

THE USE OF TECHNOLOGY-BASED TEACHING METHODS AMONG ACADEMIC STAFF MEMBERS IN PUBLIC TERTIARY INSTITUTIONS IN EKITI STATE, NIGERIA

FOLASADE BUSAYO OGUNTOYE¹, ABOSEDE FISAYO HAMMED^{2*}, OLUWASEUN OLUROPO AJIBARE³

¹Department of Information Management, Lead City, University, Ibadan, Oyo State, Nigeria

²Department of Office Technology & Management, Federal Polytechnic, Ado-Ekiti, Nigeria

³Department of Information Management, Lead City, University, Ibadan, Oyo State, Nigeria

*Corresponding author: hammedabosed33@yahoo.com

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Abstract

The purpose of the paper was to examine the use of technology-based teaching methods among academic staff members in public tertiary institutions in Ekiti State. The study was guided by three research questions. The study adopted a quantitative survey research design to achieve the purpose of the study. A structured questionnaire was used as a primary source of data collection. The data collected from the respondents were analysed using descriptive statistics (for example, mean and standard deviation) and inferential statistic (for example, Chi-Square). One hundred and fifty (150) copies of the questionnaire were administered on the respondents, comprising of some selected academic staff members of the five public tertiary institutions in Ekiti State. The result showed that the level of availability of technology-based teaching methods in tertiary institutions in Ekiti State is high. The result also revealed that academic staff members in the five public tertiary institutions in Ekiti State often utilize variety of emerging technologies during teaching. The result further showed that there is a significant moderate interplay between emerging technologies and quality service delivery among academic staff members in public tertiary institutions in Ekiti State. The authors recommended, among others, that tertiary institutions should endeavour to intensify efforts to provide comprehensive training programmes for academic staff members on emerging technologies in order to foster teaching effectiveness.

Keywords: *Academic Staff Members, Service Delivery, Emerging Technologies, Public Tertiary Institutions, Technology-Based Teaching Methods.*

Introduction

In this 21st century, technology is an important tool to achieve the goal of education. This is because technology has become a tool for knowledge transfer in most countries. Nowadays, emerging technologies has gone through innovations and transformed many societies which has totally changed the way people think, work and live (Grabe, 2017). As part such institutions, particularly educational institutions which are supposed to prepare students to live in “a knowledge society” need to integrate technology into their curriculum (Ghavifekr, Afshari & Amla Salleh, 2017). Emerging technology in education refers to the use of computer-based communication that incorporate into daily classroom instructional process. In conjunction with preparing students for the current digital era, academic staffs are seen as the key players in using ICT in the classrooms. This is

due to the importance of ICT in providing dynamic and proactive teaching-learning environment (Arnseth & Hatlevik, 2012). While, the aim of emerging technology is to improve and increase the quality, accessibility and cost-efficiency of the delivery of instruction to students, aims at networking the learning communities to face the challenges of current globalization (Albirini, 2016). However, the process of adoption of ICT is not a single step, but it is an on-going and continuous steps that fully support teaching and learning as an information resources (Young, 2020).

Generally, emerging technology in education involves technology-based teaching and learning process that closely relates to the utilization of learning technologies in the classroom. Due to the fact that students are familiar with technology and will learn better in technology-based environment, the issue of emerging technology, specifically in the classroom is essential. This is because, the use of technology in education contributes a lot to the pedagogical aspects in which the application of ICT will lead to effective learning with the help and supports from ICT elements and components (Saubern et al., 2023). It is needed to say that almost all expunge subjects ranges from mathematics, science, languages, arts and other major fields can be learned more effectively through technology-based resources and equipment. In addition, ICT provides the help and complementary supports for both academic staff and students where it involves effective learning with the help of the computers to serve the purpose of teaching and learning aids (Sheikh, 2021).

Technology-based teaching and learning make many changes in institution that requires for proper planning and policy making. However, lack of adequate ICT equipment and internet access are some of the key problems that hinder effective teaching and learning delivery in educational institutions. In most institutions, technical difficulties sought to become a major problem and a source of frustration for students and academic staff and cause interruptions in teaching and learning process. If there is low supply of technical assistance and no solution, academic staffs are not able to use the computer for academic purpose. The implication is that academic staff will be discouraged from using computers because of fear of the ineffectiveness of equipment and facilities since they are not given any assistance on the possibilities of overcoming the issue. A preliminary investigation revealed that technical problems have become a major barrier to the instructional delivery of academic staff. These problems include low connectivity, virus attack and dysfunctionality of printing gadgets. It is based on this precarious situation that the authors decided to provide empirical data on the use of technology-based teaching methods among academic staff members in public tertiary institutions in Ekiti State.

Objectives of the Study

The aim of this study is to examine the use of technology-based teaching methods among academic staff members in public tertiary institutions in Ekiti State. Specifically, the study seeks to examine:

1. the levels of availability, adequacy and utilization of technology-based teaching methods among academic staff members in public tertiary institutions in Ekiti State.
2. the kinds of technology-based teaching methods utilized by academic staff members in public tertiary institutions in Ekiti State for instructional delivery.
3. the interplay between emerging technologies and quality service delivery among academic staff members in public tertiary institutions in Ekiti State.

Research Questions

The following research questions guided study.

Research Question 1: What are the levels of availability, adequacy and utilization of technology-based teaching methods among academic staff members in public tertiary institutions in Ekiti State?

Research Question 2: What are the kinds of technology-based teaching methods utilized by academic staff members in public tertiary institutions in Ekiti State for quality service delivery?

Research Hypothesis

The following null hypothesis were formed to guide the study.

Research Hypothesis: There is no significant interplay between emerging technologies and quality service delivery among academic staff members in public tertiary institutions in Ekiti State.

Theoretical Framework

Constructivist Learning Theory

The constructivist learning theory was propounded in the 1950s by a Swiss psychologist, named: Jean Piaget, who postulated that learners actively construct their own knowledge by engaging with their environment and reflecting on their previous experiences. This theory posited that learning is a dynamic process that involves the integration of new information with existing cognitive structures. According to Piaget, learners progress through stages of cognitive development, where they build more complex mental frameworks as they encounter and assimilate new information. In the context of teaching methods in public tertiary institutions in Ekiti State, the constructivist learning theory implies that academic staff should foster an environment that encourages active engagement and critical thinking. This could involve techniques such as problem-based learning, inquiry-based approaches, and collaborative group work. These methods encourage students to explore and construct knowledge through hands-on experiences, discussions, and reflective activities.

Additionally, the theory emphasizes the importance of scaffolding, which involves providing appropriate support and guidance to students as they engage in complex tasks. This ensures that students are challenged but not overwhelmed, leading to optimal learning outcomes. Instructors can facilitate this process by adapting their teaching strategies to match the current cognitive development stage of their students. Implementing constructivist principles can enhance the quality of education by promoting deeper understanding, critical thinking skills, and the ability to apply knowledge in practical situations. It also aligns with contemporary educational paradigms that emphasize learner-centered approaches.

Service Quality Theory

The service quality theory was introduced by Zeithaml, Parasuraman and Berry in 1985. This theory was initially developed as a conceptual framework to measure and evaluate the quality of services provided by organizations across various industries. This theory identifies five dimensions of service quality, namely: reliability, assurance, tangibles, empathy and responsiveness. In the

context of education, particularly tertiary institutions, this theory can be adopted to assess the quality of service delivery by academic staff members. Reliability pertains to the consistency and dependability of services. In an educational context, this could involve the timely delivery or provision of course materials, adherence to schedules, and consistent provision of feedback. Assurance relates to the competence, knowledge, and courtesy of service providers. In academia, this translates to the expertise of academic staff, their ability to effectively communicate course content, and their approachability for academic and personal support. Tangibles refer to the physical and tangible aspects associated with the service. In a university setting, this might include the quality of learning resources, the availability of modern teaching facilities and accessibility of technology for educational purposes. By integrating constructivist learning theory and service quality theory into this study, one can comprehensively evaluate the academic staff members service delivery via emerging technology-based teaching methods in public tertiary institutions in Ekiti State. These dual perspectives would help ensure a holistic understanding of the educational experience and offers valuable insights for enhancing the quality of education in the region.

Methods

Research Design

The paper utilized a quantitative survey research design to collect and analyse data. This type of design is appropriate and relevant in a study such as this because they help to empirically test the strength of interplay between the research variables.

Population and Sampling Procedure

The population of this study comprised of all the academic staff members in public tertiary institutions across Ekiti state, namely: Ekiti State University, Federal University Oye-Ekiti, Federal Polytechnic Ado-Ekiti, Ekiti State Polytechnic Isan-Ekiti, Bamidele Olumilua University of Education, Ikere-Ekiti. A convenience sampling technique was employed to select 150 academic staff members across the institutions.

Data Collection Instrument

The structured questionnaire was distributed personally to the respondents, with the help of 5 research assistants who were briefed on the procedure to follow. The respondents were contacted through letters before the structured questionnaire were administered on them using the direct contact modality. The respondents were allowed to fill the structured questionnaire and were retrieved immediately.

Validation and Reliability of Instrument

The structured questionnaire was subjected to face and content validation by two directors at the Federal Polytechnic, Ado-Ekiti, with necessary changes implemented based on their input. To ensure reliability, a test-retest method was applied, administering 10 copies of the validated instrument to the respondents, which were from outside the sample.

Data Analysis

The SPSS version 23.0 was employed to analyze the data collected from the participants. The descriptive statistics (for example, mean and standard deviation) were used to answer the research questions and the inferential statistic (for example, Chi-Square) was used to test the hypothesis at a 0.05 level of significance.

Result

Answering Research Questions

Research Question 1: What are the levels of availability, adequacy and utilization of technology-based teaching methods among academic staff members in public tertiary institutions in Ekiti State?

Table 1: Mean and standard deviation on the levels of availability, adequacy and utilization of technology-based teaching methods among academic staff members in public tertiary institutions in Ekiti State.

S/N	Items	A	D	Min	Max	M	SD
1.	The institution provides adequate training and support for faculty to integrate technology into their teaching practices.	130	20	1	2	1.33	0.34
2.	There is sufficient access to computer labs and internet connectivity for students and faculty in my institution.	140	10	1	2	1.07	0.25
3.	The institution encourages the use of online platforms for collaborative learning and discussions.	150	0	1	2	1.00	0.00
4.	Assessments in my institution often involve the use of online tools or platforms.	135	15	1	2	1.11	0.30
5.	The institution regularly updates its technological infrastructure to keep up with advancements in educational technology	120	30	1	2	1.20	0.40

Note. M = Mean, SD = Standard Deviation, A = Agree, D = Disagree, n = 150.

Table 1 showed that highest percentage of the respondents agreed that the institution provides adequate training and support for faculty to integrate technology into their teaching practices with a mean of 1.33 and a standard deviation of 0.34. Item 2 also indicated that 140 respondents of the respondents agreed that there is sufficient access to computer labs and internet connectivity for students and faculty in their institution with a mean of 1.07 and a standard deviation of 0.25. Item 3 also indicated that all the respondents agreed that their institution encourages the use of online platforms for collaborative learning and discussions. Regarding assessments with a mean of 1.00 and a deviation 0.00, 135 of the respondents agreed that their institution often involves the use of online tools or platforms with a mean of 1.11 and a standard deviation of 0.30. Finally, 120 of the respondents agreed that their institution regularly updates its technological infrastructure to keep up with advancements in educational technology with a mean of 1.20 and standard deviation of 0.40. All in all, the findings showed that technology-based teaching methods is highly available in public tertiary institutions in Ekiti State.

Research Question 2: What are the kinds of technology-based teaching methods utilized by academic staff members in public tertiary institutions in Ekiti State for quality service delivery?

Table 2: Mean and standard deviation on the kinds of technology-based teaching methods utilized by academic staff members in public tertiary institutions in Ekiti State for quality service delivery.

S/N	Items	Agree	Disagree	Min	Max	<i>M</i>	<i>SD</i>
1.	The use of Learning Management Systems (LMS) is common among academic staff members in my institution.	140	10	1	2	1.07	0.25
2.	Academic staff frequently incorporate interactive multimedia elements, such as videos and simulations, in their lectures.	120	30	1	2	1.20	0.40
3.	Virtual Reality (VR) or Augmented Reality (AR) technologies are regularly used by academic staff members for instructional purposes.	140	10	1	2	1.07	0.25
4.	Academic staff members often utilize online collaborative tools for group projects and discussions.	130	20	1	2	1.13	0.34
5.	The integration of social media platforms for educational purposes is a common practice among academic staff members.	120	30	1	2	1.20	0.40

Note. M = Mean, SD = Standard Deviation, A = Agree, D = Disagree, n = 150.

Table 2 showed that 140 of the respondents agreed that Learning Management Systems (LMS) is commonly utilized among academic staff members in their institutions with a mean of 1.07 and standard deviation of 0.25. Item 2 also indicated that 120 of the respondents agreed that academic staff members frequently incorporate interactive multimedia elements, such as videos and simulations, in their lectures with a mean of 1.20 and a standard deviation of 0.40. Item 3 also indicated that 140 respondents agreed that Virtual Reality (VR) or Augmented Reality (AR) technologies are regularly used by academic staff members for instructional purposes with a mean of 1.07 and standard deviation of 0.25. Also, 130 of the respondents agreed that academic staff members often utilize these for group projects and discussions with a mean of 1.13 and a standard deviation 0.34. Finally, research question 2 indicated that 120 of the respondents agreed that the integration of social media platforms for educational purposes is a common practice among academic staff members with 1.20 mean and standard deviation of 0.40. By and large, the findings revealed that academic staff members in Ekiti institutions often utilize variety of emerging technologies in their teaching.

Testing Research Hypothesis

Research Hypothesis: There is no significant interplay between emerging technologies and quality service delivery among academic staff members in public tertiary institutions in Ekiti State.

Table 3: Chi-Square on the interplay between emerging technologies and quality service delivery among academic staff members in public tertiary institutions in Ekiti State.

S/N	Items	A	D	RT
1.	Emerging technologies have streamlined administrative processes, improving efficiency in academic service delivery.	100 (70)	50 (60)	150
2.	The integration of emerging technologies enhances communication with students and colleagues.	80 (70)	70 (60)	150
3.	The use of emerging technologies has positively impacted the accessibility and availability of academic resources for students.	100 (70)	50 (60)	150
4.	Academic staff believe that emerging technologies contribute to more personalized and tailored support for individual student needs.	80 (70)	70 (60)	150
5.	The adoption of emerging technologies has facilitated collaborative efforts among academic staff members.	90 (70)	60 (60)	150
COLUMN TOTAL		450	300	750

Note. A = Agree, D = Disagree, RT = Row Total.

The decision rule here is stated as follows: The pre-set level of significance for this study was 0.05. Reject H_0 if Chi-Square calculated is greater than the Chi-Square tabulated otherwise, we failed to reject H_0 . The null hypothesis one which states that there is no significant influence of emerging technologies on service delivery of academic staff in public tertiary institutions in Ekiti State was tested using chi square analysis. In the analysis, the values of emerging technologies were tested on the values of academic staff service delivery. The chi square test results are presented in Tables 3.

Calculation of the expected frequency

$$\text{Expected frequency} = \frac{\text{ROW TOTAL} \times \text{COLUMN TOTAL}}{\text{GRAND TOTAL}}$$

$$\text{Agree} = \frac{450 \times 150}{750} = 70$$

$$\text{Disagree} = \frac{300 \times 150}{750} = 60$$

Table 4: Chi-square value (χ^2) on the interplay between emerging technologies and quality service delivery among academic staff members in public tertiary institutions in Ekiti State.

S/N	Items	A	D
$\frac{(O-E)^2}{E}$ where O is the observed frequency and E is the expected frequency			
1.	Emerging technologies have streamlined administrative processes, improving efficiency in academic service delivery.	12.85	0.17
2.	The integration of emerging technologies enhances communication with students and academic staff members.	1.42	0.17
3.	The use of emerging technologies has positively impacted the accessibility and availability of academic resources for students.	12.85	0.17
4.	Academic staff members believe that emerging technologies contribute to more personalized and tailored support for individual student needs.	1.42	0.17
5.	The adoption of emerging technologies has facilitated collaborative efforts among academic staff members.	6.67	0.00

$$(\chi^2) = \sum \frac{(O-E)^2}{E} = 12.85 + 1.42 + 12.85 + 1.42 + 6.67 + 0.17 + 0.17 + 0.17 + 0.17 + 0.00$$
$$(\chi^2) \text{ calculated} = 35.89$$

At 5% level of significant level i.e. at 95% confidence level with degree of freedom, table value is 9.488

$$(\chi^2) \text{ tabulated} = (R-1) (C-1) = (5-1) (2-1)$$
$$= 4 \times 1 = 4$$
$$\chi^2_{(0.95, 4)} (\text{tabulated}) = 9.488$$

Conclusion: Since Chi-Square calculated value (38.9) is greater than the Chi-Square calculated value tabulated (9.488) we reject H_0 and conclude there is significant influence of emerging technologies on service delivery of academic staff members in Ekiti State institutions often used in their teaching.

Discussion

The findings of the study revealed significant insights into the implementation and impact of technology-based teaching methods in public tertiary institutions in Ekiti State. Firstly, the results indicate a high level of technology-based teaching methods available in these institutions. A substantial majority of respondents agreed that their institutions provide adequate training and support for faculty to integrate technology into their teaching practices. This aligns with the findings of Tondeur et al. (2017), who emphasized the importance of institutional support in successful technology integration in higher education. Furthermore, the near-unanimous agreement on sufficient access to computer labs and internet connectivity underscores the institutions' commitment to providing necessary infrastructure, which Becker et al. (2018) identified as crucial for effective technology-enhanced learning.

Secondly, the study highlights the diverse range of emerging technology tools frequently used by academic staff members. The widespread use of LMS and the incorporation of interactive multimedia elements demonstrate a shift towards more interactive and engaging teaching methods. This trend is consistent with the observations of Keengwe and Bhargava (2014), who noted the increasing adoption of multimedia tools in higher education to enhance student engagement. The high utilization of VR or AR technologies is particularly noteworthy, reflecting a growing trend in immersive learning experiences as discussed by Fowler (2015).

Lastly, hypothesis was tested and the result shows that emerging technologies has significant interplay on service delivery of academic staff members in public tertiary institutions in Ekiti State often used in their teaching, this is to show that the importance of emergence technology on service delivery of academic staff members in public tertiary institutions in Ekiti State often used in their teaching cannot be overemphasize. This variability in perceived benefits aligns with the findings of Kirkwood and Price (2014), who noted that the impact of technology on teaching and learning can be influenced by various factors, including individual attitudes and institutional contexts.

Conclusion

The study results indicate a high level of technology-based teaching methods available in these institutions which has significantly improved academic staff members service delivery in public tertiary institutions in Ekiti State. Secondly, the study highlights the diverse range of emerging technology tools frequently used by academic staff. The widespread use of LMS and the

incorporation of interactive multimedia elements demonstrate a shift towards more interactive and engaging teaching methods. However, hypothesis was tested and the result shows that emerging technologies has significant interplay on service delivery of academic staff members in public tertiary institutions in Ekiti State.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Tertiary institutions should endeavour to intensify efforts to provide comprehensive training programmes for academic staff members on emerging technologies. This will address the gap in communication enhancement and personalized support, ensuring that staff can fully utilize these tools to improve their service delivery and student engagement.
2. Tertiary institutions should endeavour to invest more in cutting-edge technologies, particularly in areas like VR and AR. The high adoption rate of these technologies suggests their potential for further enhancing the learning experience and academic staff members service delivery.
3. A collaborative platform should be established for academic staff members across different institutions to share best practices in technology-based teaching methods. This will foster the exchange of ideas and experiences, potentially leading to more innovative approaches in service delivery and addressing the moderate impact on academic staff members collaboration observed in the study.

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