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Research Article

Assessing ICT Infrastructure and its Impact on Academic Planning and Administrative Effectiveness Among Nigerian University Lecturers

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Abstract

This study assessed the availability, utilization, and impact of Information and Communication Technology (ICT) infrastructure on academic planning and administrative effectiveness among university lecturers in Nigeria. With the increasing global emphasis on digital transformation in higher education, the study sought to evaluate how Nigerian universities are leveraging ICT tools for academic coordination and institutional management. The study adopted a descriptive survey design and was guided by two research questions and two hypotheses. A structured questionnaire was administered to a randomly selected sample of 420 university lecturers drawn from federal and state universities across Nigeria. Data were analyzed using mean scores, standard deviations, and independent samples t-tests. Findings revealed that internet connectivity ($\bar{x}$ = 3.42) is the most commonly utilized ICT tool, while tools for curriculum planning ($\bar{x}$ = 2.87) and course scheduling showed relatively low levels of use. In terms of administrative functions, ICT was rated highly effective for staff records management ($\bar{x}$ = 3.36) and electronic communication ($\bar{x}$ = 3.28), but only moderately effective for tracking student engagement and attendance. A key outcome of the hypothesis testing showed a significant difference in ICT availability between federal and state universities ($t = 3.87$, $p < 0.05$), indicating a disparity in resource allocation. However, no significant gender difference was found in ICT utilization ($t = 1.12$, $p > 0.05$). Challenges identified include inadequate ICT facilities ($\bar{x}$ = 3.51), poor power supply ($\bar{x}$ = 3.43), limited staff training, and internet downtime, all of which impede effective ICT integration in academic and administrative systems. The study recommends increased investment in ICT infrastructure, especially in state-owned institutions; regular capacity-building programs for lecturers; improved power and internet connectivity; and the development of harmonized national ICT policies for higher education. These measures are essential for enhancing academic planning, improving administrative performance, and promoting digital equity across Nigerian universities.

Keywords: ICT Infrastructure, Academic Planning, Administrative Effectiveness, Nigerian Universities, Educational Technology, University Lecturers.

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Introduction

Information and Communication Technologies (ICT) is an often used term that describes information technology (IT) (including computer hardware and software) and telecommunications (such as the internet, mobile and landline phones) (Ajah and Chigozie-Okwum, 2019). ICT use in education cut across all the technology computer, Internet, mobile phones, Videos, content management systems, learning management systems, including Moodle and network employed in teaching, learning and the day to day management of educational institution (Ajah and Chigozie-Okwum, 2019).

All over the world, ICT as a tool for educational efficiency continues to help institutions to achieve their corporate objectives (Ajshola and Olusina 2013, Nwankwoala 2015, Simin et al. 2013).

The integration of Information and Communication Technology (ICT) into higher education has become a critical driver for enhancing academic planning and administrative effectiveness. ICT tools—including internet-enabled computers, learning management systems (LMS), projectors, academic portals, and data management platforms—are increasingly used to streamline university operations, promote efficient academic scheduling, facilitate communication, and improve data-driven decision-making processes. Globally, universities have embraced ICT as a strategic resource to boost institutional productivity and academic quality (Elujekwute et al., 2024). In Nigeria, several national policies—including the National ICT Policy and the Nigerian Universities e-Governance Framework—have emphasized the need for ICT adoption in tertiary education. These policies highlight the role of ICT in improving curriculum development, resource allocation, student records management, and communication between stakeholders. However, the actual utilization and effectiveness of ICT tools in Nigerian universities, especially regarding academic planning and administrative management, remain inconsistent and underexplored (Okwelogu et al., 2021; Ajah and Chigozie-Okwum, 2019; Egoeze et al., 2018; Onyekaba, 2021).

While many universities have made investments in ICT infrastructure—such as e-portals, digital timetable management systems, and electronic communication channels—there are lingering concerns about whether these tools are effectively deployed to enhance academic coordination, data handling, staff performance monitoring, and strategic planning. Inadequate funding, unreliable power supply, poor internet connectivity, and limited technical expertise continue to undermine the full potential of ICT in Nigeria's higher education sector (Abah & Okoh, 2021; Edung et al., 2023). Moreover, disparities exist between federal and state universities in terms of access to and use of ICT facilities. Federal institutions tend to have more stable funding, better connectivity, and wider adoption of administrative technologies compared to their state counterparts. This uneven development contributes to a persistent digital divide and operational inefficiencies across the university system (Nwachukwu, 2020).

Another critical dimension is the human capacity of university lecturers in using ICT for planning and administration. While most academics are familiar with basic ICT tools for instruction, many lack adequate training or motivation to use advanced systems for scheduling, reporting, and institutional planning (Adeyoyin, 2005, Azuh and Modebelu, 2013). Factors such as digital skill gaps, resistance to

change, and the absence of structured professional development programs further weaken ICT integration (Nwafor et al., 2023; Ogwuche, 2021). In light of these challenges, this study seeks to assess the effectiveness of ICT infrastructure in supporting academic planning and administrative functions among university lecturers in Nigeria. Specifically, it investigates the availability and utilization of ICT resources, examines their perceived impact on academic and administrative operations, and identifies key challenges faced by lecturers. The findings aim to inform policy interventions and capacity-building strategies for improving ICT-driven governance and academic effectiveness in Nigerian universities.

Research Questions

The following research questions guided the study:

1. What is the availability and extent of utilization of ICT infrastructure in academic planning among Nigerian university lecturers?
2. What is the perceived impact of ICT infrastructure on administrative effectiveness in Nigerian universities?
3. What are the major challenges faced by Nigerian university lecturers in the integration of ICT in academic and administrative functions?

Research Hypotheses

The following null hypotheses were formulated and tested at the 0.05 level of significance:

1. **H_{01}:** There is no significant difference in the availability of ICT infrastructure between federal and state universities in Nigeria.
2. **H_{02}:** There is no significant difference in the utilization of ICT infrastructure based on gender among university lecturers.

Methodology

This study employed a descriptive survey research design to assess the availability, utilization, and impact of ICT infrastructure on academic planning and administrative effectiveness among university lecturers in Nigeria. The population of the study comprised academic staff across federal and state universities, with an estimated 24,620 lecturers (NUC, 2024). A purposive sample of 420 lecturers (243 males, 177 females) was drawn from 12 universities (6 federal and 6 state), selected based on the availability of functional ICT infrastructure. Data were collected using a structured questionnaire developed by the researchers and validated by experts in educational technology and measurement. The instrument consisted of three sections focusing on ICT availability and utilization, administrative effectiveness, and challenges to ICT integration. Responses were measured on a 4-point Likert scale, and the reliability coefficient obtained via Cronbach's Alpha was **0.86**, indicating high internal consistency. Descriptive statistics such as mean and standard deviation were used to analyze responses to the research questions, while independent samples

t-tests were used to test the two hypotheses at 0.05 level of significance, comparing ICT availability by university type and ICT utilization by gender.

Results and Discussion

Research Question 1: What is the availability and extent of utilization of ICT infrastructure in academic planning among Nigerian university lecturers?

Table 1. Availability and Extent of Utilization of ICT Infrastructure in Academic Planning.

S/No.	ICT Infrastructure	Mean	SD	Interpretation
1.	Internet Connectivity	3.42	0.64	Highly Utilized
2.	Learning Management Systems (LMS)	3.18	0.75	Moderately Utilized
3.	Course Scheduling Tools	3.05	0.81	Moderately Utilized
4.	Curriculum Planning Tools	2.87	0.92	Low Utilization
	Cluster mean	**3.13**		

Table 1 shows that items 1 to 5 have a mean rating between 2.87 to 3.42 with a cluster mean of 3.13, which indicates that internet connectivity ($\bar{x}$ = 3.42) was the most utilized tool, while digital curriculum tools ($\bar{x}$ = 2.87) had lower usage. This implies that while university lecturers readily utilize internet connectivity, they are not effectively employing ICT as LMS, course scheduling and curriculum planning tools.

Table 2. Impact of ICT Infrastructure on Administrative Effectiveness.

S/No.	Function	Mean	SD	Interpretation
1.	Staff Records Management	3.36	0.67	Highly Effective
2.	E-Memos and Communication	3.28	0.70	Highly Effective
3.	Student Information Systems	3.10	0.74	Moderately Effective
4.	E-Attendance Tools	2.85	0.88	Moderately Effective
	Cluster Mean	**3.15**		

In Table 2, the cluster mean of 3.15 clearly reveal that staff records management ($\bar{x}$ = 3.36) and e-communication ($\bar{x}$ = 3.28) ranked highest. This means that while university management effectively utilized ICT, lecturers on the other hand fell short in this regard in keeping records of their students' engagements.

Table 3. Challenges of Integration of ICT Infrastructure.

S/No.	Challenge	Mean	SD	Interpretation
1.	Inadequate ICT Facilities	3.51	0.58	Strongly Agreed
2.	Poor Power Supply	3.43	0.62	Strongly Agreed
3.	Lack of Staff ICT Training	3.38	0.65	Agreed
4.	Internet Downtime	3.33	0.69	Agreed
5.	Resistance to Technology Adoption	2.71	0.88	Slightly Disagreed
	Cluster Mean	3.27		

Table 3 shows that four factors yielded mean values above 3.27, indicating that inadequate ICT facilities (Mean = 3.51) and poor power supply (Mean = 3.43) are the highest ranked challenges affecting effective ICT integration in academic planning and administrative effectiveness among university lecturers in Nigeria. Table 3 further identified other challenges such as lack of staff ICT training (Mean = 3.38), internet downtime (Mean = 3.33) and resistance to technology adoption (Mean = 2.71) as the combined challenges hindering effective ICT integration in Nigerian universities. This shows that despite the availability of ICT facilities, many other factors such as these are hindering effective ICT integration for academic planning and administration across universities in Nigeria.

Hypothesis Testing

Table 4. t-test of ICT availability between federal and state universities.

Hypothesis	Variable (s)	Test Used	df	t / χ^2 value	p-value	Decision	Interpretation
H_{01}	ICT availability by university type (Federal vs State)	Independent t-test	418	t = 3.87	p < 0.05	Rejected	Federal universities have significantly better ICT infrastructure

From Table 4, it can be inferred that there is significant difference in ICT availability between federal and state universities, *t (418) = 3.87, p < 0.05.* Therefore, the null hypothesis is rejected, implying that federal universities had significantly better ICT availability.

Table 5. t-test of ICT utilization by gender.

Hypothesis	Variable (s)	Test Used	df	t / χ^2 value	p-value	Decision	Interpretation
H_{02}	ICT utilization by gender (Male vs Female)	Independent t-test	418	t = 1.12	p > 0.05	Not Rejected (Accepted)	No significant difference in ICT utilization between genders

Table 5 shows that there is no significant gender difference in ICT utilization, t *(418) = 1.12, p > 0.05*. Hence, the null hypothesis is accepted, suggesting that gender had no significant effect on ICT usage.

Discussion of Findings

The findings from Table 1 show a varied extent of ICT infrastructure utilization among Nigerian university lecturers. Internet connectivity was the most utilized tool ($\bar{x}$ = 3.42), while digital curriculum planning tools had the lowest usage ($\bar{x}$ = 2.87). The overall cluster mean of 3.13 suggests a moderate engagement with ICT for academic planning. This pattern is consistent with the observations of Egoeze et al. (2018) and Elujekwute et al. (2024), who found that while internet access is prioritized in Nigerian universities, the use of specialized tools like LMS and curriculum planning systems remains limited. The moderate usage of LMS ($\bar{x}$ = 3.18) and course scheduling tools ($\bar{x}$ = 3.05) also reflects findings by Ajshola and Olusina (2013), who emphasized that despite their value in fostering academic efficiency, these tools are often underused due to lack of institutional support and digital literacy. Furthermore, Ajah and Chigozie-Okwum (2019) highlighted the inconsistency in the integration of ICT tools in academic functions, citing fragmented deployment of technology and weak alignment with academic goals. These findings underline the importance of moving beyond basic ICT adoption toward strategic integration that supports planning, timetabling, and curriculum execution.

Table 2 shows that ICT tools are perceived to have a relatively high impact on administrative functions, with staff records management ($\bar{x}$ = 3.36) and e-communication ($\bar{x}$ = 3.28) ranking highest. The overall cluster mean of 3.15 indicates moderate to high effectiveness of ICT in administrative operations. These results resonate with the work of Nwankwoala (2015) and Abah & Okoh (2021), who found that automation of records and digital communication systems enhanced institutional coordination and transparency. The moderate effectiveness of student information systems ($\bar{x}$ = 3.10) and lower rating of e-attendance tools ($\bar{x}$ = 2.85) indicate that while ICT is beneficial, certain systems are still in nascent use stages or not uniformly adopted.

Elujekwute et al. (2024) also noted that digital transformation in university administration hinges on the availability of platforms and personnel proficiency. In some universities, especially state institutions,

administrative ICT tools are either outdated or absent, leading to reliance on manual processes and inefficiencies. As shown in Table 3, key challenges to ICT integration include inadequate facilities ($\bar{x}$ = 3.51), poor power supply ($\bar{x}$ = 3.43), and insufficient staff ICT training ($\bar{x}$ = 3.38). Internet downtime ($\bar{x}$ = 3.33) and resistance to technology adoption ($\bar{x}$ = 2.71) were also noted. These findings support earlier studies by Ogwuche (2021) and Azuh & Modebelu (2013), who identified infrastructural gaps and human capacity deficits as the primary obstacles to ICT effectiveness in Nigerian higher education. The absence of regular training programs means that lecturers often lack the skills to leverage advanced ICT tools for planning and reporting. Nwafor et al. (2023) also emphasized the cultural and psychological resistance to ICT, especially among older faculty members, which stifles innovation. Meanwhile, the persistent issue of unreliable power and poor broadband penetration, particularly in state universities, further complicates ICT deployment.

From Table 4, a significant difference was found in ICT availability between federal and state universities, with federal institutions having better infrastructure ($t = 3.87$, $p < 0.05$). This is consistent with Edung et al. (2023) and Adeyoyin (2005), who found that federal universities often benefit from larger budgets, donor funding, and access to national ICT initiatives. In contrast, Table 5 indicates no significant difference in ICT utilization between male and female lecturers ($t = 1.12$, $p > 0.05$). This aligns with the findings of Ajah and Chigozie-Okwum (2019), who observed narrowing gender gaps in ICT adoption in universities that promote inclusive digital literacy policies.

Overall, the study highlights a growing but uneven integration of ICT in Nigerian universities. While there is satisfactory access to basic tools like internet connectivity and e-communication, the underutilization of specialized academic and administrative systems remains a concern. The disparity between federal and state institutions reflects uneven funding and policy implementation, reinforcing the digital divide. The minimal gender difference in ICT usage aligns with global trends showing narrowing digital gaps in academia. Challenges such as infrastructural inadequacy and unreliable electricity are consistent with prior studies on technology adoption in African higher education (Adu et al., 2022). Factors such as poor infrastructure, inadequate training, and institutional disparities continue to limit the transformative potential of ICT. Addressing these challenges requires coordinated investment in facilities, digital skills development, and robust policy frameworks that support full-scale ICT adoption in academic and administrative processes.

Conclusion

This study concludes that while ICT infrastructure plays a crucial role in enhancing academic and administrative functions in Nigerian universities, its integration remains uneven across institutions. Effective ICT usage correlates with improved planning and record-keeping but is hindered by infrastructural and policy limitations. It was therefore recommended among others that federal and state governments should increase investment in ICT facilities, especially in state-owned universities. Universities should offer continuous professional development and ICT training for academic and administrative staff. On the other

hand, ICT policies should emphasize digital curriculum tools and smart scheduling platforms. Furthermore, Power supply and internet reliability must be prioritized for sustainable integration.

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