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Saidu, M.

College of Education Waka-Biu, Borno State, Nigeria

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Saidu, M.

College of Education Waka-Biu, Borno State, Nigeria

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Abstract

This research explored the integration of technology in teaching and learning at College of Education, Bama. Hence, the evolution of the educational landscape, has brought about the acceptance of technological tools as a norm for improving pedagogical productivity and student's commitment. The study employed a mixed- methods approach, which combines quantitative surveys and qualitative interviews, in assessing the current state of the use of technology among schools and students and further identified opportunities and challenges associated with technological integration. The research highlighted all the gains which technology brings on learner motivation stemming from the facilitation of interactive learning environments. Thus, the inherent differences on the access and utilization of technological tools emphasizes the need for targeted interventions to ensure equitable technology integration across varying school populations. Conclusively therefore, the study recommended strategic policies that will promote professional development for educators, encourage a culture of innovation within and among institutions, and improve technical infrastructures. Therefore, by contending with current limitations and cashing in on the use of technology effectively, the College of Education, Bama will be capable of improving educational outcomes and prepare future educators for a better technologically- driven society. This research contributed to the broader discourse on educational technology in Borno state, by offering clear understanding and practical solutions to advance teaching and learning practices in the region.

Keywords: Technology, Teaching and Learning, ICT

For corresponding author:
E-mail: *info@esxpublishers.com*
Subject: *1025-0220.*

Introduction

The inclusion of technology in teaching and learning has brought about a critical component in higher education, especially in developing countries such as Nigeria, which has gained popularity because of the rapid advancements and spread in the use of information and communication technology (ICT), where it has also provided new ways to acquire knowledge and improve educational outcomes (Kumar and Sahu, 2020). Thus, within the context of the College of Education Bama, to comprehend the impact of technology on educational practices is vital because of the unique ways it will help in tackling and solving challenges and providing opportunities for both students and educators alike.

Therefore, in recent years, several studies have shown the benefits of incorporating technology in all educational settings, which has helped increase students engagement, improved access to resources, and intensified collaboration among learners (Adedoyin and Soykan, 2020). Interestingly, digital tools such as multimedia, learning management systems, and interactive e- learning platforms have turned traditional teaching methodologies into a more dynamic, student- centered methodologies (Benefield, 2022). However, while the potential advantages of technology are extensive, implementation remains restrained by factors like, inadequate infrastructure, insufficient training for schools, and limited access to technology for students in rural areas (Owoeye and Yusuff, 2021).

In perspective also, the integration of technology within the main stream of educational institutions in Borno state has been further complicated by socio- political challenges and limited resources like, the Boko Haram insurgency which is a manifest exemplification in view, that has led to a large scale infrastructural damage and paucity in qualified teachers (Fadilah, 2021). Thus, to help in striving to recover and rebuild, an effective technology in place will present a practical pathway for enhancing educational delivery and bridging the gaps worsened by these misfortunes.

To juxtapose this therefore, the College of Education Bama, stands at a critical juncture where technology integration may serve as a ready catalyst for pedagogical innovation and enhanced learning outcomes, that can help develop strategies that would contribute to effective teaching and learning experiences, and also become increasingly important to examine how technology can be meaningfully integrated into academic curricula to prepare future educators for the demands of the 21st century and beyond (Gordon and Dorey, 2021). Consequently, this study seeks to examine the integration of technology in teaching and learning within the College of Education Bama, that will contribute to the advancement of education in Borno state, and perhaps Nigeria as a whole.

Statement of the Problem

The integration of technology in teaching and learning has been seen to have attracted significant attention in educational research, particularly within the context of higher education. Worthy of note therefore, in Nigeria, the College of Education Bama, represents a critical case for examining how technology can enhance educational practices and outcomes. Notwithstanding, the possible benefits of technology integration in schools, which includes improved access to resources, increased student engagement, and enhanced learning experiences (Obi *et al.,* 2020), the actual implementation in institutions like Bama faces a wide range of demands.

Worthy of note however, some of these challenges include infrastructural deficits, a lack of adequate training for both educators and students, and perhaps a culpable resistance to change from traditional pedagogical methods (Kicinger, 2019). Furthermore, socio- economic factors, such as limited internet connectivity and insufficient funding, contributes majorly in complicating the successful adoption of technology in these educational settings (Oyekan and Johnson, 2019). Consequently, this situation has raised a lot of questions about the effectiveness of existing technological initiatives and their actual impact on teaching and learning processes within the college.

Pertinently also, the gap observed in the literature provides a veritable credence on the need for empirical research to investigate the specific barriers to technology integration in the College of Education Bama. Hence, identifying these factors will provide valuable insights into how technology can be effectively and efficiently harnessed to improve educational outcomes which will thereby prepare future educators for the demands of a digitally- driven learning environment (Adebayo *et al.,* 2021). Therefore, this research aims to bridge this gap and in addition contribute to the wider discourse on technology integration in Nigerian educational institutions.

Objectives of the Study

This research aimed at exploring the importance of integrating Technology in Teaching and Learning in College of Education Bama, with the sole goal of improving educational outcomes and preparing students for a technology- driven world. While the objectives of the study are to:

i. Evaluate current technology usage
ii. Identify barriers and challenges
iii. Analyze the impact on learning outcomes

Literature Review

Technology

The concept of Technology can be defined as the application of scientific knowledge for practical purposes, especially in industry (Oxford Dictionaries, n.d). This encompasses the tools, machines, and systems that are developed by

humans to solve problems, achieve goals, and or improve the quality of life (Ropohl, 2020). Therefore, as technology is constantly evolving and shaping the world in which we live in, the driving innovation and progress in various fields such as education, communication, transportation, health care, and more are constantly improved through technology (Rosenberg, 2017).

Information Communication Technology (ICT)

The concept of Information Communication Technology (ICT) refers to the use of a wide range of technologies such as computers, software, and telecommunications to manipulate and communicate information effectively (UNESCO, 2020). ICT encompasses a variety of technologies and tools that ease the creation, storage, processing, and transmission of information in various forms, such as text, images, and multimedia amongst others (OECD, 2019).

Pedagogy in Teaching and Learning

The concept of Pedagogy refers to the strategies and methods used by educators to enhance learning and development in students. This include understanding how students learn best and helping them to tailor instructions to meet their individual needs. Darlington Hammond (2017), posits that effective pedagogy should involve creating a supportive and inclusive learning environment that will encourage and motivate students to achieve their learning objective.

Empirical Literatures

Relevant literatures explaining the importance of integrating technology in teaching and learning in College of Education Bama are reviewed under the following sub- heading:

Current usage of Technology in Teaching and Learning in Colleges of Education

Ajani and Aregbesola (2023). The impact of digital technology integration on teaching effectiveness of college education lecturers in Nigeria. International Journal of Educational Technology, 15(1), 45- 58. The authors explored how digital technology integration impacts on teaching effectiveness, but their study did not dig into specific challenges that lecturers face in putting to use, these technologies in rural contexts, such as in Bama, Borno State. Bello and Zubair (2022). Evaluating the use of educational technology resources in Nigeria's Colleges of Education: A focus on student's engagement and learning outcomes. Journal of Educational Research and Practice, 12(3), 189- 204. The authors were only specific on the role of educational technology in enhancing student's engagement and learning outcomes. However, their study primarily examines responses from urban institutions, leaving a knowledge gap which is based on the review and experiences of students and instructors in rural colleges like those in Borno State.

Barriers and Challenges faced in the use of Technology to Teach and Learn in Colleges of Education

Ojo and Eze (2021). Exploring the barriers to the integration of technology in teaching and learning in Nigerian colleges of education. Journal of Educational Technology Systems, 49(3), 263- 275. The authors study identified several barriers to technological integration in Nigerian colleges, such as inadequate infrastructure, lack of training for educators, and poor internet access amongst others. However, their study did not explore and proffer solutions for overcoming the challenges identified, nor does it probe into the perception of students on the significance of technology integration in their learning process.

Adeyemi and Wokoma (2022). Adoption of digital tools in teaching practices: Challenges faced by Nigerian educators. International Journal of Educational Research, 111, 101835. doi: 10. 1016/j.ijer.2021.101835. The authors outlined various challenges, which includes amongst others, resistance from faculty, insufficient institutional support, and financial constraints that readily prevent the adoption of digital tools in educational practices. However, their study neither considered the roles which student's engagement and feedback may play in facilitating the adoption of digital tools, nor did it evaluate the effectiveness of existing technologies currently put in use.

Impact of Technology in Learning Outcomes in Colleges of Education

Salami and Ndamani (2022). The impact of digital resources on pedagogical practices in teacher education colleges in Nigeria. International Journal of Educational Technology in Higher Education, 19(1), 1- 15. The authors provided in their study, insights into how digital resources could support pedagogical practices. However, they did not specifically address the long term effects of technological integration on student's academic performance in Colleges of Education.

Abubakar and Ibraheem (2023). Learning outcomes in a digital age: Exploring the role of ICT in teacher education in Nigeria. Journal of Educational Research and Practice, 13(3), 112- 126. The authors in their research highlighted the positive correlation between ICT use and academic achievements. Though, their work lacks a comprehensive analysis of the barriers faced by educators in effectively integrating technology use in their teaching process.

Materials and Method

This research adopted a mixed- methods approach in investigating the significance of integrating technology in teaching and learning at College of Education Bama. The methodology was divided into two main components of quantitative and qualitative approaches.

The Quantitative Approach

Survey Design

A structured questionnaire was developed in collecting data from a representative sample of students and school/ faculty members. The questionnaire evaluated the availability of technological resources, the frequency of time technology was used in teaching, and the general perceptions of the effectiveness of technology in enhancing educational outcomes.

Population of Study

The population for this study was the total number of students in College of Education Bama, which encompass all the students representing various departments. Hence, the total number of registered students was 1350.

Sample Size and Sampling Technique

A stratified random sampling technique was used in ensuring and capturing the diverse representation across different departments in College of Education Bama. Thus, a sample size of three hundred and twenty six (326) students were randomly selected out of the 1350 registered students as shown in Table 1.

Data Collection

Data for this study was collected using structured questionnaires. The primary data collected were analyzed using descriptive that involved the use of frequencies and percentages.

The Qualitative Approach

Interviews and Focus Groups

An in- depth interview was conducted with selected school/faculty members in gaining insights into their various experiences and challenges regarding the need for technology integration. Additionally, a focus group discussion was organized in exploring their viewpoints on technology- enhanced learning.

Observational Method

A classroom observation was carried out in evaluating the actual use of technology in teaching practice sessions. This helps in triangulating data from surveys and interviews that was subsequently offered in comprehensive view of technology usage.

Ethical Considerations

In conducting this research an informed consent was obtained from all the participants, with full assurances of ensuring anonymity and confidentiality of responses from them, after clearly communicating the purpose of the research and how the data obtained was used.

Measurement of the Respondents Perception towards the use of ICT

Respondents' perception towards the use of ICT was measured on a five-point likert scale of strongly agreed through strongly disagreed. The score attached to each scale is as follows: strongly Agree SA (5), Agree A (4) Undecided U (3), Disagree D (2) and Strongly Disagree SD (1).

The scoring was reversed for negative statements. An average score of 3.0 and above was regarded as agreed and below 3.0 as disagree for positive statements. For negative statements, an average score of 3.0 and above was regarded as disagree and below 3.0 as agreed. Total perception score for each statement was computed and the average was determined. Also, the overall averages for positive and negative statements were determined. Based on the deviation of the averages from the cut-off point (3), scores were grouped into two categories namely: favourable and unfavourable perceptions.

Result and Discussion

Respondents' Perception on the Application of ICT

Table 2 above reveals lecturers' perception towards the use of ICT in teaching/learning in College of Education Bama. The table consists of twelve statements that were presented to the respondents. To determine their general perception towards the use of computer in teaching, the average of average for both statements with favourable (4.07) and unfavourable (1.81) were calculated. This is indicative that the respondents had favourable perception towards the use of computer in the performance of their duties.

Table 3 presents the analysis of lecturers' perception toward the use of internet for teaching/learning. The overall average for both statements, favourable (4.07) and unfavorable (1.93), indicates that the perception of lecturers on using

internet in teaching and learning is favourable. Table 4 consists of six statements and presents the analysis of the results of students' perception on the application of ICT. The table reveals 4.03 as the overall average scores for positive statements, while 2.6 overall average for negative statements. It is obvious here, also, that the general result reveals that the overwhelming majority of the respondents (students) have positive perceptions of the application of ICTs in learning activities.

The findings of this study established that both lecturers and students are satisfied with the application of ICT in teaching and learning. For all agreed that it would facilitate teaching and learning and feel that the application of ICT is relevant and important. Despite the fear shown by respondents on some aspects, particularly on reliability and authenticity of reference materials from internet, their responses have all suggested positive perception on the application of ICT in teaching/learning activities.

Conclusion and Recommendation

The summary on the analysis of the perception of lecturers and students on the application of ICT in teaching and learning in Colleges of Education Bama. This is evident from the fact that; the majority of the respondents had positive perception on the use of computer and Internet in teaching/learning. However, the enthusiasm shown by both lecturers and students regarding the application of ICT in teaching and learning, particularly as demonstrated by their positive perception, suggests a great hope that in the near future the trend will definitely reach the desired status of proper application, integration and transformation stages in college of education Bama.

Therefore, to intensify effort in creating awareness and encouraging researches on the application of ICT in teaching/learning, particularly, for the attainment of great success and realization of positive result from Information and Communication Technologies. It is therefore recommended that strategic policies that will promote professional development for educators, encourage a culture of innovation within and among institutions, and improve technical infrastructures should be implemented by both state and federal government of Nigeria.

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Tables

Table 1: Student's Population and sample selected from COE Bama

S/N	Institution	Population	Sampled
1	COE Bama	1350	326
Total		**1350**	**326**

Table 2: Distribution of Lecturers' Perception towards the use of ICT

S/N	Statements	SA	A	UN	D	SD	Total	F	Points	AV.
1.	I feel comfortable with the role of computer as a tool in teaching and learning.	61%	30%	5%	2%	2%	100%	41	182	4.44
2.	The use of the computer as a learning tool excites me	47%	44%	7%	2%	-	100%	41	178	4.34
3.	The use of computer is a valuable tool for teachers.	52%	39%	2%	2%	5%	100%	41	176	4.29
4.	The use of computer helps students to express their thinking in better and different ways.	17%	78%	5%	-	-	100%	41	169	4.12
5.	The use of computer helps lecturers to teach in more effective ways.	27%	71%	2%	-	-	100%	41	174	4.24
6.	The use of computer makes students reluctant to learning.	-	-	14%	59%	27%	100%	41	77	1.88
7.	The use of computer is not conducive to student learning because it is not easy to use.	-	-	10%	49%	41%	100%	41	69	1.68
8.	The use of computer distorts students understanding of concepts.	-	-	2%	81%	17%	100%	41	76	1.85
9.	The application of computer creates inaccuracy in teaching activities.	-	2%	20%	54%	24%	100%	41	82	2
10.	The use of computer reduces creativity in teaching/learning	-	-	5%	54%	41%	100%	41	67	1.63

Source: Field Survey, 2025

Table 3: Distribution of Lecturers' Perception towards the Use of Internet for Teaching/Learning.

S/N	Statements	SA	A	UN	D	SD	Total	F	Points	Av.
1.	It gives me the opportunity to follow daily events.	30%	56%	7%	5%	2%	100%	41	166	4.05
2.	It makes access to information easier.	30%	59%	7%	2%	2%	100%	41	168	4.10
3.	It excites me to reach the world from home and school.	44%	37%	10%	7%	2%	100%	41	169	4.12
4.	It helps me to improve myself by learning new things.	38%	56%	2%	2%	2%	100%	41	173	4.22
5.	It offers new opportunities like distance learning.	22%	59%	12%	7%	-	100%	41	162	3.95
6.	It supports development in educational activities.	29%	64%	5%	2%	-	100%	41	162	3.95
7.	It irritates me due to wrong information.	-	12%	29%	32%	27%	100%	41	93	2.27
8.	It is time consuming.	-	-	5%	73%	22%	100%	41	75	1.83
9.	It encourages laziness in teaching/learning activities.	-	2%	2%	66%	30%	100%	41	73	1.78
10.	It makes lessons boredom by performing various activities.	-	-	7%	64%	29%	100%	41	73	1.78
11.	It is difficult to authenticate sources and their reliability.	24%	56%	16%	2%	2%	100%	41	163	3.98
12.	It promotes the practice of plagiarism in academic activities	-	-	10%	56%	34%	100%	41	72	1.76

Source: Field Survey, 2025

Table 4: Student's perception on the application of ICT in Teaching/Learning

S/N	Statements	SA	A	UD	D	SD	Total	F	AV.
1.	Application of ICT is very important in learning.	27%	59%	7%	6%	1%	100%	2	4.06
2.	The use of the computer is very relevant in learning.	27%	56%	10%	6%	1%	100%	2	4.01
3.	Application of ICT makes the study easy.	30%	54%	6%	8%	2%	100%	2	4.03
4.	The use of computer makes students reluctant to learning.	-	5%	16%	44%	35%	100%	2	1.91
5.	The use of computer encourages laziness in teaching/learning activities.	4%	6%	9%	50%	31%	100%	2	2.02
6.	It is difficult for to authenticate reliability of references from internet.	29%	48%	6%	15%	3%	100%	2	3.87

Source: Field Survey, 2025