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Teachers' Perception on The Availability and Accessibility Of E-Learning Facilities in Tertiary Institutions in North Central, Nigeria

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Abstract- ***This study accesses the Teachers' perception on the availability and accessibility of e-learning facilities in tertiary institutions in North Central Nigeria. The study is a cross-sectional survey design with four research questions. Four research questions guided the study. The population of the study comprised of all the teachers in North Central Nigeria. The instrument used for data collection was a structured questionnaire developed by the researcher. The instrument was validated by four experts, two from Department of Science Education, one from Computer Science Department, and one from Library and Information Science Department of ATBU Bauchi. The instrument was pilot tested with Cronbach Alpha coefficient index of 0.896 was found. The instrument was distributed over the internet across the region, in which 458 teachers responded. The collected data were analyzed using descriptive statistics of frequency and percentage. Findings revealed that most e-learning facilities such as desktop/laptop computers, CD writers, social media platforms, and video recorders were available across schools, while some tools such as projectors, audio conferencing systems, and video conferencing software were less available. The study concludes that although e-learning resources are gradually being integrated into the educational system, disparities still exist across the schools due to infrastructural and policy-related factors. The study recommends that government and school administrators should strengthen ICT infrastructure, provide consistent electricity supply, and train teachers on the effective use of e-learning tools to promote equitable access and utilization across all schools.***

Keywords: Availability, Accessibility, E-learning facilities.

I. INTRODUCTION

The integration of information and communication technology (ICT) into higher education has reshaped pedagogical approaches and expand access to quality learning (Bagde et al., 2021). E-learning which is defined as the use of electronic technologies and the internet to deliver educational content through online courses, virtual classrooms, and multimedia resources (Chitra & Raj, 2018; AbdelSalam & Madji, 2021), offers transformative potential for tertiary institutions. Comprehensive e-learning platforms such as Moodle, Canvas, and Google Classroom, along with tools like video conferencing, interactive simulations, and mobile devices, enable flexible, collaborative, and learner-centred instruction (Alameri et al., 2020; Encarnacion et al., 2021). In Nigeria, e-learning is increasingly recognised as an innovative approach to enhance teaching and learning in tertiary institutions (Ndidiamaka & Kingsley, 2019; Usman et al., 2019). Despite this promise, the effective implementation of e-learning in Nigerian tertiary institutions faces formidable challenges such as limited internet connectivity, unstable power supply, high costs of ICT infrastructure, and insufficient funding (Ogunode et al., 2020). These infrastructural and economic constraints are particularly acute in the North Central geopolitical zone, where access to e-learning facilities remains a persistent concern for educators and policymakers alike. Furthermore, the digital literacy gap among teachers complicates the utilisation of available e-learning tools (Nwadi et al., 2023).

Central to overcoming these challenges is teachers' perception which aid in the process by which they interpret and make meaning of their experiences with e-learning resources (Oladele & Modebelu, 2021).

Teachers' perceptions of the availability and accessibility of e-learning facilities significantly influence their readiness to adopt and integrate technology into their teaching practices (Oluwadare, 2022). While some Nigerian teachers express enthusiasm for technology-enhanced education, many voice concerns about inadequate resources, training, and institutional support (Ali & Ahmed, 2020). Understanding these perceptions is therefore essential for formulating targeted policies and interventions.

Although prior studies have examined e-learning adoption in Nigerian tertiary institutions (Osiesi et al., 2022), there is a scarcity of empirical research that specifically investigates teachers' perceptions of the availability and accessibility of e-learning facilities in the North Central region. This gap is important because regional differences may shape distinct perceptual patterns that influence e-learning outcomes. Consequently, this study assesses teachers' perception on the availability and accessibility of e-learning facilities in tertiary institutions in North Central, Nigeria, providing evidence to guide stakeholders in addressing the region's unique educational technology needs.

Research Questions

The following research questions were raised to guide the study:

i. What is the teachers' perception on the availability of e-learning facilities in tertiary institutions in North Central Nigeria
ii. What is the teachers' perception on the accessibility of e-learning facilities in tertiary institutions in North Central Nigeria

II. LITERATURE REVIEW

This study is anchored in the Socio-Technical Systems Theory (Trist & Bamforth, 1951) and the Technology Acceptance Model (Davis, 1989). The Socio-Technical Systems Theory views effective e-learning implementation as the product of two interacting subsystems: the social system (institutional support, policies, and collaborative culture) and the technical system (hardware, software, and infrastructure) (Molleman & Broekhuis, 2001). The Technology Acceptance Model, meanwhile, explains that a user's willingness to adopt technology is strongly predicted by its perceived ease of use and usefulness (Tarus & Gichayo, 2015). Within the e-learning context, these frameworks collectively suggest that teachers' positive perceptions and actual use of e-learning depend not only on whether facilities physically exist but also on how accessible and user-friendly they are within a supportive institutional environment. Together, the theories provide a lens for understanding the interplay between technical provision, social conditions, and individual perceptions in tertiary institutions.

E-learning encompasses the use of digital technologies and the internet to deliver educational content, facilitate interactive experiences, and enable flexible access to knowledge beyond traditional classroom boundaries (Basar et al., 2021; Rahman et al., 2023). It spans modalities such as blended learning, fully online courses, and massive open online courses, leveraging platforms like learning management systems, video conferencing, and mobile applications (Shafieiosgouei et al., 2018). In tertiary education, e-learning promotes student-centred pedagogy, encourages independent learning, and enhances motivation when appropriately integrated (Rajabalee & Santally, 2021; Nda, 2023).

However, in Nigerian, this potential is frequently undermined by digital divides, high data costs, erratic power supply, and insufficient institutional infrastructure, all of which constrain participation and hinder the quality of online learning experiences (Maheshwari, Gupta & Goyal, 2021).

Availability of e-learning facilities refers to the presence, adequacy, and maintenance of technological infrastructure such as computers, internet connectivity, projectors, interactive boards, and learning management systems within educational institutions (Encarnacion et al., 2021; Bolaji, 2022).

In Nigerian tertiary institutions, policies and investments have sought to equip universities with basic ICT resources; yet, practical integration especially of emerging technologies in teaching and learning remains at an elementary stage, and many academic staff continue to rely on traditional instructional methods (Onyema, 2020). Teachers may resist adopting e-learning tools not simply because of personal reluctance but because the facilities are poorly maintained, technically unsupported, or insufficient in quantity, leading to a perception of unavailability even when some resources are nominally present. This gap between provision and perception highlights that availability must be understood not merely as physical existence but as functional readiness for teaching. Accessibility on the other hand concerns the ease with which teachers can actually locate, reach, and utilise e-learning resources without undue barriers (Chidozie-Anaeche & Ozofor, 2019). It includes factors such as reliable internet connectivity, user awareness of available platforms, digital literacy, and institutional policies that facilitate or restrict use (Ternenge & Kashimana, 2019; Anyim, 2018). Studies across Nigerian educational levels have documented low accessibility of ICT resources, often due to inadequate computers, frequent power outages, high data costs, and over-protective custody of equipment that limits hands-on use (Bolaji & Adeoye, 2022). In tertiary institutions, similar constraints persist, and when teachers perceive e-learning facilities as inaccessible, their motivation and capacity to integrate technology into their pedagogy are severely diminished. Accessibility thus directly shapes both initial acceptance and sustained utilisation.

The intersection of availability and accessibility is where teachers' perceptions become decisive. Where infrastructure is present but poorly accessible due to complexity, unreliable connectivity, or lack of training, teachers develop negative attitudes that hinder adoption as predicted by the Technology

Acceptance Model (Davis, 1989). Conversely, institutions that align technical provisioning with social support systems, such as training and responsive technical assistance, are more likely to foster positive perceptions and meaningful e-learning integration, as emphasised by the Socio-Technical Systems Theory. In North Central Nigeria, where economic disparities and infrastructural deficits are pronounced (Ogunode et al., 2020), understanding how teachers perceive both dimensions simultaneously is highly important to diagnosing the true obstacles to e-learning uptake. Existing research often treats availability and accessibility in isolation or focuses on different educational levels, leaving a critical gap in context-sensitive evidence. This study addresses that gap by investigating how teachers in tertiary institutions in North Central Nigeria perceive the availability and accessibility of e-learning facilities, providing insights necessary to inform targeted policy and institutional interventions.

III. METHODOLOGY

This study adopted a descriptive survey research design. The study population consisted of 22,973 teachers drawn from tertiary institutions in the region. Purposive sampling was used to select teachers across the two educational levels. The sample size of the study was 822 teachers. Data was collected using Teachers' Perception of the Availability and Accessibility of E-Learning Facilities Questionnaire" (TPAAELF-Q) which was developed from the literatures consisting of 23 items. The instrument was subjected to face, construct, and content validation by four experts in science education, library science, and computer science. Cronbach Alpha analysis was used to determine the reliability of the instrument which yielded a coefficient of 0.85, confirming internal consistency. The final instrument was administered on the respondents electronically via Google forms shared on WhatsApp, Facebook, and Telegram. The data collected was analyzed using descriptive statistics (frequency and percentage). Facilities rating 45% and above were considered moderately available/accessible while items below 44% were considered and the items rated above 75% were considered high. The hypotheses were tested using the chi-square test of independence at a 0.05 significance level

IV. RESULTS

Research Question One

What is the teachers' perception on the availability of e-learning facilities in tertiary institutions in North Central Nigeria?

The result presented in Table 1 shows that some e-learning facilities are largely available in tertiary institutions in North Central Nigeria. They include video conferencing platforms such as Zoom and Google Meet (97.45%), social media platforms such as WhatsApp, Facebook, Telegram, and Skype (93.07%), and modems (93.07%). Other facilities such as local area networks (91.36%), video recorders (85.89%), desktop/laptop computers (85.28%), WiFi (82.48%), and open library subscriptions (82.73%) are also considerably available.

On the other hand, the result further reveals that facilities like cloud storage devices (51.46%), are relatively not available. The overall result revealed that 95.65% of the identified e-learning facilities are available while 4.35% are not, these findings revealed that the perception of teachers on the availability of foundational ICT infrastructure is high in tertiary institutions in North Central Nigeria.

Table 1. Availability of e-learning facilities in Tertiary institution in North Central Nigeria

S/N	Item Description	N	Available	Not Available
1	Cloud Storage devices like Dropbox	822	399 (48.54%)	423 (51.46%)
2	CD writer	822	671 (81.63%)	151 (18.37%)
3	Desktop/Laptop Computer	822	701 (85.28%)	121 (14.72%)
4	School Emails	822	561 (68.25%)	261 (31.75%)
5	Flash Drive	822	499 (60.71%)	323 (39.29%)
6	Flexible Learning Toolbox	822	598 (72.75%)	224 (27.25%)
7	External Hard Disk Drives	822	587 (71.41%)	235 (28.59%)
8	Interactive White Board	822	656 (79.81%)	166 (20.19%)
9	WiFi	822	678 (82.48%)	144 (17.52%)
10	Local Area Network	822	751 (91.36%)	71 (8.64%)
11	Modem	822	765 (93.07%)	57 (6.93%)
12	Social media like WhatsApp, Facebook, Telegram, Skype	822	765 (93.07%)	57 (6.93%)
13	YouTube	822	566 (68.86%)	265 (32.24%)
14	Multimedia tools like Power Point Software	822	577 (70.19%)	245 (29.81%)
15	Audio Conferencing	822	487 (59.25%)	335 (40.75%)
16	Projector	822	465 (56.57%)	357 (43.43%)
17	Respondus software/Study mate for creating exam Questions	822	499 (60.71%)	323 (39.29%)
18	Video Conferencing like Zoom, Google Meet	822	801 (97.45%)	21 (2.55%)
19	Video Recorder	822	706 (85.89%)	116 (14.11%)
20	Video Tape	822	593 (72.14%)	229 (27.86%)
21	Open Library Subscription	822	680 (82.73%)	142 (17.27%)
22	Audio Tape	822	680 (82.73%)	142 (17.27%)
23	Learning Management System	822	451 (54.87%)	371 (45.13%)
	Total		22(95.65%)	1(4.35%)

Research Question Two

What is the teachers' perception on the accessibility of e-learning facilities in tertiary institutions in North Central Nigeria?

The result presented in Table 1 shows that some e-learning facilities are largely accessible in tertiary institutions in North Central Nigeria. They include video conferencing platforms such as Zoom and Google Meet (97.45%), social media platforms like WhatsApp, Facebook, Telegram, and Skype (93.07%), and modems (93.07%). Other facilities such as local area networks (91.36%), video recorders (85.89%), desktop/laptop computers (85.28%), WiFi (82.48%), and open library subscriptions (82.73%) are also considerably accessible. This indicates that tertiary institutions provide teachers with strong access to internet connectivity and interactive technologies that support effective e-learning.

On the other hand, the result further reveals that facilities like cloud storage devices (79.81%), learning management systems (45.13%), and projectors (40.75%) are relatively not accessible. The overall result revealed that 95.65% of the identified e-learning facilities are available while 4.35% are not, these findings revealed that the perception of teachers on the accessibility of foundational ICT infrastructure is high in tertiary institutions in North Central Nigeria.

Table 2. Accessibility of e-learning facilities in Tertiary Institution Secondary School in North Central Nigeria

S/N	Item Description	N	Accessible	Not Accessible
1	Cloud Storage devices like Drop box	822	166 (20.19%)	656 (79.81%)
2	CD writer	822	671 (81.63%)	151 (18.37%)
3	Desktop/Laptop Computer	822	701 (85.28%)	121 (14.72%)
4	School Emails	822	561 (68.25%)	261 (31.75%)
5	Flash Drive	822	499 (60.71%)	323 (39.29%)
6	Flexible Learning Toolbox	822	598 (72.75%)	224 (27.25%)
7	External Hard Disk Drives	822	587 (71.41%)	235 (28.59%)
8	Interactive White Board	822	656 (79.81%)	166 (20.19%)
9	WiFi	822	678 (82.48%)	144 (17.52%)
10	Local Area Network	822	751 (91.36%)	71 (8.64%)
11	Modem	822	765 (93.07%)	57 (6.93%)
12	Social Media like WhatsApp, Facebook, Telegram, Skype	822	765 (93.07%)	57 (6.93%)
13	YouTube	822	566 (68.86%)	265 (32.24%)
14	Multimedia tools like Power Point Software	822	577 (70.19%)	245 (29.81%)
15	Audio Conferencing	822	487 (59.25%)	1152 (140.15%)
16	Projector	822	465 (56.57%)	335 (40.75%)
17	Respondus software/Study mate for creating exam questions	822	499 (60.71%)	323 (39.29%)
18	Video Conferencing like zoom, Google Meet	822	801 (97.45%)	21 (2.55%)
19	Video Recorder	822	706 (85.89%)	116 (14.11%)
20	Video Tape	822	593 (72.14%)	229 (27.86%)
21	Open Library Subscription	822	680 (82.73%)	142 (17.27%)
22	Audio Tape	822	680 (82.73%)	142 (17.27%)
23	Learning Management System	822	451 (54.87%)	(5.13%)
	Total		22(95.65%)	1(4.35%)

V. DISCUSSION

The findings on teachers' perceptions of the availability of e-learning facilities reveal a markedly positive picture of foundational ICT infrastructure in tertiary institutions in North Central Nigeria. Teachers reported that tools such as video conferencing platforms (Zoom, Google Meet), social media applications (WhatsApp, Facebook, Telegram, Skype), modems, local area networks, desktop and laptop computers, WiFi, and open library subscriptions are largely available. These results suggest that tertiary institutions in the region have invested considerably in basic connectivity hardware and communication technologies, aligning with earlier assertions that Nigerian higher education is

progressively equipping itself with essential ICT resources, albeit often at an elementary stage (Ndongfack, 2015). The high availability of internet-dependent platforms such as social media and video conferencing may be partly explained by their pervasive use beyond formal education; their ubiquity reduces institutional procurement burdens and capitalises on teachers' personal device ownership. However, the finding that cloud storage devices like Dropbox were reported as relatively unavailable introduces a caveat. Cloud storage infrastructure is frequently central to content management, collaboration, and resource sharing in contemporary e-learning ecosystems. Its limited presence indicates that while communication tools are well provisioned, the technological backbone for systematic content delivery and digital asset management is not yet fully established, potentially restricting the pedagogical depth of e-learning practices. This finding aligns with Ojo (2023) and Agogbua and Chukwudolue (2022), who similarly found that infrastructural and ICT facilities were available for teaching in Kwara and Anambra States respectively. Shaibu, Salaam and Chinonso (2024) reported that 85% of e-learning technologies such as desktop computers were available in universities in Ekiti, corroborating the high availability of hardware observed in this study.

Regarding accessibility, teachers perceived a similarly high level of access to many of the same facilities. Video conferencing platforms, social media, modems, local area networks, computers, WiFi, and open library subscriptions again received strong accessibility endorsements. The overall facility-level analysis indicated that vast majority of the listed e-learning tools were accessible, mirroring the availability distribution. Yet important disparities emerge upon closer inspection. Cloud storage devices, which were already moderately unavailable, were judged accessible by less accessible by teachers. This illustrates that physical presence of a resource does not automatically translate into usable access; factors such as institutional firewall restrictions, insufficient bandwidth, lack of user awareness, or absence of training can render a nominally present facility effectively out of reach. Similarly, learning management systems (LMS) were accessible to just majority of teachers, and projectors, meaning that nearly half of the respondents encountered barriers to tools that are pivotal for structured e-learning delivery and in-person technology-enhanced teaching. Audio conferencing and flash drives also hovered around the 60% accessibility threshold, reinforcing the notion that while internet-dependent communication tools are broadly accessible, facilities that support content creation, assessment, and collaborative knowledge management face more significant adoption obstacles. These patterns agreed with the existing literature. The discrepancy between the high accessibility of social media and video conferencing and the lower accessibility of cloud storage and LMS mirrors findings by Chidozie et al. (2019), who reported that even when ICT resources were present in schools, factors such as institutional over-protectiveness, poor maintenance, and low digital literacy restricted actual use. Ternenge and Kashimana (2019) likewise documented that challenges including inadequate computers, poor internet connectivity, and limited technical support impeded students' access to web resources in a Nigerian academic library. In the present study, the high data costs, unstable power supply, and limited institutional training characteristic of the North Central zone (Ogunode et al., 2020) may similarly explain why teachers find advanced platforms less accessible despite being able to connect via social media and video calls on personal devices. The accessibility of video conferencing tools is particularly instructive; their near-universal uptake during the COVID-19 pandemic forced familiarity, and they often require only moderate bandwidth compared to robust LMSs or cloud synchronisation, making them more viable even under infrastructural constraints.

The dual theoretical framework of the study offers a coherent lens through which to interpret these findings. The Socio-Technical Systems Theory (Trist & Bamforth, 1951) posits that optimal technological outcomes arise from the alignment of the social and technical subsystems. Here, the technical subsystem is well-developed for real-time communication and basic connectivity, teachers can easily join a Zoom session or send a WhatsApp message. However, the social subsystem, which encompasses the institutional culture, training, policies, and technical support, may not have evolved in parallel to make

more complex tools like cloud storage and LMS functionally accessible. Without training, clear institutional mandates, and reliable technical assistance, teachers are unlikely to perceive these tools as easy to use, which directly implicates the Technology Acceptance Model (Davis, 1989). TAM predicts that perceived ease of use and perceived usefulness are critical determinants of technology adoption; low accessibility ratings for LMS and cloud storage likely reflect teachers' experiences of difficulty, confusion, or lack of utility, thereby dampening their motivation to integrate these tools into their pedagogical routines.

The concentration of highly accessible facilities around social media and video conferencing also suggests a form of "bottom-up" technology adoption: teachers may be leveraging personal digital skills and consumer applications to compensate for institutional deficiencies in provision of dedicated e-learning systems. While this indicates resilience, it simultaneously limits the pedagogical possibilities to predominantly content delivery and discussion, leaving out sophisticated functions such as adaptive assessment, collaborative resource co-creation, and learning analytics that LMSs and cloud-based repositories afford. Consequently, the high overall percentage of accessible facilities can obscure a qualitative shortfall: e-learning may be operationalised primarily through informal channels rather than through structured, institutionally supported platforms.

VI. CONCLUSION

This study concludes that teachers in tertiary institutions in North Central Nigeria perceive a generally high availability and accessibility of foundational e-learning facilities which signals meaningful institutional progress in ICT provisioning. However, marked disparities persist, as more advanced platforms such as cloud storage devices and learning management systems remain substantially less accessible, often despite being nominally present. These reveal a critical disjuncture between technical infrastructure and the social support systems, including targeted training, reliable power, and institutional policies, that transform mere availability into functional accessibility. The findings underscore that sustainable e-learning integration depends not only on hardware procurement but also on cultivating an enabling environment that enhances teachers perceived ease of use and pedagogical readiness.

RECOMMENDATTIONS

Based on the findings, the following recommendations are proposed:

1. Government should strengthen targeted professional development and technical support for advanced e-learning platforms.
2. Governing council should develop institutional policies and infrastructure investments that bridge the gap between availability and functional accessibility.

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