



ICT Resources Beyond Covid-19 and it's Pedagogical Implication in the Teaching and Learning of Mathematics among Secondary School in Akwa Ibom State, Nigeria

Ofonime Friday Udo, Uwase Uwase Esuong & Enyekeme Owouko Ibok

Department of Mathematics, College of Education, Afaha Nsit

ABSTRACT

The study investigated implementation strategies of ICT resources beyond Covid-19 and pedagogical implications in the teaching and learning of Mathematics among secondary school teachers in Uyo Education Zone, Akwa Ibom State Nigeria. The research design adopted was the descriptive survey comprised all Mathematics teachers in public secondary schools in Uyo education zone. The study adopted simple random and purposive sampling techniques in selecting the participating schools in selecting 179 SS3 students and 48 teachers from 49 schools that made up the zone. The instrument used for data collections was a questionnaire of 10 items titled availability and utilization of ICT questionnaire in Mathematics (AUICTQM). Data generated were analysed using descriptive mean test statistics. Results revealed that there is to a greatly extent adequate availability of ICT tools for teaching and learning of Mathematics, the study also reveals that teachers utilization of ICT resources effect the teaching of mathematics in secondary schools. Based on the results of the findings, it was recommended among others that there is a challenge of awareness on the part of teachers enormous benefit of ICT resources in helping teachers to organize and prepare adequately for classes. Students should be encourage to utilize ICT resources in learning Mathematics.

Keywords: ICT Resources, Pedagogy, Teaching, Learning, Covid-19, Mathematics

Introduction

Information and Communication Technology (ICT) is a key to education and knowledge. Its importance in business, health, academic and economy cannot be undervalued (Ofonime, 2023). In 2012 Nigeria concluded the new policy document on miss and vision of ICT policy in the country which includes: vision to make the country globally competitive and knowledge-based society; to integrate ICT into the socio-economic development of the country; and to transform Nigeria into a knowledge-based economy countriesince 2012 ICT has continued to relive on that note, special emphasis, and attention (FGN, 2012).

ICT is an extensional term for Information Technology (IT) that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals) and computers as well as necessary enterprise software, middleware, storage and audio-visual, that enable users to access, store, transmit, understand and manipulate information (Wikipedia, 2022).

The term ICT is described as the information dissemination, storage and management of various sets of technical tools and resources that are accepted for information and communication technologies (Das, 2019). ICT has become one of the primary building's blocks of our modern society that can be used as a teaching strategy to overcome expenses, encompass teacher storage, reduces time and distance barriers along with low level of education.

Netsianda (2021) opines that the rapid growth of ICT has received considerable attention in education by Virtue of its capability to provide dynamic and innovative teaching and learning environment. He further reiterates that teachers are required to integrate ICT in their teaching with a view to supersede traditional method with modern tools and facilities.

ICT resources are instructional tools use for communication, instruction, and evaluation of learning. It uses a blend of graphs, texts, sounds, and videos for learning process (Muller, 2014). Akpan and Inyang, (2013) expressed that laptops computers are learner-centered and activity oriented. The challenge is how to optimize usage. Anache, Olofin and Onah (2010) opined that computer-assisted instruction for instance the use of laptops can promote active learning in a wide variety of disciplines from literature to the social sciences and beyond.

ICT resources platforms are useful to students and teachers and their usefulness cannot be overemphasized, as many institutions depends upon it especially during the Covid 19 era. Typical planning, preparation, and development time for a fully e-learning junior secondary school course is Six to Nine months before the course is delivered (Charles et al, 2020). This means that for educational institutions to effectively implement e- learning activities, they have to introduce the changes gradually (Orok & Esuong 2020).

The emergence of coronavirus which broke out first in Wuhan in the central part of China in 2019 circulated speeding, rapidly and globally almost all sectors of the world economy including education (Tran, 2021). Before the pandemic, Nigerian education system has adopted the conventional method of teaching other wisely known as face-to-face approach teaching and learning of subjects at both primary and post primary school.

Going by the drive of Covid-19 pandemic, lockdown orders were introduced across nations including Nigeria, these measures have brought negative effect on the educational institution across the countries (World Bank, 2020). These drastic changes caused by the pandemic, also triggered rapid changes in educational sector and thereby resulting in an upsurge in online teaching and learning which most educational institutions have prescribed to (Esuong & Edoho, 2018). On that note educational institutions have responded to the lockdown pandemic shift with different factors of strategies which include the use of you tube, goggle classroom, module, goggle meet, zone, canvass network learning management system and a whole of other on line facilities (Saavedra, 2020).

In the face of these identified problem, the research is undertaken to ascertain the level of implementation strategies of ICT resources in the Covid-19 and its effect on students' academic achievement in Mathematics.

Statement of the Problem

Mathematics is the fulcrum of all technological advancement. That is why, the federal government of Nigeria through the national policy on education maintained the compulsory nature of mathematics in all levels of education up to tertiary level though as a general course at the tertiary level (Esuong & Ofonime 2021). Government is making serious efforts to provide high quality mathematics education and one of such is the introduction of ICT resources in teaching and learning of Mathematics in secondary schools. But students interaction with digital technologies in education especially mathematics does not match their experiences at home or in their communities. For ICT to be effectively implemented, both teachers and students should be able to manipulate the computer system; have good knowledge of the available mathematics software packages they can use in their daily lesson, when to use synchronous and asynchronous online teaching and learning strategies and other aspects of ICT applications. Therefore it is a noticeable fact that ICT are not widely used in teaching and learning of mathematics in Nigeria secondary school system. As (Keshavarz, M., Rahimi, M. & Esmaili, Z. (2013) observed educators are continually reminded that, students in the past grew up in the dark intellectually and our role as teachers was to enlighten them. But in the 21st century, our students grow up in the light, connected to the world by ICT long before they go to school. The gap between education and the rapid changing world outside seems to be widening, hence the need for this study to investigate the level of availability & implementation of ICT tools in teaching and learning mathematics beyond covid-19 among SS3 students in Uyo education zone of Akwa Ibom State Nigeria.

Purpose of the Study

The purpose of this study is to investigate the level of ICT resources pedagogical implication in the teaching and learning of mathematics and academic achievement of students in Uyo Education Zone, Akwa Ibom State.

The study sought to:

1. Find out the level of availability of ICT tools for the teaching and learning of mathematics in schools
2. Determine the extent of using ICT in teaching and learning of Mathematics by teachers beyond Covid-19
3. Determine the challenges of implementation of ICT tools in teaching Mathematics.

Research Questions

The study was guided by the following research questions

1. What is the level of availability of ICT tools in teaching mathematics in your school after Covid-19?
2. What extent do you used ICT tools in learning mathematics after Covid-19?

Research Methods

The study adopted the descriptive survey design and it was carried out in Uyo Education Zone, Akwa Ibom State, Nigeria. The population of the study comprised all senior secondary three (SS3) students in public secondary schools in Uyo Education Zone of Akwa Ibom State numbered five thousand three hundred and fifty (5350) for 2022/2023 academic session, according to the State Education Board, Uyo (2023). The study adopted simple random and purposive sampling techniques in selecting participating schools in the zone and in selecting 179 SS3 students and 48 teachers from fifteen (15) schools in the zone out of forty-nine (49) schools that made up the zone.

The instrument used for data collection in this study was a questionnaire of 10 items titled availability and utilization of ICT questionnaire in Mathematics (AUICTQM).

The instrument was divided into three segments; section (A) collection of data in respects of availability of ICT resources filled by the students, section (B) for the extent of utilization of ICT resources and filled by the teachers. To measure the internal consistency of the instruments, the AUICTQM were administered to 20 samples of mathematics students from another education zone, who were not part of the study but found to be equivalent in all aspects to the sample o study. The result obtained in the administration were subjected to test-retest method and the internal consistency of 0.89 was obtained making the instrument reliable for the study.

Results

Respondents Profile:

Table 3 shows the respondents profile in the research

Description		Teachers N = 48		Students N = 179	
Gender	Male	26	54	77	43
	Female	22	46	102	57
Qualification	Ph.D	-	0	-	-
	M.Sc	20	41	-	-
	B.Sc	19	40	-	-
	NCE	9	19	-	-

The table 3 above showed an explicit description of the number of female and male teachers and students among the forty-eight (48) teachers and one hundred and seventy-nine students. There are twenty-six (26) male teachers representing 54% of the entire sample and twenty-two (22) female teachers which also represented 46% of the entire teachers. There are equally seventy-seven (77) male students being 43% and one hundred and two (102) female students being 57% of the sample students.

The table further showed that out of the entire forty-eight (48) teachers who participated in the study, non-had obtained a Ph.D, twenty (20) possessed a masters of science (M.Sc.) degree, nineteen (19) had a Bachelor of Science (B.Sc) and only nine (9) had a Nigeria certificate in education (NCE).

Research Question 1: What is the level of availability of ICT tools in teaching mathematics in your school after Covid-19?

Table 2: Shows the teachers opinion on the level of availability of ICT tools for the teaching and learning of mathematics in schools after the Covid 19 in Uyo Education Zone

S/N	ITEMS STATEMENT	SDA	DA	NADA	A	SA	Total	\bar{X}	Decision	Pooled Mean
1	My school has a functional overhead projector for teaching and learning	15	23	28	48	65	179	3.7	Agree	
2	My school has a functional interactive whiteboard	15	23	11	60	70	179	3.8	Agree	
3	My school has a functional teacher and students computer	16	25	10	50	78	179	3.8	Agree	3.7
4	My school has a functional digital camara and camcorder	08	30	12	60	69	179	3.9	Agree	
5	My school has printers	25	35	20	49	50	179	3.4	Agree	

Analysis from Table 1 above showed students opinion on the availability of ICT facilities in the teaching of mathematics in secondary schools in Uyo Education Zone. From the data analysis in table above indicated that respondents Agree with items 1, 2, 3, 4 and 5 with mean 3.7, 3.8, 3.8, 3.9 and 3.4 respectively. There was no item disagreed in the decision from the mean. The pooled mean of 3.7 is greater than the stated mean of 3.00. This implies that there is to a greater extent adequate availability of ICT tools for the teaching and learning of mathematics in most of the visited schools in the zone.

Research Question 2: To what extent does teachers' utilization of ICT facilities affect the teaching of Mathematics in secondary schools in Uyo Education Zone?

Table 3: Shows the teachers opinion on the extent teachers utilize ICT facilities in the teaching of Mathematics in secondary schools in Uyo Education Zone

S/N	ITEMS STATEMENT	SDA	DA	NADA	A	SA	Total	\bar{X}	Decision	Pooled Mean
-----	-----------------	-----	----	------	---	----	-------	-----------	----------	-------------

1	The utilization of ICT facilities provides mathematics teachers with relevant materials and made them to depend less on textbooks.	07	05	00	20	16	48	3.60	Agree	
2	Mobile phones provide the means for business studies teachers to assess information in other to encourage the students learn independently.	05	04	04	17	18	48	3.81	Agree	
3	The utilization of overhead projector increases the variations to mathematics teaching techniques at reduced cost time and time.	04	06	07	13	18	48	3.73	Agree	3.74
4	Interactive whiteboard facilities help in the representation of lessons better and effective	05	05	04	15	19	48	3.79	Agree	
5	The use of camara encourage teachers to go against the traditional methods of teaching mathematics	05	06	04	14	19	48	3.75	Agree	

Analysis from Table 3 above showed the extent teachers utilize ICT resources in teaching of Mathematics in secondary schools in Uyo Education zone. Respondents Agree with items 1, 2, 3, 4 and 5 with mean 3.60, 3.81, 3.73, 3.79 and 3.75 respectively. No item was disagree. The pooled mean is 3.74 greater than the stated mean of 3.00. this implies that teachers' utilization of ICT facilities affect the teaching of Mathematics in secondary schools in Uyo Education zone.

Discussion of Findings

The study examines Implementation strategies of ICT resources utilization and effective pedagogical implication in the teaching and learning of mathematics in Junior Secondary Schools in Uyo Local Government Area.

The finding from table 2 clearly shows that there are availability of ICT resources provided for the teaching of mathematics in school and this is occasioned by the numerous intervention of government programs for students such as the provision of internet facility, computer learning, and online learning classroom which affect students learning of mathematics positively. This finding agrees with the assertion made by Netsianda (2021) who stated that the Internet which is also known as a global system of computer networks and information superhighways have become a very important tool and required by the knowledge-based society present the contemporary for information management, information search, communication, and research and learning. He went further to add that internet is a rich, multi-layered, complex and ever-changing environment of the text.

Findings from table 3 justifies the utilization of the various ICT resources made available by the government for teaching and learning of mathematics. Results as presented showed the resources made available have been putted into effective usages for teaching and learning to strive. The study further agreed with the findings of (Mueller, 2014). Who opined that computers are instructional tools use for communication, instruction, and evaluation of learning especially in mathematics. It uses a blend of graphs, texts, sounds, and videos for learning process to improve teaching and learning. There further expressed that laptops computers are learner-centered and activity oriented which helps in taking notes enhances better recalling especially if used by students properly, and it promote active learning in a wide variety of disciplines from literature to the social sciences and beyond.

Recommendations

Based on these findings, the following recommendations were made:

- I. That there is a challenge of awareness on the part of the teachers on the enormous benefit of ICT resources in helping teachers organize and prepare adequately for classes. Hence, government should organize seminars and workshops to sensitize business studies teachers on the effective usage of e-learning facilities in schools
- II. Students should be encourage to utilize the internet facilities in their schools as well as their homes in carrying out assignments and home works.

- III. Teachers should allow students do and submit assignments on the varies online learning platforms, this will encourage students to be use to the online learning platform and utilize them maximally.

References

- Absalom N. S. and Sam R. (2021)*ICT and its implication to the western economy*. 13th International Conference on Technologies. D.1:10. 21125/edu learn 2021.0173.
- Akpan I, M. and Inyang, I. I. (2013) Covid-19 pandemic lockdown and current trends of online learning: Issues and prospects of social studies. Education in Nigeria. *Akwa Journal of arts Social Science and humanities* Vol. 1 No. 1 2021: 41-49.
- Anache, KC; Olofin B. B. and Onah N,F (2010)*ICT in teaching Mathematics: Nigeria Teachers ' perspective research gate*. Net retrieved on 10 Sept. 22.
- Das, Kaushik (2019) Role of ICT for better mathematics teaching. *Shanlax international journal of education* Vol. 7 no. 4. 2019 pp. 19-28.
- WWW.Wikipedia. Org (Information and Communication Technology) 23/07/22.
- Esuong, U. U., & Edoho E. A. (2018). Correlates of attitude of students and academic performance of senior secondary school students towards mathematics. *International Journal of Contemporary Social Science Education, 1*(1), 108-110.
- Keshavarz, M., Rahimi, M. &Esmaili, Z. (2013). The Effect of E-Learning on Educational Progress of Students' learning_activities. Accessed 31 May 2020
- Mueller, A, T. (2014). Changes in student attitudes and student computer use in a computer-enriched environment. *Journal of Research on Computing in Education, 32*, 417-432
- Ofonime (2023) *Effect of multimedia and problem-based learning on academic performance and retention of senior secondary school students in akwa ibom state*. Unpublished Doctoral Degree Thesis Micheal Okpara University Umudike
- Orok U. D. and **Esuong U. U** (2022) *Effect of multimedia instruction and academic performance of students in Uyo LGA AKS*. 2nd Annual Conference of the School of Science Akwa Ibom State College of education, Afaha Nsit
- Netsianda (2021) *The use of ICT in Mathematics teaching and learning in South African Secondary Schools*. 34th learners conference Johannesburg South Africa
- Tran T. and Nguyen P. (2021) teaching and Learning Mathematics in the Pandemic: A study on the role of ICT at High school. *4th Interantional European Conference on Interdisciplinan Scientific Research*.
- World Bank 2020 Legit. Ng Saturday 23/07/22.