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Adoption and utilization of e-learning for learning in select tertiary institutions in Kogi State

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ABSTRACT

The study entitled "Adoption and utilization of e-learning technology for learning in select tertiary institutions in Kogi State" sought to examine the adoption and use of e-learning technology in teaching in the select public tertiary institutions in the state. It also sought to identify the technology types used for e-learning in the institutions, enquire as to the level of adoption of technology for teaching, ascertain the effectiveness of the technology, and also to identify the challenges in the adoption. The researchers utilized the survey research method to gather quantitative data with the use of the questionnaire. Researchers found that e-learning technologies are needed in the higher education institutions (HEIs) to deliver lectures, curriculum development and other pedagogical purposes. Part of the findings of this study is that one of the technology types adopted for teaching and learning is fixed learning. As per the tools used, the study records web-based applications, social media platforms, and specially-designed applications. Findings showed that the level of adoption is significantly high. As per the effectiveness, researchers revealed that there is effectiveness as technologies aid flexibility in learning and convenience in learning time. The researchers concluded that there is significant adoption of e-learning in the tertiary institutions and recommend (among many others) to HEIs to be deliberate about e-learning technology adoption and acquisition.

Keywords: education, e-learning, HEIs, literacy, technology

INTRODUCTION

Education is seen as a major effort to guarantee development and growth in any society. Education is seen as a tool for increasing human potential and knowledge. Additionally, it contributes to the shaping of society, which organizes the world. Education has been shown to play a significant influence in our competitive, contemporary, industrialized environment by better preparing people for survival (Sharma, 2018). The reason for this is that modern societies are knowledge-driven, meaning that individuals who possess the necessary knowledge and skills are able to put solutions into practice that make people's lives easier and better.

E-learning is one way that people can pursue information or education. Since current conditions frequently require e-learning as a point of access to education, it is seen as a product of necessity. It continues to be a crucial component of education in the current era, whether the goal is to increase learning, maintain student engagement, or even make sure study time is not squandered because students are unable to get together in a physical classroom for instruction. The phrase "e-learning," often known as "online" or "electronic learning," refers to the process of acquiring knowledge via media and electronic technology (Ugochukwu-Ibe & Ibeke, 2021). It is the process of gaining knowledge through the use of electronic or digital tools, frequently fueled by the most recent technological advancements in a given age or era.

Today's students have the chance to maintain connections in a virtual classroom thanks to e-learning. In times of emergency, it is much more so. For instance, the significance of e-learning was made clear during the COVID-19 pandemic in both developed western nations and third world nations in Africa, Asia, and Latin America. Nonetheless, the need for alternatives to traditional classroom instruction was rising. According to a study's findings, Nigeria's Ministry of Education authorized and implemented e-learning in an effort to give students the chance to finish their education during the COVID-19-induced lockdown (Adetona et al., 2021).

Consequently, Nigerian educational institutions capitalized on the opportunity to implement many e-learning platforms as they realized for the first time how important technology was to education. According to the study, YouTube videos, Google Classroom, and social media sites like WhatsApp are among the e-learning options that the nation's educational institutions have been using (Adetona et al., 2021). In a similar vein, Alyoussef (2021) named a few cutting-edge technological networks, such as Coursera, Edmodo, social media platforms, or carefully chosen higher education platforms, that supported immersive online or e-learning at COVID-19.

A good technology-enhanced learning experience requires access to the Internet and a few other necessary technologies. It has been noted that the internet and similar technologies are crucial for creating educational resources, facilitating learners' seamless education, and managing classes inside an institution (Maatuk et al., 2021). E-learning is regarded as a flexible way or channel for students in various locations to obtain education.

Nonetheless, e-learning has the benefit of being regarded as adaptable due to a few factors. These factors include time, place, and health concerns (Maatuk et al., 2021). E-learning application results in an overall improvement in skills and knowledge efficacy by giving access to a vast amount of data, fostering collaboration, and creating long-lasting relationships within the learning domain. Even if e-learning is beneficial for acquiring knowledge, Maatuk et al. (2021) concurred that it is not a sufficient platform for supporting some kinds of practical studies.

It is important to stress again that the COVID-19 outbreak's interruption of physical learning opportunities led to a global upsurge in the adoption of e-learning including Nigeria and other countries. For instance, a study found that China's Ministry of Education implemented the *disrupted classes*, *undisrupted learning* policy in response to the pandemic, requiring schools in the republic to implement a type of remote learning and teaching by guaranteeing the delivery of all curricula online (Li et al., 2022). Even with the backing of governments from several sub-Saharan African nations, e-learning adoption still faced a number of difficulties.

According to a study, the Libyan scenario involved high electronic acquisition costs and deteriorating internet infrastructure, both of which are necessary for successful technology-based learning (Maatuk et al., 2021). Numerous problems in Nigeria had an impact on the implementation, particularly at universities and other public higher education institutions (HEIs). Universities in Nigeria were closed during the COVID-19 pandemic outbreak due to a labor dispute between the Federal Government of Nigeria (FGN) and the Academic Staff Union of Universities (ASUU), in addition to technical and logistical issues with electricity and a lack of technical know-how.

Despite the aforementioned concerns, research continues to back up the assertions that e-learning was offered in certain Nigerian educational institutions throughout the COVID-19 era; these claims are currently being reviewed (Eze et al., 2020; Ugochukwu-Ibe & Ibeke, 2021). This emphasizes even more how crucial e-learning is to education, particularly in the context of pandemics. Because e-learning systems must be able to interface with human intellects and yet give the intended outcomes even when modified under any circumstances, they need to be thoroughly researched.

A byproduct of learning management systems (LMS) is e-learning. An LMS is a web-based tool or software program that helps with the design, execution, and evaluation of a particular learning process (Kirvan & Brush, 2023). It is made up of a server and a user interface (UI) in its most basic and popular configuration. The UI is controlled by instructors, students, and administrators, while the server handles the essential tasks. An LMS gives the instructor the ability to produce and distribute information, keep track of student involvement, and evaluate student performance.

The LMS is seen as a crucial component of education in the twenty-first century and is valued highly in industrialized, emerging, and underdeveloped nations due mostly to the need to teach a larger global population. The field is seeing a change in innovation, which is thought to be essential to society's general progress. As a result, this study evaluates how e-learning technology is being adopted and used for instruction in a few public institutions in Kogi State, Nigeria.

Statement of the Problem

The government and policy makers have failed to provide adequate money for education in many regions of Nigeria and other parts of Africa. The use of technology to support education in public schools is one of the most important areas that is overlooked, and the situation is even worse for people with postsecondary degrees. Nigerian education faces a number of difficulties, such as inadequate finance and a lack of necessary technology (like e-learning) that support the development of a knowledge-based economy. However, there are instances of these technologies being used in specific regions of the nation. This is demonstrated by a study done in 2020 by Eze et al. (2020) which found that certain private HEIs in the nation are information and communications technologies (ICT) compliant and, as a result, were able to successfully implement e-learning resources during the COVID-19 pandemic. Public schools in Nigeria, however, were not considered during the pandemic's peak. Stated differently, there are no documented instances of public institutions effectively using e-learning over the studied period.

There is still an issue with access even if e-learning gives professors and students the chance to communicate, removing any issues that might have developed due to geography or distance. Numerous academics in Nigeria and other parts of Africa have done studies that have shown some variables work against the adoption of e-learning in educational institutions. One of these is access, which has grown to be a significant issue since many secondary and postsecondary educational institutions lack sufficient access to the necessary technologies (Eze et al., 2020). According to a related study, some of the obstacles to the adoption and implementation of e-learning in Nigeria include unreliable power supplies, expensive data tariffs, learners' and educators' lack of technical expertise, unavailability, and inadequate maintenance of information technology (IT) infrastructure (Ugochukwu-Ibe & Ibeke, 2021). The nation's embrace of technology in education is challenged by these issues taken together.

Thus, the purpose of this study was to assess how technology is being adopted and used in a few Nigerian HEIs. This was specifically conducted to ascertain the impact or effectiveness of such learning channels or platforms have on students' performance and to identify the challenges (if any) faced by teachers in their use of technology for teaching. It also aims to understand in details the needs for the technology, identify the types adopted, know the level of access, and identify the tools or technologies adopted.

Research Questions

The study seeks to answer the following research questions (RQs):

- **RQ1.** What technologies are adopted and utilized for e-learning in the institutions?
- **RQ2.** What is the level of adoption of e-learning technology for learning in the state?

RQ3. How effective are the adopted e-learning technologies in teaching?

RQ4. What are the challenges faced with the adoption and utilization of the technology?

CONCEPTUAL REVIEW

E-Learning

E-learning and technology is the concept for review in this chapter. For clarity, a componential review of the concept is advanced under this section. E-learning is a word that combines "electronic" and "learning." According to the Economic Times, e-learning is the use of electronic resources to administer formalized teaching-based learning. This implies that e-learning is learning through use of internet and computers. Also known as web-based training or online learning, e-learning is the delivery of instruction over the internet to learners equipped with browser – and it is done anytime anywhere (Lutkevich, 2020). It is an important aspect of education in modern society mainly because of the flexibility it offers thousands and millions of people to learn with the use of electronic devices.

E-learning has also been described as connecting point of the convergence of technological and pedagogical innovations (Hettiarachchi et al., 2016). It is actually an answer to years of the quest for uninterrupted learning within and out of the academic environment. The central idea behind e-learning is that academic resources that enable learning are made available at any place and time (Bibi et al., 2024). In other words, barriers are completely obliterated from the academic domain.

The concept of e-learning has also been described as a meeting point between two important areas namely learning and technology. The systems aggregate different tools such as communication technologies, writing technologies, storage and visualization (Najim & Al-Noori, 2020). The learner is able to take advantage of ICTs that combines different aspects to broaden the horizon and project electronic learning experience for the learners or student. Within the academic environment, e-learning tools are considered game changers – as with them, a whole lot of new things can be experimented and results expected in the end.

As an interactive system, e-learning provides the learner with the use of communication and information technologies and is largely dependent on an integrated digital electronic environment that supports the display of courses across electronic networks, organize test and other evaluation resources and procedures, as well as guidance and counselling (Najim & Al-Noori, 2020). It is a problem solver and here lies its importance as is offers solution to the challenge of knowledge explosion. This is in addition to meeting the ever-increasing demand for education and expanding opportunities for admission to educational institutions.

Technology

Technology as a concept is wide and has been given different interpretations (Ramey, 2013). It has been described as the use of scientific knowledge for practical applications or purposes applicable to our daily lives and even within industries (Wood, 2023). It is imperative to isolate the word "knowledge" in the foregoing understanding of the concept of "technology". This implies that it is a product of human intellects to simplify task and make life a lot easier. Technology has also been conceptualized as the practical application of knowledge with background in different fields such as engineering, science, and tools or equipment towards the improvement of methods of accomplishing a task in specific content or area (Williams, 2015).

It refers to the different forms of software and hardware resources implemented with the aim of applying useful information and knowledge (Crawford, 2022). The application is geared towards solving human problems to ensure better experience with daily activities. It is against this backdrop that technology has been described as the application of scientific knowledge to solve practical problems especially as seen in commerce and industry (Kasemsap, 2016). Such scientific knowledge application is important to all segments and sectors of the society including education, production, manufacturing and so much more. These areas are made better when the scientific knowledge is applied in the processes involved.

Technology has been described as an application or tool used to propel the completion of various online tasks that may range from the design of a plan for a better learning experience, communicating at a distance, the development of an online module prototype, and online instruction delivery (Baylen & Dequilla, 2022). This is perhaps the most relevant definition or description of the concept in respect of the focus of this study – being that it is an assessment of the adoption and utilization of e-learning technology for teaching in select public tertiary institutions in Nigeria. This also implies that with technology, learning is made easier. The ease-of-learning created by virtue of the improvement in technology is evident across different areas of human endeavors including education.

Another conceptualization of the concept of technology is that it involves human knowledge that results in systems, tools, and materials and applies in almost every human activity; at work, for communication, education, transportation, data security, manufacturing, business scaling and many others (Ramey, 2013). Once technology is applied, the end result is a product that simplifies human task. A well applied technology results in huge benefit to mankind – and the opposite is the case once it is used for malicious purposes. For example, while technology can be utilized in positive dimension to make learning a lot easier as seen in e-learning, online learning, and distance learning, technology in the wrong hands can also be used to defraud man and make them record huge financial losses in form of cyber-fraud.

LITERATURE REVIEW

Literature of significance exists in the area of education in general and e-learning in particular. Some of such literature is considered in this section of this study. It is imperative to start with different perspectives on the understanding of e-learning as portrayed in different studies. Also known as computer-based learning, e-learning is seen as a learning process that has to do with the connection of system-based administrations, digitally conveyed content, as well as mentoring bolster (Zhang et al., 2010).

It has also been described as the as a term that defines learning process that is mediated by technology and empowered by digital possibilities – through the use of

hardware (e.g., digital camera, tablets, PCs, printer, scanner, OHP, digital videos, OHP screen, and overhead projector), software (editing, writing, cloud computing technologies, operating systems, applications, MS Office, CD textbooks that fall within the category of what is now referred to as e-content, OERS, and courseware), and others (e.g., CD-ROM and USB drives), be it in form of classroom or distance setting (PC helped learning), to bolster and improve the experience of teacher to student interactions (Eze et al., 2018).

In reality, what e-learning does to education is that it moves the citadel of learning from the popular tradition to customized ICT-based, module-driven, synergistic, and adaptable learning that involves the facilitator, the learner, the specialist and the instructor (Falana, 2015; Olojo et al., 2012). The implication of the foregoing is that e-learning is a unique and a whole new experience added (as part of educational technology innovation) to ensure ease-of-learning and teaching. It has also been described as the innovative platform used for the transmission of requisite skills and knowledge from teachers to learners (Eduard & Lucian, 2020)

In a study, it was ascertained that e-learning is needed for a number of reasons including the development and training of employees, and overall learning for all those who seek requisite knowledge in their chosen fields (Kyari et al., 2018). The implication of the foregoing is that the eLearning innovation in the twenty-first century education sector is an important need for development for our world especially one that is knowledge-based. If the world wants to develop at a geometric rate, knowledge is an important factor for consideration. Its uniqueness is seen in that the technology is cheap, saves time, comes with a wider coverage, and promotes learning and collaboration (Eduard & Lucian, 2020).

Relatedly, it has also be noted that e-learning is adopted within the Nigerian education space to enable distance education – so as to create the enabling academic environment for inclusiveness towards providing education to the majority of the country's less educated or uneducated population (Musa et al., 2021). This is most relevant on the basis that records from the country reveal that over 76 million adult Nigerians falls within the illiteracy categorization and this implies that 31% of persons in the country are uneducated (Erunke, 2022; Onyedinefu, 2022; Suleiman, 2022; Tribune, 2021).

Though a study found that the pace of adoption of e-learning technology for learners in developing countries when compared to developed ones is considerably low (Kanwal & Rehman, 2017), that of Nigeria is considered different. In contrast, the adoption of e-learning in the Nigerian educational institutions has continued to be at a remarkably fast rate regardless of the peculiar challenges (Musa et al., 2021). This continuous adoption and use of technology in learning in the Nigerian educational sector, Musa et al claim has supplemented the traditional system of education delivery hitherto popular among HEIs. The advantages include flexibility in learning and a net of inclusion for most people across the world to access education (Salawudeen, 2010).

On the adoption of e-learning by different HEIs in Nigeria, study shows that despite the hindrances/threats encountered by the country's institutions in respect of e-learning technology adoption, some public institutions have continued to deploy more courses that supports distance learning through technology with accreditation from the appropriate quarters, the National Universities Commission and some of such institutions include the University of Ibadan, Ahmadu Bello University Zaria, National Open University of Nigeria, the Federal School of Survey, Oyo, and Obafemi Awolowo University Ile-Ife, among many others (Musa et al., 2021).

On a general note, the effectiveness of e-learning technology adoption in the Nigerian educational sector can be measured by the quality output in terms of students performance and motivation to learn. However, some scholars have made clarifications as to how e-learning is effective in the education sector of the country (Egielewa et al., 2021; Eze et al., 2018; Sucuoğlu & Andrew, 2022). The implementation of eLearning will generally improve the quality of education in Nigeria (Bubou & Job, 2021). The technology serves as a tool for improving quality learning and teaching in institutions (Coopasami et al., 2017). This is done through an increase in the motivation of students to learn as well as the motivation of the teachers to teach (Bates, 2009). Another way that improvement can be achieved is through the training of new crop of teachers and upskilling existing ones to meet the pedagogical expectations of the 21st century (Oye et al., 2011).

As effective as e-learning is in the society in modern times, the system also face certain challenges (Bubou & Job, 2021). A study identified factors such as shortage of laptops/computes, lack of incentives, limited ICT skills, lack of recognition and apportioning of the copyrights for modules developed by the teachers, weak internet access and connectivity, insufficient online interaction time, and inadequate computer laboratories (Mutisya & Makokha, 2016). Results of the study further revealed that these challenges all combine to negatively impact the adoption and application of e-learning in universities in Kenya. In Nigeria, inadequate investment and absence of clear commitment to the development of e-learning solution and applications have contributed to its slow adoption and utilization in the 18 Nigerian universities studied (Kamba, 2009).

Review of Empirical Studies

In a study by Anene et al. (2014), the primary aim was to study the problems and prospects of e-learning in University of Abuja, Nigeria and this was made possible through the assessment of the availability and accessibility of e-learning resources to unravel students' adoption and use of e-learning platforms during studies. Findings of the study showed that a major challenge in the use of ICT is that of poor and inadequate infrastructure. In the survey, the Nigerian students who participated opined that the university lacks the fund to build a domain library adequate for e-learning. The students with the perception are unable to take part in online discussions, online examination and online seminars with their tutors or lecturers because of the challenge of limited bandwidth. The foregoing was evident in the study conducted by Eze et al. (2018). The consequence or fall-out of the foregoing problem is the case of perennial strikes by the ASUU, a body of the academics who always strive to force the government to correct abnormalities and increase the annual budget for the education sector (Eze et al., 2018). In recent times, HEIs in the country were shut down for long after which students reacted in form of protests to draw the attention of the government.

A study conducted was a review of the impact of e-learning on training and education by public HEIs in Nigeria's also was a discourse of the impact of e-learning technologies – and identified lack of technical know-how, power supply problems, and computer hardware high acquisition cost as factors that affect full adoption of e-learning (Nwokolo et al., 2017). Part of

the study was a mention of the prospects of the full implementation to the HEIs as well as recommendations on the future. Part of the recommendations was that governments at both the federal and state levels should prioritize investment in the ICT sector and ensure the development of the needed manpower and the creation of the enabling enablement through situating the right infrastructure for e-learning adoption and utilization to be taken seriously. The study also noted that HEIs invest in renewable energy sources as alternative power source and then encourage human capacity development through training of teaching staff towards ensuring they are able to provide learning resources in the cloud for timeless access.

A study conducted by Chiaha et al. (2013) investigated the e-learning facilities students have access to in the Nigerian public institutions, the level or extent of access by students to the facilities, and the factors that hinders them from gaining access to these facilities. Part of the results of the study revealed that over 41% of the students are able to access e-learning facilities. However, it has also been revealed in a study that students primarily have access to just an aspect of the facilities needed for e-learning, primary of which is the electronic mail (e-mail) and that factors such as poor network connection and access, and epileptic or unstable electric power supply act as hindrances to students' ability to access e-learning facilities in Nigeria (Eze et al., 2018).

A related research was conducted by Abdulhamid et al. (2017) where they investigated the elements of perpetuation intention to use e-learning among students in public universities in Nigeria and situated the study on expectancy disconfirmation theory and technology acceptance model (TAM) while the statistically sample size for the study was a total of 760 students. The study further sought to enquire onto the relationship between elements of perpetuation intention to utilize e-learning among students of tertiary institutions that are owned by the Nigerian state. Accomplishment was found to be the main determinant of perpetuation intention to use e-learning and it is based on endorsement of using e-learning, observed simplicity of use, observed excellence, and internet self-efficacy. Essentially, the study found out that these variables are significant determinants of perpetuation intention of using e-learning among students in the public-funded HEIs in Nigeria.

There are several gaps in the literature upon which the conduct of this study can be justified. However, the most significant is that the studies under review did not consider select states in Kogi State, Nigeria. The state is central to the education sector in North central Nigeria as it host about five HEIs in the country. While four of these institutions are public-owned, one is private, which provides the opportunity to also look at the adoption of e-learning by the private HEI in the state. Whereas there are numerous studies with focus on the adoption of e-learning in the education sector of Nigeria especially the HEIs or tertiary institutions, a higher number of such studies have focused on the prospects, problems, difficulties, and issues associated with the availability of e-learning facilities mostly in public HEIs (Anene et al., 2014; Eze et al., 2018). Additionally, the area of adoption and utilization of the technology in the country especially among private and public institutions have been essentially understudied.

Theoretical Framework

This study is anchored on unified theory of acceptance and use of technology (UTAUT). The theory UTAUT was introduced by Venkatesh et al. (2003). This marvelous achievement was recorded after comprehensively studying several existing related models or theories such as theory of reasoned action, TAM, motivational model, theory of planned behavior, combined TPB/TAM, model of PC utilization, innovation diffusion theory, and social cognitive theory (Venkatesh et al., 2003). It is therefore fair to say UTAUT is a theoretical advancement to many other related theories and models developed to provide a unified view regarding the adoption and diffusion of IT or information system by its proponents.

The theory is used to predict users' adoption and use of technology. It proposes that performance expectancy, effort expectancy, and facilitating conditions have direct influence on behavioral intention (BI). It also proposes that BI directly influences user behavior and that moderating variables affect relationships between constructs. The theory is well organized and discussed in a manner that it can be easily understood by anyone. Going forward, UTAUT expressly provides a more comprehensive and unified view regarding the adoption and use of technology and by extension ensure better understanding concerning user BI towards technology. Beyond this, it further captures the conditions necessary for facilitating users' intention towards adoption of technology. More so, it is a practical and the most widely reviewed or researched theory with general acceptance found to be very useful and applicable to all works on adoption and diffusion of new technology (Venkatesh et al., 2003). It is used in this study to systematize ideas on the adoption and utilization of e-learning technologies by HEIs.

METHODOLOGY

The survey research method was the research design adopted for this study. The population of the study comprised of students in the select tertiary institutions in the state of focus – Kogi State herein referred to as the study area. Purposive sampling method was used to select three tertiary institutions in the state namely Federal University, Lokoja (FULokoja), Prince Abubakar Audu University, Anyigba (PAAU) and Salem University, Lokoja (SU). These three were chosen for ownership balance. Whereas FULokoja is owned by the FGN, PAAU is state-owned while SU is private. Information from the administrative unites of the universities put the population estimate of the student at 58,380.

With the use of the Australian sample size calculator, a sample of 594 was taken from the population. With the aid of Google Form, the survey instrument was designed in line with the research objectives. The researchers adopted the simple random sampling technique to send the link to the respondents. However, as of the time the online survey instrument stopped accepting responses, 581 respondents had provided answers to the question making it approximately 98 percent response rate for the study. The attrition rate of 2 percent implies that of an insignificant number and an indication that the 98 percent returned can be grounds upon which the analysis can be drawn for the study.

Table 1. E-learning resources deployed (Field Survey, 2021)

Parameters	F (%)					Decision
	SD	D	U	SA	A	
Course module and information on course content is part of the e-learning resource.	7 (1)	6 (1)	10 (2)	216 (37)	342 (59)	Accepted
Lecture links/videos are some of the resources.	9 (2)	5 (1)	9 (2)	199 (34)	359 (61)	Accepted
Lecture notes are some of the resources.	8 (1)	9 (2)	10 (2)	218 (38)	336 (57)	Accepted
Live chats and real time (online interaction with course instructors and lecturers).	210 (36)	122 (21)	40 (7)	109 (19)	100 (17)	Rejected

Note. SD: Strongly disagree; D: Disagree; U: Undecided; SA: Strongly agree; A: Agree; & F: Frequency

Table 2. E-learning technology types deployed (Field Survey, 2021)

Parameters	F (%)					Decision
	SD	D	U	SA	A	
Certain types of e-learning technology are deployed for learning.	78 (13)	21 (4)	12 (2)	219 (38)	249 (43)	Accepted
CML is a type of technology deployed for e-learning.	81 (14)	17 (3)	280 (48)	178 (30)	25 (4)	Undecided
Interactive online learning is the type deployed.	76 (13)	11 (2)	294 (51)	181 (31)	19 (3)	Undecided
Fixed e-learning is the type deployed.	104 (18)	95 (16)	38 (7)	203 (35)	141 (24)	Accepted

Note. SD: Strongly disagree; D: Disagree; U: Undecided; SA: Strongly agree; A: Agree; & F: Frequency

Table 3. Tools used for delivery of e-learning (Field Survey, 2021)

Parameters	F (%)					Decision
	SD	D	U	SA	A	
There are specific tools used for delivery of e-learning.	69 (12)	17 (3)	33 (5)	178 (31)	284 (49)	Accepted
Web-based applications are used.	106 (18)	52 (9)	111 (19)	115 (20)	197 (34)	Accepted
Social media platforms like (WhatsApp, Google Classroom, and other specially-designed mobile applications) are used.	-	13 (2)	18 (3)	249 (43)	301 (52)	Accepted
Short messaging is also used for e-learning.	72 (12)	11 (2)	101 (17)	218 (38)	179 (31)	Accepted

Note. SD: Strongly disagree; D: Disagree; U: Undecided; SA: Strongly agree; A: Agree; & F: Frequency

Table 4. Level of adoption of e-learning technology (Field Survey, 2021)

Parameters	F (%)					Decision
	SD	D	U	SA	A	
E-learning tools are significantly adopted in my HEI.	102 (18)	101 (17)	12 (2)	250 (43)	116 (20)	Accepted
Every student is advised to acquire one form of gadget or the other for e-learning.	-	-	29 (5)	301 (52)	251 (43)	Accepted
The adoption of e-learning tools in my HEI is high.	89 (15)	81 (14)	27 (5)	140 (24)	244 (42)	Accepted
There is no form of e-learning adoption in our HEI.	298 (51)	188 (32)	15 (3)	67 (12)	13 (2)	Rejected

Note. SD: Strongly disagree; D: Disagree; U: Undecided; SA: Strongly agree; A: Agree; & F: Frequency

Table 5. Effectiveness of the e-learning tools in learning (Field Survey, 2021)

Parameters	F (%)					Decision
	SD	D	U	SA	A	
E-learning tools are effective in learning.	89 (16)	29 (5)	17 (3)	204 (35)	241 (41)	Accepted
Tools aid flexibility in learning.	30 (5)	19 (3)	32 (6)	286 (49)	214 (37)	Accepted
Convenient learning time is enabled through e-learning.	89 (15)	81 (14)	27 (5)	140 (24)	244 (42)	Accepted
There is course load reduction by virtue of e-learning adoption.	88 (15)	69 (12)	310 (53)	68 (12)	46 (8)	Undecided

Note. SD: Strongly disagree; D: Disagree; U: Undecided; SA: Strongly agree; A: Agree; & F: Frequency

FINDINGS

Demographic data from the survey revealed that more men took the. Furthermore, students in L-200 are more in the number of respondents that took the survey. Meanwhile, more persons in humanities and engineering participated in the survey as they constituted 51 percent of the number of participants in the exercise. Whereas 38 percent of the respondents are students of FULokoja, 32 are students of PAAU, and 30 are of SU. By the foregoing, more of the respondents of FULokoja took the survey upon receipt of the Google Form-enabled link.

The data seen in **Table 1** demonstrate that e-learning resources/materials deployed through the use of e-learning technologies include course module and information on course contents, lecture links and videos, and lecture notes. However, live chats and real-time online interaction with course instructors were rejected as part of the materials.

Data in **Table 2** reveal that the specific technology types used for e-learning are computer managed learning (CML), interactive online learning, and fixed e-learning. However, 35 percent and 24 percent strongly agreed and agreed to the notion that fixed e-learning is one of the types of technologies deployed for learning in the HEIs studied. That CML and interactive online learning as types were both rejected by respondents.

In **Table 3**, data show that tools utilized for e-learning include those that are web-based, social media platforms, and short messaging systems.

The result in **Table 4** shows that there is a significantly high level of adoption and use of e-learning technologies in the various HEIs in the state in which the survey was conducted.

Data in **Table 5** show that the effectiveness of e-learning technology on the learning experiences of students include flexibility and convenient learning time. However, the

Table 6. Usefulness of e-learning technology (Field Survey, 2021)

Parameters	F (%)					Decision
	SD	D	U	SA	A	
Technology has become useful in the classroom.	17 (3)	21 (4)	39 (7)	321 (55)	183 (31)	Accepted
It is used for delivery lectures.	18 (3)	15 (3)	52 (9)	197 (34)	299 (51)	Accepted
It aid in delivery other pedagogical materials.	78 (13)	97 (17)	238 (41)	107 (19)	61 (10)	Undecided
It provides means for simplification of task.	81 (14)	68 (12)	319 (55)	70 (12)	43 (7)	Undecided

Note. SD: Strongly disagree; D: Disagree; U: Undecided; SA: Strongly agree; A: Agree; & F: Frequency

Table 7. Challenges (Field Survey, 2021)

Parameters	F (%)					Decision
	SD	D	U	SA	A	
Certain challenges are associated with the adoption and use of e-learning technology.	82 (14)	19 (3)	27 (5)	219 (38)	234 (40)	Accepted
Poor Internet connectivity is a major challenge.	17 (3)	119 (20)	31 (5)	265 (46)	149 (26)	Accepted
High cost of e-learning tools acquisition is a challenge.	309 (53)	35 (6)	19 (3)	108 (19)	110 (19)	Rejected
Lack of technical know-how is an also challenge.	70 (12)	70 (12)	298 (51)	85 (15)	58 (10)	Undecided

Note. SD: Strongly disagree; D: Disagree; U: Undecided; SA: Strongly agree; A: Agree; & F: Frequency

respondents were undecided in respect of the course load reduction effective point of e-learning.

In **Table 6**, data show that e-learning technologies have become useful in the HEIs based on their use for delivery of lectures. Respondents are, however, undecided as to the aid they provide in delivery of other pedagogical materials and simplification of tasks.

Table 7 presents data that show that poor internet is a major challenge in the adoption of e-learning technology. Respondents rejected the point that high acquisition cost of e-learning tools is a challenge and were undecided on lack of technical know-how constituting as challenge in the adoption.

DISCUSSION OF FINDINGS

Findings of this study showed that there is adoption of e-learning technologies in the select HEIs in Kogi State as lecture link videos, course module and information on course content and lecture notes are some of the e-learning resources deployed. Data in **Table 1** showed that majority of the respondents agreed with the notion that the technology deploys the resources as captured in the foregoing. What the foregoing finding implies is that there is significant knowledge of the adoption and use of technology in the educational system. This is in consonance with the findings of earlier studies on the knowledge and awareness of e-learning technologies in Nigeria (Musa et al., 2021; Odegbesan et al., 2019).

The data from the study also showed in **Table 2** that fixed e-learning is the main type of e-learning technology deployed in the HEIs studied. Additionally, the researchers found that respondents were undecided as to whether or not CML and interactive online learning were part of the e-learning technologies adopted for teaching and learning in the HEIs in the state. This is based on the perception of 48 percent of the respondents who were undecided in respect of CML and 51 percent who were undecided in respect of the use of interactive online learning as the type of technology. The implication of these results is that the main focus of e-learning technology deployed in the select HEIs in Kogi State is that of fixed learning.

The study demonstrated that e-learning in the HEIs is delivered through certain channels or tools. According to the data in **Table 3**, the specific tools are web-based applications, social media platforms such as WhatsApp, Google Classroom, and other specifically-designed mobile applications as well as short messaging system. A major take-away from the results from the survey is that there is a growing acceptance of certain social media tools in educational content delivery in some of the HEIs in Nigeria. WhatsApp happened to be prominently utilized tool/platform for content delivery to the end-user and these. This contrast results of earlier studies which showed the adoption of advanced form of technologies for teaching (Eze at al., 2018, 2020; Tonukari & Anyigba, 2023).

As revealed in **Table 4**, study findings revealed the level of adoption of e-learning in the HEIs. Researchers found out that e-learning technology adoption is of significant extent. First, this was demonstrated by virtue of the fact that every student is advised to acquire one form of gadget or the other so as to have access to e-learning system-delivered content. Second, data also showed that the level of adoption is high based on the notion of 24 percent respondents who strongly agreed and 42% who agreed to the notion that adoption is high. Lastly, respondents rejected the notion that there is no form of e-learning adoption in their HIEs. Therefore, it suffices to state that there is a reasonably high level of adoption of e-learning in the select HEIs in Kogi State.

Further findings highlight several ways or areas of effectiveness of e-learning technology on the learning experience of the students. Data in **Table 5** showed that the e-learning tools adopted in the HEIs aid flexibility in learning and occasioned convenience in learning time. However, data also showed that respondents are undecided as to the effectiveness of e-learning being that of course load reduction. This implies that there are areas of positive effect in respect to the use of e-learning technology for learning in the HEIs. This mirrors the results from a similar study conducted by Kokoç (2019) where findings showed that there is flexibility in learning by virtue of the use of e-learning technologies.

Study's findings as seen in **Table 6** demonstrated that technology has become useful in the classroom as their use for delivery of lecture in modern time is one of the proofs. However, there are certain challenges faced in the adoption and utilization of e-learning technologies in the selection of HEIs. Accordingly, respondents that took the survey are of the opinion that poor internet connection is a challenge. They, however, rejected the notion that high cost of acquiring e-learning tools is a challenge and undecided in respect of lack of

technical know-how posing a challenge. Implication of this result is that there are challenges associated with e-learning technology adoption.

CONCLUSION AND RECOMMENDATIONS

From the above findings, the researchers concluded that there is need for the adoption of technology for e-learning as they are used for learning. Specific findings of the study informed the foregoing conclusion. In specific terms, researchers also concluded that e-learning technologies are useful in lecture delivery, curriculum development and other related pedagogical purposes. Furthermore, the researchers also concluded that HEIs in the study area used to fixed e-learning type of technology but that innovation in technology show that other options are more effective. The implication of the foregoing is that digitally-delivered contents have moved from the fixed to more advanced forms of delivery which HEIs must now strive to acquire. Against this backdrop, this study recommends that:

1. There should be deliberate efforts on the part of HEIs in the country; privately and publicly owned ones to ensure that e-learning adoption and acquisition is a matter of priority. If funding is a challenge, then it can be done in collaboration with financial institutions on an overdraft or loan repayable within a period. This will ensure that there is steady technological acceptance among the students and will be instrumental to educational development in the country.
2. The government through the Nigerian Communications Commission in conjunction with telecommunication companies makes provision for a better coverage to forestall cases of poor network connectivity identified as part of the problems militating against the adoption and utilization of e-learning in some HEIs.
3. A significant solution to the problem of lack of technical know-how is the training and re-training of both teachers and students. Such trainings should be organized to teach appreciation of basic e-learning tools and emphasis laid on the need to embrace these technologies. The need for such technical knowledge does not just apply to education sector alone but extends to other areas of national life which implies that the drive should start from the elementary school system where children are taught basic steps of handling e-learning tools or technologies.

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