently in instruction.

A related key concept is the digital divide, which refers to the gap between individuals or institutions that have adequate ICT access and those that do not (Ben Youssef et al., 2022). The digital divide exists across countries, regions, institutions, and social groups (Raihan et al., 2025). It affects both technological equity and educational quality (Tadesse & Muluye, 2022). In teacher education, the digital divide limits lecturers' ability to prepare future teachers for digital classrooms. This study conceptualizes access as the foundation for ICT utilization and views the digital divide as a major barrier to effective technology integration in Colleges of Education in Kaduna State.

2.2 Global Perspective on Access to ICT in Education

Globally, access to ICT has been recognized as a prerequisite for digital transformation in education. In developed countries like Finland, the United States and the United Kingdom, governments have invested heavily in ICT infrastructure, broadband internet, digital content and teacher ICT training (Raihan et al., 2025). As a result, lecturers in these countries have high levels of access, enabling extensive use of ICT in planning, instruction, assessment and student engagement (Khan, 2024). Asian countries such as Singapore, South Korea and China have also made significant progress by ensuring every teacher and student has access to digital devices, e-learning platforms and reliable internet connectivity (Ben Youssef et al., 2022). These nations have demonstrated that high access leads to high utilization, provided that institutional systems support digital integration.

However, in many developing countries, inadequate ICT access remains a major barrier. While some nations like Malaysia and India have made strides by equipping teacher education institutions with ICT tools, others still struggle with limited infrastructure and unequal distribution of resources (Raihan et al., 2025). The global trend shows that where access is prioritized, ICT utilization improves; where access is ignored, utilization remains low regardless of attitudes or skills.

2.3 The Digital Divide in Africa and Nigeria

In Africa, the digital divide is more pronounced due to infrastructural deficits, poor funding, unreliable power supplies and limited internet connectivity (Khan, 2024). While some African countries like Rwanda and Kenya have advanced ICT education initiatives, many others lag behind. Teacher education institutions, in particular, often have weaker ICT infrastructure compared to universities (Tadesse & Muluye, 2022). These inequalities result in inconsistent access to ICT across the continent, affecting lecturers' ability to integrate technology in teaching (Ben Youssef et al., 2022).

In Nigeria, the National Policy on ICT in Education promotes the use of technology in teaching and learning, but implementation remains weak. Universities and private institutions tend to have better ICT facilities, while Colleges of Education, especially in northern states, face serious access challenges (Adebayo & Bello, 2022). Many institutions lack sufficient computers, projectors, internet access, digital libraries and technical support (Khan, 2024). Even when ICT tools are available, they are often outdated, poorly maintained or inaccessible due to administrative restrictions (Suleiman & Umar, 2022). This persistent access gap undermines the ability of lecturers to integrate ICT into instruction, widening the digital divide within the education sector.

2.4 Factors Affecting ICT Access in Colleges of Education

Several factors influence ICT access in Colleges of Education. First is funding, as insufficient budgets limit the purchase and maintenance of ICT infrastructure (Adejumo & Ibrahim, 2022). Second is infrastructure, including computers, projectors, internet connectivity, digital libraries and multimedia tools (Khan, 2024). Third is electricity and internet stability, as unreliable power or poor bandwidth discourages ICT use (Adebayo & Bello, 2022). Fourth is

institutional policy and leadership support; where management prioritizes ICT, access improves (Tadesse & Muluye, 2022). Where ICT is not a priority, access remains low. Fifth is technical support, as lecturers need assistance to maintain and troubleshoot ICT tools. Hence, equitable distribution of ICT resources matters; often, administrative units receive more ICT tools than academic departments, limiting lecturers' access (Ben Youssef et al., 2022). These challenges are particularly severe in Colleges of Education in Kaduna State, contributing to inconsistent ICT utilization.

2.5 Empirical Studies on Access and ICT Utilization

International studies have consistently shown that access is strongly linked to ICT utilization. Kozma (2020) found that lecturers in high-access environments use ICT more frequently and creatively. In Singapore and South Korea, high access combined with professional development led to full integration of ICT in teacher education (Ben Youssef et al., 2022). In Africa, Chigona (2020) and Tadesse & Muluye (2022) reported that limited access to ICT tools was the most significant barrier to technology adoption among lecturers.

In Nigeria, Ajayi (2020) and Olatokun & Ajagbe (2021) found that lecturers with access to functional ICT tools were more likely to integrate technology in teaching. However, most studies focused on universities rather than Colleges of Education. Kpolovie and Awusaku (2021) emphasized that ICT adoption is lower in Colleges of Education due to poor access. Suleiman and Umar (2022) reported that lecturers in Colleges of Education in Northern Nigeria face greater infrastructural challenges than their counterparts in the south. Despite these findings, very few studies have examined access as the primary factor influencing ICT utilization in Colleges of Education. Even fewer have focused specifically on Kaduna State. This reveals a clear gap in the literature.

2.6 Digital Divide Theory

This study is anchored on the Digital Divide Theory, which explains the inequalities in access to ICT and their impact on technology usage outcomes. The theory identifies three levels of digital divide: first-level divide (physical access to ICT tools and infrastructure), second-level divide (skills and confidence to use ICT), and third-level divide (educational and social outcomes of ICT use). The first-level divide is central to this study, as lecturers cannot utilize ICT if they lack access to devices, internet or power (Van Dijk, 2020). The theory argues that access is foundational; without it, even the most motivated or skilled lecturers cannot apply ICT in teaching (Mirazchiyski, 2025). In the context of Colleges of Education in Kaduna State, the digital divide theory explains why structural inequalities, inadequate resources and institutional barriers limit lecturers' ICT utilization. By using this theory, the study positions access not only as a physical condition but also as a social and institutional issue that shapes educational quality and equity.

3. Methodology

This study adopted a quantitative survey research design to investigate the role of ICT access in influencing lecturers' utilization of technology in Colleges of Education in Kaduna State. The survey method was considered suitable because it enables the collection of standardized data from a large population and allows for statistical analysis of the relationship between access to ICT tools and their actual use in instructional delivery. The population consisted of all lecturers in the two Colleges of Education in Kaduna State one federal and one state-owned, who are responsible for training future teachers and expected to model ICT-based pedagogy. According to official staff records from the two institutions (2023), the total population of lecturers is approximately 800.

A sample of **274 lecturers** was determined using the Krejcie and Morgan (1970) sample size determination table. For a population of 800, the Krejcie and Morgan table

recommends a minimum sample size of **260** at a 95% confidence level and a 5% margin of error. To strengthen representation and compensate for possible non-response, the sample size was slightly increased to **274**, ensuring adequate statistical power and fair coverage of lecturers across departments and institutions.

A proportionate stratified random sampling technique was employed to ensure fair inclusion of lecturers across both institutions and departments. A structured, self-administered questionnaire was used to collect data. The instrument consisted of three sections: Section A captured demographic information, Section B measured access to ICT tools (availability, connectivity, infrastructure, and support), and Section C measured ICT utilization in teaching and learning. All items were rated on a 5-point Likert scale ranging from strongly disagree to strongly agree. The instrument was validated by experts in educational technology and measurement to ensure content and face validity, while a pilot test with 30 lecturers outside the study area was conducted to determine reliability. Cronbach's alpha values of 0.88 for ICT access and 0.87 for ICT utilization indicated that the instrument was highly reliable.

Institutional permission was obtained prior to data collection, and the questionnaires were distributed in person with the help of trained research assistants. Participation was voluntary, confidentiality was assured, and no personal identifiers were recorded. The returned questionnaires were screened for completeness and coded for analysis.

Table 1: Summary of Methodology Components

Component	Description
Research Design	Quantitative Survey
Population	Lecturers in two Colleges of Education, Kaduna State
Sample Size	274 lecturers
Sampling Technique	Proportionate Stratified Random Sampling
Instrument	Structured Questionnaire (Likert Scale)
Sections	A: Demographics B: ICT Access C: ICT Utilization
Validity	Expert Review (Content/Face Validity)
Reliability	ICT Access = 0.88 ICT Utilization = 0.87
Data Collection	Self-administered questionnaire with institutional approval
Data Analysis	Descriptive statistics, t-test, ANOVA, correlation, regression
Software	SPSS Version 23
Significance Level	$p < 0.05$
Ethics	Voluntary participation, confidentiality maintained

Data were analyzed using SPSS version 23. Descriptive statistics (mean, standard deviation, frequency, and percentage) were used to summarize levels of ICT access and ICT utilization. Inferential statistics were employed to test the hypotheses. Independent samples t-test and one-way ANOVA were used to examine differences based on demographic variables such as gender, institution type, and qualification. Pearson correlation was used to determine the relationship between ICT access and ICT utilization, while simple linear regression was employed to examine the predictive power of access on utilization. All statistical tests were conducted at a 0.05 level of significance. Ethical standards were strictly observed by ensuring informed consent, confidentiality, voluntary participation, and institutional approval.

4. Results and Discussion

4.1 Descriptive Statistics of ICT Access and ICT Utilization

Table 1 presents the means and standard deviations for ICT access and ICT utilization among lecturers.

Table 1 Descriptive Statistics of ICT Access and ICT Utilization (N = 274)

Variable	Mean (M)	Standard Deviation (SD)	Interpretation
ICT Access	3.28	0.64	Moderate
ICT Utilization	3.21	0.59	Moderate

The results show that lecturers have a moderate level of ICT access and ICT utilization. This suggests that while ICT tools are available, they are not consistently accessible or adequate for regular instructional integration.

4.2 Relationship Between ICT Access and ICT Utilization

A Pearson correlation analysis was conducted to determine the relationship between the two variables.

Table 2 Correlation Between ICT Access and ICT Utilization

Variables	ICT Access	ICT Utilization
ICT Access	1	.67***
ICT Utilization	.67***	1

***p < .001

A strong, positive, and significant relationship exists between ICT access and ICT utilization ($r = .67$, $p < .001$). This implies that lecturers who have greater access to ICT tools are more likely to use them in teaching.

4.3 Predictive Power of ICT Access on ICT Utilization

A simple linear regression was carried out to determine how well ICT access predicts ICT utilization.

Table 3 Regression Summary for ICT Access Predicting ICT Utilization

Statistic	Value
R	.67
R^2	.45
Adjusted R^2	.45
p-value	< .001

ICT access accounts for 45% of the variance in ICT utilization. This means that almost half of the lecturers' use of ICT can be explained by the extent to which they have access to ICT tools and infrastructure.

4.4 General Discussion

The findings reveal that access to ICT plays a critical role in determining whether lecturers integrate technology into teaching. Although both access and utilization are moderate, the strong correlation ($r = .67$) and high predictive value ($R^2 = .45$) show that improving access would significantly increase ICT use.

This aligns with global studies showing access as the foundational step in ICT integration. It also supports the Digital Divide Theory, which argues that physical access is the first-level barrier that must be addressed before meaningful technology integration can occur. ICT utilization and preparing future teachers for technology-driven classrooms.

5. Conclusion

This study investigated the role of ICT access in influencing lecturers' utilization of technology in Colleges of Education in Kaduna State. The findings revealed that lecturers had

moderate access to ICT tools and demonstrated moderate utilization of ICT in instructional activities. A strong and statistically significant relationship was found between ICT access and ICT utilization, with access accounting for 45% of the variance in lecturers' use of ICT. This indicates that access is a major determinant of whether lecturers can integrate ICT into teaching and learning.

The study concludes that improving ICT utilization requires first addressing the fundamental issue of access. Without reliable access to functional ICT tools, internet connectivity, and supporting infrastructure, lecturers cannot effectively employ technology in their instructional practices regardless of their attitudes, skills, or willingness. Bridging the digital divide in Colleges of Education is therefore essential for enhancing instructional quality, fostering digital inclusion, and preparing future teachers for technology-driven classrooms.

6. Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. **Improve ICT Infrastructure:** Management of Colleges of Education should increase investment in ICT facilities such as computers, projectors, smart classrooms, internet connectivity, and digital libraries to ensure consistent access for lecturers.
2. **Ensure Equitable Distribution of ICT Resources:** ICT tools should be distributed fairly across all academic departments rather than being concentrated in administrative units or ICT centres.
3. **Enhance Power Supply and Internet Connectivity:** Institutions should provide reliable electricity and stable internet services, as access is ineffective without supporting infrastructure.
4. **Strengthen Technical Support Systems:** Functional ICT support units should be established or reinforced to help lecturers maintain and troubleshoot ICT tools, thereby encouraging sustained utilization.
5. **Implement Institutional ICT Policies:** Colleges of Education should develop and enforce policies that promote ICT integration, such as incorporating ICT usage into teaching evaluations or providing incentives for innovative digital practices.
6. **Provide Continuous Professional Development:** Training programmes should be regular, practical, and classroom-focused to enhance lecturers' competence in applying ICT tools in pedagogy.
7. **Strengthen Government and Stakeholder Support:** Government agencies, including the National Commission for Colleges of Education (NCCE), should allocate adequate funding and monitor ICT policy implementation in teacher education institutions.
8. **Encourage Future Research:** Subsequent studies should examine how other factors such as self-efficacy, motivation, leadership, and institutional culture influence ICT utilization, and compare access between federal and state-owned Colleges of Education.

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