Integration of Emerging Technologies in Teaching and Learning at the Federal College of Education, Yola, Adamawa State, Nigeria

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ABSTRACT

This paper is designed to examine the integration of emerging technologies in teaching and learning at the Federal College of Education, Yola Adamawa State, Nigeria. Three objectives and three research questions were raised to guide the conduct of the study. The study adopted a descriptive survey research design where a total of 569 respondents were randomly selected from the study area. A 30 item questionnaire was used as instrument for data collection from the respondents. Data collected were analyzed using mean score method of data analysis. The finding of the study revealed that the integration of emerging technologies is becoming significant, important and central teaching - learning process. Despite the significance of emerging technologies in teaching and learning process there are various challenges affecting its integration like: negative attitude, lack of computer and technical difficulties, Based on the above conclusion, the paper recommends that Educational institutions should ensure the provision of relevant infrastructures to facilitate the adoption and integration of emerging technologies and educational institutions should formulate flexible policies that would encourage the integration of emerging technologies in the teaching and learning process.

KEYWORDS: integration, emerging technologies, teaching and learning

Introduction

In the last few decades, national authorities and multinational organisations have emphasized the importance of increasing the use of information and communication technologies (ICT) and other emerging technologies in the school system (Roztocki, Soja & Weistroffer, 2019 and UNESCO ICT Competency Framework for Teachers, 2018). This is because of the fact and the realization that emerging technologies are making dynamic changes globally. Emerging technologies are influencing all aspects of life. The influences are felt more and more in the educational system. This is because emerging technologies provide both the students and teachers with more opportunities in adapting learning and teaching to individual needs (Fisseha, 2011).

The rapid advancement of emerging technologies and their integration into various aspects of our daily lives, including the education sector (Lu, 2019) is making their integration in teaching and learning process a necessity and not a choice for educators considering the level of influx of technology (Edeh, 2019). This according to him is because the integration of emerging technologies has become so irresistible in the teaching and learning process. This assertion is not far from the fact that Information Technology through emerging technologies has become a critical resource to the extent that its absence can result in lack of knowledge and poor decisions and failure (Khajeh, 2011 cited by Jawad et al. 2014).

Emerging technologies have been developing for decades, and their applications have been in existing for a long time (Namatherdhala, Mazher, & Sriram, 2019). However, the 2020 COVID-19 pandemic accelerated the adoption of emerging technologies globally (Cone, et al 2022). The pandemic brought about profound changes in the education industry. This is why emerging technologies is constantly modifying the teaching and learning process thereby accommodating different kind of learners, enhancing research and improving the academic performance of students.

In other words, integrating emerging technologies in teaching and learning process assists educators to adapt to the changing trends in education (Edeh, 2019). Unfortunately, the education sector seems to be lacking the necessary technological resources needed to bring the education sector in Nigeria at large and Adamawa State in particular at par with international standards. It is against this backdrop that this paper is designed to examine the integration of emerging technologies in teaching and learning at Federal College of Education, Yola Adamawa State

Objectives of the Study

This study was designed to achieve the following objectives:

1. Ascertain the availability of emerging technologies for teaching and learning at the Federal College of Education, Yola, Adamawa State.

2. Examine the importance of integrating emerging technologies in teaching and learning at the Federal College of Education, Yola, Adamawa State.

3. Identify the challenges of integrating emerging technologies in teaching and learning at the Federal College of Education, Yola, Adamawa State.

Research Questions

Three research questions were raised to guide the conduct of the study. These research question are:

1. What are the emerging technologies available for teaching and learning at the Federal College of Education, Yola, Adamawa State?

2. What are the importance of integrating emerging technologies in teaching and learning at the Federal College of Education, Yola, Adamawa State?

3. What are the challenges of integrating emerging technologies in teaching and learning at the Federal College of Education, Yola, Adamawa State?

Review of Related Literature

Concept and types of Emerging Technologies

The number of emerging technologies available to support teaching and learning is growing exponentially (Annemieke et al., 2012). The concepts of emerging technology generally include the internet as well as other electronic media devices such as broadband desktops, laptop, tablets, smartphones, radio, cassette tapes, audio streams, downloadable packages, television, iPads, interactive boards, etc. (United States Department of Education, Office of Technology, 2017). Mormah and Bassey (2021) stated that emerging Technology types may vary according to one's perception on these materials. It may also vary according to design example high and low technologies, classification by utilization, hardware and software technologies (computer), projected and non-projected, electronic materials and gadgets such as radio, audio streams, internet, Ipads, interactive boards, other hand held devices etc.

Importance of Emerging Technologies in the teaching – learning Process

Emerging technologies have brought fundamental changes to the lives of 21st century learners, who are the most frequent users of emerging technologies and online service (OECD, 2016). According to Halverson and Smith (2009) emerging technologies have always held great promise for transforming our teaching, thinking, and learning. The importance of emerging technologies and their applications as teaching and learning tools cannot be over-emphasized (Milovanovi, et al., 2013). According to Ahmad and Muhammad (2023), higher education is increasingly utilizing innovative and emerging technologies as more and more lecturers are embracing new technology for casual and formal teaching and learning.

Emerging Technologies play a vast role in the teaching-learning process. This is because the application of emerging technologies in education is changing learners' experiences both inside and beyond the classrooms. Mormah and Bassey (2021) emerging technologies improve the teacher's performance. The integration of emerging technologies in the teaching and learning process is capable of improving the job performances of educators, but to achieve this they need literacy in digital media.

Challenges of Integrating Emerging Technologies in the teaching – learning Process

According to Nagel (2013) despite the widespread adoption of emerging technologies and the importance of integrating Emerging Technologies in the classroom situation in teacher education programmes, there are various challenges affecting it proper integration. Some of the challenges, according to Hofer & Swan, (2008) include, negative attitude, lack of computer, technical difficulties, poor funding, resistance to change, poor administrative support, low levels of computer literacy and technical skills, technology misaligned with the curriculum, lack of incentives, poor training opportunities and lack of vision as to how to integrate technology into learning processes, lack of required IT skills and feel uncomfortable, nor do they have trainings needed to use the technology in their teaching (Fisseha, 2011).

In most educational institutions, some teachers are intimidated by technology and are very comfortable with their own established traditional teaching methods. Teachers feel threatened by loss of control in the classroom as students who are usually more adept at using technology can quickly access information and challenge the teacher's role as the primary source of information (Harris, Mishra, & Koehler, 2009, Palak & Walls, 2009 and Hennesy et al., 2010).

Research Methodology

The study adopted a descriptive survey research design. A descriptive survey design was considered most appropriate for this study because it sought the opinions of the respondents (as recommended by Nancy (2004).

The study was carried out in the Federal College of Education, Yola. The population of the study consisted of all 7,036 students and 364 academic staff totaling 7,400. Out of the target population of 7, 400, a total of 569 respondents were randomly selected from the study area. These respondents comprised of 378 students and 191 lecturers.

The questionnaire was the instrument used for data gathering from the respondents. The questionnaire has two sections. Section A of the questionnaire was used to collect general information about the respondents. Section B of the questionnaire has 30 items intended to elicit responses on the integration of emerging technologies in teaching and learning at the Federal College of Education, Yola Adamawa State. The items were structured on a Modified four-point Likert rating scale of: Strongly agree, agree, disagree and strongly disagree.

The questionnaire was validated by experts in the field of ICT and Teacher education. The reliability of the instrument was confirmed through pilot testing. The Pearson's Product Moment Correlation Coefficient of 0.79 was obtained from a two sets of scores using test-retest method. The administration of the instrument was carried out personally by the researchers using the face to face method of questionnaire which yielded a 100 percent questionnaire return rate.

Data collected regarding the research questions were analyzed using mean score method of data analysis. Any item whose mean score was 2.50 and above qualifies to be accepted or retained. On the other hand, any item with a mean score below 2.50 did not qualify to be accepted or to be retained.

Result and Discussion

This section deals with presentation of result and discussion of the analyzed information, the information analyzed were obtained through the research questionnaire administered to the subjects.

Research Question One: What are the emerging technologies available for teaching and learning at the Federal College of Education, Yola, Adamawa State?

Table 1: Emerging Technologies Available For Teaching and Learning at the Federal College of Education, Yola, Adamawa State

		LECTURERS		STUDENTS	
S/N	ITEM	Mean	Decision	Mean	Decision
1	Audio Tape Recorder	2.53	Retained	2.64	Retained
2	Desktop Computer	3.69	Retained	3.09	Retained
3	E libraries	2.57	Retained	2.67	Retained
4	ICT Centers	2.59	Retained	2.66	Retained
5	Interactive board	2.61	Retained	2.69	Retained
6	Interactive CD-ROM and DVD	2.70	Retained	2.79	Retained
7	Projectors / projected materials	3.09	Retained	2.70	Retained
8	Technology Centers	2.79	Retained	2.61	Retained
9	Web sites / E-mail Facilities	2.70	Retained	2.67	Retained
10	Computer application packages	2.62	Retained	2.68	Retained
	Total	**2.79**	**Retained**	**2.72**	**Retained**

Source: Research Survey, 2023

From the analysis in table one above, it is clear that there are varied emerging technologies that are available for integration in teaching and learning in Federal College of Education Yola. Some of these emerging technologies according to the opinion of the respondents as summarized in table 1 above include: Audio tape recorder, desktop computer, E-libraries, ICT centers, interactive board, interactive, CD-ROM and DVD, projectors / projected materials, technology centers, web sites / e-mail facilities and computer application packages. This assertion is supported with cumulative mean scores of 2.79 for lecturers and 2.72 for students. The assertion is therefore retained because the cumulative means are above 2.50 which is the bench mark for decision.

Research Question `Two: What are the importance of integrating emerging technologies in teaching and learning at the Federal College of Education, Yola, Adamawa State?

Table 2: The Importance Of Integrating Emerging Technologies In Teaching and Learning at the Federal College of Education, Yola, Adamawa State

		LECTURERS		STUDENTS	
S/N	ITEM	Mean	Decision	Mean	Decision
1	Emerging Technologies play a vast role in the educational process.	2.64	Retained	2.67	Retained
2	Emerging technologies improved teaching performance	2.54	Retained	2.62	Retained
3	Emerging technological devices and artifacts are increasing the experience of learners.	2.55	Retained	2.63	Retained

4	Emerging technologies improve the critical thinking skills of students.	2.55	Retained	2.63	Retained
5	Emerging technologies revolutionize the way students and teachers work together	2.51	Retained	2.54	Retained
6	Emerging technologies make learning more efficient	2.52	Retained	2.65	Retained
7	Emerging technologies make learning more entertaining	2.63	Retained	2.73	Retained
8	Emerging technologies make learning more engaging	3.01	Retained	2.60	Retained
9	Emerging technologies improve the problem-solving skills of students.	2.97	Retained	2.59	Retained
10	Emerging technologies improves students and teachers interaction in the teaching – learning process	2.79	Retained	3.03	Retained
	Total	**2.67**	**Retained**	**2.67**	**Retained**

Source: Research Survey, 2023

The analysis in table 2 above revealed that the importance of integrating modern technologies in teaching and learning at the Federal College of Education, Yola Adamawa State are: Emerging technologies play a vast role in the educational process, emerging technologies improved teaching performance, emerging technological devices and artifacts are increasing the experience of learners, emerging technologies improve the critical thinking skills of students, emerging technologies revolutionize the way students and teachers work together, emerging technologies make learning more efficient, emerging technologies make learning more entertaining, emerging technologies make learning more engaging, emerging technologies improve the problem-solving skills of students and emerging technologies improves students and teachers interaction in the teaching – learning process. This assertion is supported with cumulative mean score of 2.67 for lecturers and 2.67 for students.

Research Question `Three: What are the challenges of integrating emerging technologies in teaching and learning at the Federal College of Education, Yola, Adamawa State?

Table 3: The Challenges of Integrating Emerging Technologies in Teaching and Learning at the Federal College of Education, Yola, Adamawa State

		LECTURERS		STUDENTS	
S/N	**ITEM**	**Mean**	**Decision**	**Mean**	**Decision**
1	Epileptic power supply	2.76	Retained	2.77	Retained
2	Lack of computer and computer resources	2.67	Retained	3.35	Retained
3	Lack of required IT skills	2.70	Retained	2.87	Retained
4	Low levels of computer literacy and technical skills	2.69	Retained	3.01	Retained
5	Negative attitude towards emerging technologies	2.77	Retained	2.60	Retained
6	Poor administrative support system	2.72	Retained	2.77	Retained
7	Poor funding of the education sector	2.68	Retained	2.95	Retained
8	Teachers and learners Resistance to change	2.70	Retained	2.59	Retained
9	Technical difficulties	2.98	Retained	2.85	Retained
10	Unstable network	2.73	Retained	2.87	Retained
	Total	**2.74**	Retained	**2.86**	Retained

Source: Research Survey, 2023

The summary of analysis in Table three above revealed that: the challenges of integrating modern technologies in teaching and learning at the Federal College of Education, Yola Adamawa State are: Epileptic power supply, lack of computer and computer resources, lack of required it skills, low levels of computer literacy and technical skills, negative attitude towards emerging technologies, poor administrative support system, poor funding of the education sector, teachers and learners resistance to change, technical difficulties and unstable network. This is supported with calculated mean scores of 2.74 and 2.86 for lecturers and students respectively.

Discussion of Findings

The finding of the study shows that there are varied emerging technologies that are available for integration in teaching and learning at the Federal College of Education Yola. Some of these emerging technologies according to the opinion of the respondents as summarized in the table above include: Audio tape recorder, desktop computer, E-libraries, ICT centers, interactive board, interactive, CD-ROM and DVD, projectors / projected materials, technology centers, web sites / e-mail facilities and computer application packages. This finding agreed with the findings of Fisseha, (2011), United States Department of Education, Office of Technology, (2017) and Mormah and Bassey (2021).

The findings of the study also revealed that the importance of integrating modern technologies in teaching and learning at the Federal College of Education, Yola Adamawa State are: Emerging technologies play a vast role in the educational process, emerging technologies improved teaching performance, emerging technological devices and artifacts are increasing the experience of learners, emerging technologies improve the critical thinking skills of students, emerging technologies revolutionize the way students and teachers work together, emerging technologies make learning more efficient,

emerging technologies make learning more entertaining, emerging technologies make learning more engaging, emerging technologies improve the problem-solving skills of students and emerging technologies improves students and teachers interaction in the teaching – learning process. This findings agreed with the findings of Halverson and Smith (2009) and Mormah and Bassey (2021).

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Conclusion and Recommendations

The study highlights the emerging technologies, their importance and challenges facing the integration of emerging technologies in teacher education programme in Federal College of education, Yola. The result affirms that the integration of emerging technologies is increasingly significant, important and central to the achievement of teaching and learning objectives. Despite the significance of emerging technologies in teaching and learning there are various challenges affecting its proper integration. Some of these challenges are: negative attitude, lack of computers and technical difficulties.

Based on the outcome of the study, the following recommendations were put forward:

i. Educational institutions should ensure the provision of relevant infrastructures to facilitate the adoption and integration of emerging educational technologies

ii. Educational institutions should formulate flexible policies that would encourage the integration of emerging technologies in the teaching and learning process.

iii. Government should undertake strong policies to implement ICT in educational institution.

iv. Teachers should be trained on how to use ICT in teaching

v. Technical support should be provided to the teachers to overcome identified barriers.

vi. There is a need for the government to provide computer and computer resources for colleges of education Technical difficulties,

vii. There is the need to develop Positive attitude towards the use of technologies

viii. There should be an increased budgetary allocation for educational institutions to improve their capacity to acquire, implement, upgrade, and maintain emerging technologies

ix. There should be periodic training and retraining of academic staff to update their knowledge on learning on emerging technologies.

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