Availability and Utilization of Emerging Technologies and Effective Management of Basic Education in Ogoja Education Zone of Cross River State, Nigeria

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Abstract

This study examined the availability and utilization of emerging technologies for effective management of basic education in Ogoja Education Zone, Cross River State. Two research questions and two hypotheses were developed to direct the study. Descriptive survey research design was adopted in this study. The population of the study was all the public schools in the study area. Stratified random sampling technique was used to select the sample. The sample was 300 teachers and 36 administrators. The instrument used was the questionnaire titled "Availability and Utilization of Emerging Technologies for Effective Management of Upper Basic Education" (AUETEMUBE). The instrument was validated by two experts in the Measurement and Evaluation Department. A 4-point Likert type questionnaire of Strongly Agree (SA-4), Agree (A-3), Disagree (D-2), Strongly Disagree (1) was used to collect data for the study. The questionnaire contained twenty (20) items. The data collected was analyzed using the mean and standard deviation for the research questions while the Pearson Product Moment Correlation Analysis was used to analyze the hypotheses at 0.5 level of significance. The items with mean score 2.50 and above were accepted while items with criterion mean of less than 2.50 were rejected. The findings revealed that availability and utilization of emerging technologies are rare in most schools in the study area. Based on the findings, it was recommended among others that government should collaborate and partner with technology companies and non-governmental organizations to provide schools with necessary resources and support for integration of technology into education; government should collaborate with some agencies to organize workshops and online courses to train teachers on the use of digital tools and resources.

Keywords: Availability, Utilization, Emerging technologies, Management, Basic Education.

Introduction

The Universal Basic Education (UBE) was established in 1999 under the President Olusegun Obasanjo's regime. The programme was meant to offer a free basic education for every Nigerian child of school age who falls between the ages of 6 and 15 years. It was a nine (9) year innovative education programme which was established after the Universal Primary Education programme failed. The programme was designed to cover three (3) years lower basic education programme for primaries 1–3, three (3) years middle basic education programme for primaries 4 – 6 and three (3) years upper basic education programme for junior secondary (JSS) 1 – 3. According to Universal Basic Education Commission (UBEC, 2015), the objectives include: to ensure unfettered access to nine (9) years of formal basic education; to provide free, universal basic

education for every Nigerian child of school age; to reduce drastically the incidence of drop-outs from the formal school system through improved relevance, quality and efficiency; to ensure acquisition of appropriate levels of literacy, numeracy, manipulative, communicative and life skills as well as the ethical, moral and civic values needed for laying of solid foundation for life - long learning.

The curriculum has undergone several reviews or modifications, due to the changing nature of the society. Anashie and Offem (2018) stated that learning is the act, process or experience of gaining knowledge or skills. They added that as the world changes, information and knowledge also changes rapidly to meet the needs of the society. According to Obioma (2023), the intention for the review of the curriculum was to reduce the overload within and across subjects without compromising the appropriateness, debt and interrelatedness of the content of the curriculum. In 2006, the Nigeria Educational Research Development Council (NERDC) (2013) stated that the Basic Education Curriculum was introduced in 2005 for the purpose of improving on existing curriculum to meet the needs of the society. Education plays a significant role in the development of the society (Anashie and Uko 2018). Therefore educational programmes must be constantly reviewed to meet the needs of the society.

Management of Basic Education

Management involves planning, organizing, staffing, coordinating, directing, controlling of human, material and budgeting of financial resources for the achievement of organizational goals.

Management according to Anashie and Offem ((2019) simply means harnessing of financial, material and human resources for the achievement of institutional goals. They added that it is the responsibility of the administrator to guide, direct and plan activities that will lead to availability and utilization of available resources. Obi (2004) elucidated that management is a process that is designed to ensure the intervention, cooperation, participation and involvement in achieving given objectives.

The management of basic education programme has faced numerous challenges including poor / inadequate facilities, poor funding, inadequate qualified teachers, poor supervision and improper implementation of progammes. UNESCO, (2002) stated that one of its aims is to ensure that all schools in member countries have access to best facilities that will enable the populace contribute to the development of knowledge economy and also play required roles in modern society. The pace at which the society is changing in terms of technological advancement necessitated the integration of information and Communication Technology (ICT) into the management of education.

Offem et al (2017) stated that one of the innovations that necessitated the 4th edition of the National Policy on Education was the introduction of ICT into the school system. Adeyemi and Olaleye (2010) found out in their study among others that intermittent disruption of electricity and inadequate funding were found as some of the major problems hindering the usage of ICT equipment for the management of schools. The study of Uyi (2000), revealed that adequate management of ICT learning facilities not only improve students' academic achievement but it assists the school administrator to meet the task of school management. Furthermore, Nwosu (2003) observed that the management of ICT facilities in schools aids in updating the evaluation of school programmes, enhances the school routine programme and helps in solving problems and concluded that the use of ICT in the management of schools is imperative for sustainable development.

Availability of technological tools in schools

Education Technology is very crucial in the development of every society and nation. Thus, the Nigerian government in recognition of the importance and potentials of Education Technology in revolutionizing education introduced and implemented several policies and initiatives aimed at enhancing the integration of technology into education. The implementation of technology in education has faced several challe

nges which include- lack of adequate infrastructure, high cost of digital devices, unavailable power supply, lack of adequate financial resources from government, lack of equal access to digital

devices and internet connectivity between rural and urban areas, lack of adequate training for teachers, resistance to change among policy makers, educators and administrators, lack of comprehensive research on education technology initiatives in Nigeria, lack of relevant local content for education technology.

In a study conducted by Attah (2021), it was revealed that the major challenge facing Nigeria schools is access to technology. The study also revealed that about 90% of the primary schools in the study area do not have computer teachers. The study conducted by Michael and Igenewari (2022) revealed that most of the ICT facilities were available but in short supply while many others were unavailable. The study of Jaja and Emerole (2024) revealed that the awareness, availability and utilization of AI, Robotics, Internet of things Blockchain and Machine learning was very low.

Utilization of technological tools

Millions of teachers and students worldwide use technology for their daily activities but most schools do not use emerging technologies in teaching and learning. The study of Michael and Igenewari (2022) revealed that the available ICT facilities were under-utilized by teachers. In another study by Awoleye, Siyanbola and Oladipo (2008) it was concluded that both staff and students enjoy internet as a result of the facilities it offers which include audio broadcasting, emailing, discussion/chart activities, telex/video conferencing, World Wide Web browsing among others

Globally, information and commutation Technology (ICT) has transformed the management of education in areas as e-learning, writing various entrances for admission processes, keeping of admission registers, preparation of lesson and researches among others The National Policy on Education (2004) stated that government shall provide the necessary infrastructure and training for the integration of ICT into the educational system. Anashie and Odim (2018) stated in their study that the availability of the internet has given rise to an electronic approach to education called e-learning; they added that if properly accessed, e-learning can provide a lot of benefits. Jagboro

(2004) conducted a study using Obafemi Awolowo University, Ile Ife as a case study. They concluded that internet has a wide base which allows access to a wide range of research information to students such as reports, abstracts, publications or summaries.

Teachers' competence in the utilization of technological tools

The issue of traditional method of managing education in the 21st century does not encourage students and staff to be computer literate. It has been observed that unavailability and poor utilization of emerging technologies has affected the management of education. Bhukuvham et al. (2011) observed that though ICT tools are in abundance, their utilization remain a critical issue. In a study carried out by Ochuku, Aniakaino and Chaerlain (2013), it was revealed that various e-learning technologies were available for instructional delivery but were poorly utilized.

The findings of Nwoye (2021) and UNESCO (2020) revealed that most teachers in Nigeria lack technical knowledge and the necessary skills to access and effectively used most recent emerging technologies. In another study carried out by Mshelia, Biwai and Tilde, (2022), it revealed that Technology and Basic Science teachers were untrained to teach the subjects.

Ezeani and Ishaq (2013) observed that student's poor performance in ICT could be associated with teachers' non-utilization and application of appropriate ICT tools in the classroom. Osakwe (2010) stated that research has shown that poor access to basic ICT equipment has effect on the utilization of internet and computers in Nigerian schools. Mandoga, Matswetu and Mhishi (2013) in their study found out that computers were not utilized in all areas of curriculum but only utilized in computer studies lessons. It also revealed that there was poor access to ICT facilities by students of Federal Unity schools. Buabeng – Andoh (2012) stated that effective integration and adoption of ICT into teaching and learning is mainly dependent on the availability and accessibility of ICT resources. While Bhukuvhani, Zezekwa and Sunzuma (2011) stated that availability of computers in schools does not imply that they are accessible to teachers and students,

Teachers like other professionals need essential tools to become competent in their field. Kynikidou, Chrisotomou and Bank (2000), in their study maintained that successful integration of

ICT into education largely depends on the competence and attitude of teachers towards the role of modern technologies. In the same vein, the study of Kadel (2005) emphasized that the key to how ICT tools are used depends on the teachers. In line with the above, Allanach (2025) stated that it is not just the availability of technology that is important but the way educators use them is very crucial.

Examples of some technological tools that can be used in schools

The following are some examples of technological tools that can be used in the educational system:

- Artificial Intelligent (AI): it can aid in the setting and marking of examinations among other functions.

-Virtual Reality (VR): teachers can advance from giving static information to involving students in a range of virtual environments.

- metaverse: this is like Virtual Reality but it goes beyond the classroom as it can provide shared learning environment for students outside the classroom.

- **Augmented Reality:** with this, the teacher can put virtual elements into the real world.

- **Mobile devices, tablets and laptops:** these are core digital devices. Both teachers and students can use these to work both in and outside the classroom.

-Learning Management System: these are platforms that enable or allow administrators or teachers to distribute school materials.

Interactive whiteboards: it is also known as smart board. Multiple devices can be connected to it to create interactive tasks.

- Projectors/Television Screens: they facilitate multi- media content within the classrooms. These include music, text and videos.

- Cloud storage: According to Krishna (2019), it is a method of storing data online through ICT.

- Social media and messaging tools: these include platforms like Facebook, zoom, E-mail, WHATSAPP etc. Manu *et al.* (2021), cited in Anashie, Mezeiobi & Edeh (2023) defined social media as web based.

- Technology – based grade and attendance system: these streamline the paper work intensive process of record keeping in the school system and classroom monitoring of behavior.

The above tools can be used to ultimately enrich the overall learning experiences. Regrettably, it has been observed that these emerging technologies are in rare supply and use in most schools. The study of Anashie and Odim (2018) revealed that teachers in the study area have some facilities for e-learning but do not use it in teaching. If adequately provided and properly utilized, these trending technologies will transform the educational system.

Statement of the problem

Globally, the availability and utilization of emerging technologies have become increasingly an important factor in all spheres of life especially in teaching and learning. Technology has brought about numerous changes to many organizations including education. In the school system most teachers and administrators still experience some challenges in the use of technological devices. These lack of access to emerging educational technologies has grossly affected the management of educational institutions in the area. This has also affected the improvement in teachers' professional skills in lesson planning, instructional delivery, communication process and classroom management among others. Others are keeping of records, monitoring of instruction and students' performance, provision of feedback to the government, school and parents.

The government of Cross River State between 2012 and 2019 made it compulsory and ensured that all teachers in primary and secondary schools in the state were provided with computers like desktops and laptops with the aim of integrating (ICT) into teaching and learning. Workshops were organized on how to use the devices but there was no monitoring of the usage and the training period was not adequate to make them competent. This led to some teachers selling their computers at a cheaper rate since the money was deducted from their salaries. Despite the efforts of the government in providing some devices to teachers, the problem of lack of computers and poor utilization of emerging technologies still persist in the area of study.

Some schools were also equipped with computer laboratories but there still existed the problem of lack of trained teachers. The absence of competent trained staff in the usage of ICT learning facilities has affected management of education thus the computers were not put to use It was on this basis that the researcher intends to examine government' role in the availability of emerging technological tools in the management of Basic Education and the level of teachers' competence in the utilization of emerging technological tools in the management of Basic Education in Ogoja Education Zone of Cross River State.

Purpose of the study

Generally, the purpose of the study is to examine the relationship between the availability and utilization of emerging technologies and the management of basic education in Ogoja Education Zone, Cross River State. Specifically the study seeks to examine: the availability of emerging technological tools in the management of Basic Education and the level of teachers' competence in the utilization of emerging technological tools in the management of Basic Education.

Research questions

The following research questions were raised to guide the study:

1. To what extent does the availability of emerging technological tools relate to the effective management of basic education..
2. What is the level of teachers' competence in the utilization of emerging technological tools in the effective management of basic education.

Research hypotheses

The following hypotheses were formulated to guide the study:

1. There is no significant relationship between the availability of emerging technological tools and effective management of basic education
2. There is no significant relationship between teachers' competence in the utilization of emerging technological tools and effective management of basic education.

Research design and methodology

This study adopted the survey research design. The population of the study was all the upper basic education schools (junior secondary schools) in the study area. The stratified random sampling technique was used to select six (6) schools and ten (10) teachers per school. Making it sixty (60) teachers from each Local Government Area in the study area. The sample of the study was thirty six (36) school Administrators (one principal and one vice principal) in each school and three hundred (300) teachers. It examined the relationship between the availability and utilization of emerging technologies and the management of basic education. In this study the independent variables are availability and utilization of emerging technologies and the dependent variable is management of Basic Education.

The instrument used for data collection was a self – designed questionnaire titled "Availability and Utilization of Emerging Technologies and Management of Basic Education Questionnaire" (AUETMBE). The response scale was a 4-point likert rating scale of Strongly Agree (SA-4), Agree (A-3), Disagree (D-2), Strongly Disagree (SD- 1). The instrument was validated by two experts in Measurement and Evaluation Department in the University of Calabar. All corrections were affected by the researchers. The Mean and Standard Deviation were used to answer the research questions while the Pearson Product Moment Correlation Analysis was used to analyze the hypotheses. All items with criterion men of 2.50 and above were accepted while the items with less than 2.50 were rejected.

Results and discussion

Research questions 1: To what extent does the availability of emerging technological tools relate to effective management of Basic Education in Ogoja Education Zone, Cross River State,

Table 1 showed that the mean and the standard deviations of the responses on the availability of emerging technological tools for the management of Basic Education in Ogoja Education Zone of Cross River State. The items were measured on 4-point scale, with the highest obtainable score

in an item to be 4 and the lowest being 1. However, the cutoff mean value was 2.50 obtained by finding the mean of the sum of the highest obtained score and the lowest obtainable score.

Table 1: Response by School Administrators on availability of emerging technological tools for the management of Basic Education. (N= 32)

S/N	Items	N	Mean	SD	Remarks
1.	In my school, there is a computer laboratory	32	2.61	0.56	Accepted
2.	There are interactive whiteboards in all the classrooms	32	2.52	0.58	Accepted
3.	Projectors are used in teaching at my school	32	2.60	0.64	Accepted
4.	Teachers are provided with laptops/ desktops in my school.	32	1.53	0.61	Rejected
5.	Our classrooms are equipped with Television	32	1.48	0.62	Rejected
6.	There is free Wi-fi in strategic areas in my school	32	1.83	0.73	Rejected
7.	In my school, students view their admission status online.	32	2.68	0.82	Accepted
8.	In my school, there is a well – equipped computer laboratory	32	2.59	0.70	Accepted
9.	Teachers attend Zoom meetings in my school	32	2.55	0.67	Accepted
10	Offices are equipped with computer devices	32	1.48	0.58	Rejected

The least obtained mean value was 1.48, which is the mean value of the fifth item, while the highest obtained mean was 2.68, which is the mean to the sixth item. This showed that the respondents mostly agreed that the availability of emerging technological tools relates with management of Basic Education in Ogoja Education Zone of Cross River State. However, the items were not all accepted. This indicated that, based on respondents' perception, the items do not describe that the availability of emerging technological tools relate with the management of Basic Education.

Research questions 2: What is the level of teachers' competence in the utilization of emerging technological tools in the management of basic education in Ogoja Education Zone of Cross River State? Table 2 showed the mean and the standard deviations of the responses on the level of teachers' competence in the utilization of emerging technological tools in the management of basic education in Ogoja Education Zone of Cross River State.

Response by teachers on the level of teachers' competence in the utilization of emerging technological tools in the management of basic education, (N= 300)

S/N	Items	N	Mean	SD	Remarks
1.	Teachers are encouraged to undergo ICT training	300	2.70	0.84	Accepted
2.	I use mobile applications in teaching	300	1.60	0.64	Rejected
3.	I use AI to generate examination questions and answers	300	2.50	0.58	Accepted
4.	In my school, online classes are organized.	300	1.45	0.53	Rejected
5.	In my school, students' results are uploaded online	300	2.65	0.76	Accepted
6.	Televisions are used in teaching	300	1.68	0.52	Rejected
7.	Videos are used in the classroom to screen films	300	2.42	0.50	Rejected
8.	Students write online examinations in my school	300	2.49	0.52	Rejected
9.	There are trained ICT teachers in my school	300	2.67	0.81	Accepted
10	Interactive whiteboards are used in teaching / learning in my school	300	2.51	0.78	Accepted

The items were measured on a 4-point scale, with the highest obtainable score in an item to be 4 and the lowest being 1. However, the cutoff mean value was 2.50, obtained by finding the mean of the sum of the highest obtained score and the lowest obtainable score. The least obtained mean value was 1.45, which is the mean value of the fifth item, while the highest obtained mean was 2.67, which is the mean to the eighth item. This showed that the respondents mostly agreed with the level of teachers' competence in the utilization of emerging technological tools in the management of basic education in Ogoja Education Zone of Cross River State. However, the items were not all accepted. This indicated that, based on respondents' perception, the items do not describe that the government's role in the availability of emerging technological tools for the management of Basic Education.

Hypothesis 1: There is no significant relationship between the availability of emerging technological tools and management of basic education.

The result in Table 3 revealed that the calculated r-value of .876** was significantly greater than the critical value of .113 when tested at the .05 level of significance with 298 degrees of freedom.

Table 3: Summary of Correlation analysis of the relationship between the availability of emerging technological tools and management of basic education (n=300)

Variables	Mean	SD.	r cal.	P-value
Availability of emerging technological tools	17.63	2.541	876**	.000
Management of basic education	16.56	2.370		

- Significant at .05 level; df = 298 critical – r .113

Therefore, the null hypothesis was rejected while the alternative hypothesis was accepted. This implies that there is a significant relationship between the availability of emerging technological tools and management of basic education.

Hypothesis 2. There is no significant relationship between teachers' competence in the utilization of emerging technological tools and management of basic education.

Table 4: Summary of Correlation analysis of the relationship between teachers' competence in the utilization of emerging technological tools and management of basic education (n=300)

Variables	Mean	SD.	r cal.	P-value
Teachers' competence in the utilization of emerging technological tools	17.56	2.552	787**	.000
Management of basic education	16.56	2.370		

- Significant at .05 level; df = 298 critical – r .113

The result in Table 4 revealed that the calculated r-value of .787** was significantly greater than the critical value of .113 when tested at the .05 level of significance with 298 degrees of freedom. Therefore, the null hypothesis was rejected while the alternative hypothesis was accepted. This implies that there is a significant relationship between teachers' competence in the utilization of emerging technological tools and management of basic education.

Discussion of Findings

The calculations of the results of the statistical analysis for the two hypotheses were made as follows:

The result of hypothesis one showed that there is a significant relationship between the availability of emerging technological tools and effective management of basic education. The result agrees with the views of Bhukuvham et al. (2011) who observed that though ICT tools are in abundance but their utilization remains a critical issue. Result also agreed with the finding by Ochuku, Aniakaino and Chaerlain (2013), whose result revealed that various e-learning technologies were available for instructional delivery but were poorly utilized. Finding also supports the result of the finding by Ezeani and Ishaq (2013) which revealed that student's poor performance in ICT could be associated with teachers' non-utilization and application of appropriate ICT tools in the classroom. Osakwe (2010) stated that research has shown that poor access to basic ICT equipment has effect on the utilization of internet and computers in Nigerian schools.

The finding on the hypothesis two showed that there is a significant relationship between teachers' competence in the utilization of emerging technological tools and effective management of basic education. The finding is in line with Kadel (2005) who study emphasized that the key to how ICT tools are used depends on the teachers, therefore, teachers must be competent in the use of ICT facilities for effective achievement of goals. Finding also supports the result of the finding by Allanach (2025) whose study stated that it is not just the availability of technology that is important but the way educators use them is very crucial. They added that schools can have all the edtech that could possibly be imagined but the educator who uses it is the most vital component due to the fact that pedagogy does not come from the technology but from the teacher.

Recommendations:

1. Government should collaborate and partner with technology companies and non-governmental organizations to provide schools with necessary resources and support for integration of technology into education.
2. Government should collaborate with some agencies to organize workshops and online courses to train teachers on the use of digital tools and resources.

3. Schools can use learning management systems (LMS) to share assignments, study materials and feedback with students

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