
AVAILABILITY AND UTILIZATION OF COMPUTER RESOURCES FOR TEACHING OF MATHEMATICS IN SENIOR SECONDARY SCHOOLS IN ABUJA MUNICIPAL AREA COUNCIL, NIGERIA

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Abstract

This research examined the availability and utilization of computer resources for teaching and learning of mathematics in Senior Secondary Schools in Abuja Municipal Area Council (AMAC). The study is descriptive survey research design. The population of the study comprised all 87 Mathematics teachers in 26 public Senior Secondary schools in AMAC. A sample of 62 mathematics teachers was randomly selected and used. The instruments: Computer Resources Inventory Scale (CRIS), Mathematics Teachers' Usage of Computer Resources (MTUCR) and their Knowledge of Computer Resources (MTKCR) were used for data collection. The instruments were ensured to be valid and

reliable. Mean and standard deviation was used to answer the research questions that guided this study. The findings revealed that computer resources were mostly not available and there is rare usage of the few available ones. It was recommended among others that Government and stakeholders in education should device means of making computer resources functional and available for teachers of mathematics to enhance teaching of mathematics in Senior Secondary schools in AMAC.

Keywords: Utilization, availability, computer resources, technology integration, AMAC

Introduction

In this modern and technological driven time, the most critical sector in the life of any nation

is equipping its citizens with the knowledge of technology. African countries which are often referred to as developing nations require quality education of its citizens for rapid development of science and technological development. Bolaji (2022) stated that despite the importance of ICT to enhance quality instruction in education, secondary schools in Nigeria are yet to comprehensively adapt computer resources to enhance instructional quality in teaching the students. Although, mathematics knowledge is crucial in developing students' minds for logical and precision in carrying out required tasks, there is more need in the use of technology. Hence, the requirement of computer resources in this era of educational evolution in the use of technology to enhance teaching of mathematics is undisputed for quality education in our schools.

Computer is defined as a data processing machine which can store and processes data based on the logic supplied by the user (Ajumobi, 2012). In this study, computer resources refer to the physical computer and all the necessary mechanisms needed to deliver quality instruction in mathematics. As such, the computer resources include mathematics teachers' knowledge to operate and use the computer resources like Laptop/Desktop computers, Internet, Movable Projector Board, Trace Board,

Speakers or Public Address System for effective communication in the mathematics class among other resources. It was highlighted by Bliss, Mark, Jonathan, Godwin and Justine (2017) and Ozofo (2015) that computer resources are vital in delivering quality classroom instructions. Modern computers have Software like Microsoft Word, Microsoft Excel, Microsoft PowerPoint, and Corel Draw to aid construction of mathematics packages for classroom instructions. However, Otuka (2019) stated that some teachers have enthusiastically integrated technologies into their instructional practices; while others are yet to, due to unavailability of the instructional technology or teachers' lack of knowledge and skills to use them. In addition, Nwana, Egbe, Ofoegbu (2017) perceived that the ICT resources needed for teachers' use are often not available. It is then important to give more attention to the availability and usability of computer resources in teaching of mathematics in our schools. However, Teachers' knowledge and operational skills are requirements for usability of computer resources for effectiveness in the classroom teaching of mathematics.

Computer knowledge refers to the skills required to operate computer resources for positively impact in teaching of mathematics. In utilization of computer, Otuka (2019)

emphasized that it is important for teachers to be thoroughly acquainted with computer resources and services available and should have a clear understanding of the functional materials-selection programme. It is more important that mathematics teachers should be computer literate to effect quality teaching of mathematics. For mathematics teacher to be more viable in a required modern classroom, the teacher should be computer literate. They teacher should be able to boot a computer, click on the Mouse for appropriate command of the computer and navigate to required site in operating Mathematics and computer packages to be used for teaching in the classroom.

In a report of Busari, Ernest and Ugwuanyi (2016) and Maigana (2016) revealed Computer Assisted Instruction was effective and favourable in mathematics instruction. Mathematics teachers need to utilize instructional technologies in this evolving modern world in the classroom. Nzwili (2016) carried out a study on the availability of resources and facilities for ICT integration in some Kenyan primary schools in Kitui County, it was revealed that electricity was available in most of the schools to support computer resources for teachers' usage, but lacked ICT resources such as electronic projectors, CD-ROMs/software and internet connectivity for educational purposes; but

confirmed that Laptop computers were available to good number of teachers. In another study, Kamene (2014) found that Head teachers were in the know about the use of computer resources in education and were positive toward its usage to improve instructions, but did not use them due to some factors like low knowledge of computer resources among teachers and even those with little knowledge lacked the quality time to use them during classroom instruction.

Moreover, Ochu (2016) found that digital technologies such as modem, digital video camera, digital photo printer, digital camera, iPods, smart watch, and card reader were not available for teaching primary school pupils in the study area and the digital technologies available were rarely used for teaching. Muhammad and Calista (2022) found in their study that digital technologies such as modem, digital video camera, digital photo printer, digital camera, iPods, smart watch, and card reader were not available for teaching primary school pupils in the study area. Bolaji (2022) discovered in his study that inadequate funding of ICT education, inadequate ICT facilities in secondary schools, unstable power supply, High Cost of ICT facilities, poor implementation of Government policies on ICT, poor network service and coverage, and poor ICT literacy as the challenges preventing effective

administration of ICT in the public secondary schools in Kwara State. A research carried out by Amuchie (2015) on availability Information and Communication Technology resources for teaching and learning in Secondary Schools of two local governments in Taraba state. Their study showed low availability of ICT resources in the Secondary schools in the studied area. It was discovered by the study that many factors were perceived by the teachers and principals as constraints to effective utilization of ICT resources, poor power supply, lack of adequately trained teachers, high cost of computers and accessories among others. It is against the backdrop of availability of computer resources and its usability to enhance quality teaching of mathematic that this study invests its interest.

Statement of the Problem

Computer resources are perceived not available and not in usage by mathematics teachers in Senior Secondary schools in FCT. The unavailability or lack of usage of computer resources in FCT Senior Secondary schools may undermine the efforts of FCT Education Secretariat and MTN–Nigeria, a telecommunication company in a perceived establishment of ICT centres in Senior Secondary schools.

There is perception that mathematics teachers' lack of knowledge in computer

resources can be a factor in utilization of the ICT centres in AMAC. Mathematics teachers are perceived to lack the knowledge of computer resources in Senior Secondary schools. This situation was said to either hinder or deprive students from experiencing a more dynamic teaching of mathematics using modern technology.

Research Questions

The study is guided by the following research questions:

1. what are the mean availability of computer resources available in teaching of Senior Secondary school students in Abuja Municipal Area council?
2. what are the mean extent of mathematics teachers' knowledge in utilization of computer resources for teaching in Senior Secondary schools in Abuja Municipal Area council?
3. what are the mean extent of mathematics teachers' utilization of computer resources in teaching Senior Secondary school students in Abuja Municipal Area Council?

Methodology

This study adopted descriptive survey research design that involves taking list of items to analyze given situations or trends in educational practice. Checklist and

Questionnaires were used to solicit information from the respondents that guided answers to formulated research questions of this study. The study population consisted of 87 mathematics teachers in all 26 public Senior Secondary schools in Abuja Municipal Area Council (AMAC). Simple random sampling was used to select mathematics' teachers from different school in AMAC. A sample of 62 mathematics teachers was drawn for the study.

The instruments used to collect data for the study were: Computer Resources Inventory Scale (CRIS), Mathematics Teachers' Knowledge of Computer Resources (MTKCR) on 4-point rating scales of High extent (H.E), Moderate extent (M.E), Extent (E) and Low extent (LA) had 4-point rating scales from 4 to 1 of High extent (H.E), Moderate extent (M.E), Extent (E) and Low extent (LA) respectively, and Mathematics Teachers' Utilization of Computer Resources (MTUCR) on 4-point rating scales from 4 to 1 of Very Rarely (V.R), Often Rarely (O.R), Rarely (R) and Low Rarely (L.R) respectively for data analyses. The instruments were subjected to three experts in ICT for face and

Findings

1. **Research Question 1:** what are the mean availability of computer resources available in teaching of Senior Secondary school students in Abuja Municipal Area council?

content validity. Their observed corrections were effected to improve the instruments. The instruments were trial tested on 20 mathematics teachers outside the sample of the study within schools in AMAC. Cronbach formula for reliability coefficients was used in calculating the scores obtained in MTKCR and MTUR which of 0.79 and 0.77 respectively. And these were considered good reliability coefficient for the study.

The data for this study were collected by the researchers in direct contact with the respondents who filled in the Checklists and Questionnaires on spot. This was to ensure 100% return of the data from the respondents. In analyzing the data, a mean criterion response of each item of at least 2.50 was considered available on the Checklist and considered accepted on the Questionnaires. But below 2.50 were considered not available or not accepted on the Questionnaires based on the boundary limits of the study as: 3.50 – 4.00; 2.50 – 3.49; 1.50 – 2.49 and 0.05 – 1.49 used to interpret the results as H.E, M.E, E, and L.R respectively as well as V.R, O.R, R, and L.R accordingly.

Table 1: Mean Availability of Computer Resources in Senior Secondary Schools in AMAC

S/N	Items	Mean	Standard Deviation	Decision
1.	Desktop/Laptop Computer	2.45	0.03	Available
2.	Projectors	2.60	0.05	Available
3.	Movable Projector Board	0.60	0.05	Not Available
4.	Internet Services	0.13	0.07	Not Available
5.	Flash Drive	1.10	0.06	Not Available
6.	Mathematics Software Package	1.00	0.02	Not Available
7.	Power Saver (UPS)	0.80	0.02	Not Available
8.	Power supply (Standby Generator)	2.66	0.31	Available
9.	Air Conditioner	0.16	0.00	Not Available
10.	Graphical Calculator	1.67	0.51	Not Available
11.	Trace Board	0.00	0.00	Not Available
12.	Computer Pen	0.00	0.00	Not Available
13.	Computer External Speakers	2.57	0.45	Available
14.	Earphones	0.19	0.06	Not Available
15.	Public Address System	0.40	0.12	Not Available
16.	Plasma Television	0.20	0.10	Not Available
17.	DVD player	0.20	0.10	Not Available
18.	Scanner	0.00	0.00	Not Available
19.	Printer	0.15	0.09	Not Available
20.	Photocopier	0.15	0.09	Not Available

Table 1, reveals that computer resource such as: Computers, Computer External Speakers, Projectors, Printers and Standby Generators were perceived available in the Senior Secondary schools in AMAC. This is from the fact that the computer resources noted as available have attained the bench mark mean of 2.5 and above to be considered available by this study. Other computer resources such as Movable Projector Board, Internet, Scanner, Photocopier, Flash Drive, Mathematics Software Packages, Power saver (UPS), Air Conditioner, Graphical Calculator, Trace Board, Computer Pen, Computer External speakers, Earphones, Public Addressed (P.A.) System and DVD Player did not met up the bench mark of above 50% and are said to be unavailable by this study.

Research Question 2: what are the mean extent of mathematics teachers' knowledge in utilization of computer resources for teaching in Senior Secondary schools in Abuja Municipal Area council?

Table 2: Mean and Standard Deviation of Mathematics Teachers' Knowledge in Utilization of Computer Resources in Teaching Senior Secondary School students in AMAC

S/N	items	Mean	Standard Deviation	Decision
1.	Boot a Computer	2.84	0.93	Accepted
2.	Type a Document in Computer	2.65	0.60	Accepted
3.	Save a Document in Computer	2.62	0.77	Accepted
4.	Open a Folder	2.73	0.57	Accepted
5.	Save a Document in a Folder	2.57	0.44	Accepted
5.	Connect Computer to a Projector	2.55	0.41	Accepted
6.	Connect Computer to an Internet	2.53	0.38	Accepted
7.	Source for teaching materials on internet	1.85	0.82	Not Accepted
7.	Save teaching materials from internet	1.56	0.86	Not Accepted
8.	Create teaching materials on Computer PowerPoint	1.45	0.16	Not Accepted
9.	Present PowerPoint instruction for mathematics class	0.86	0.33	Not accepted
10.	Command Computer to print a Document	2.67	0.38	Accepted
11.	Scan teaching materials into a Computer	1.89	0.33	Not Accepted
12.	Design Software Packages for teaching	1.74	0.35	Not Accepted
13.	Very Good at Microsoft Word	1.48	0.25	Not Accepted
14.	Very Good at Microsoft Excel	1.60	0.32	Not Accepted
15.	Very Good at Corel Draw	0.44	0.32	Not Accepted

Table 2, reveals that mathematics teachers' knowledge are able to: boot a computer, save a document on the computer, type a document, save a document, open a folder, save document on a folder, connect computer to a projector, connect computer to internet,

command a computer to print a document were accepted by this study for the fact that their means were at least 2.50 as required by the study. However, it is observed that mathematics teachers' knowledge on the following: source for computer resources for better teaching, scan mathematics teaching resources, save mathematics teaching

resources from internet to computer, create teaching materials on PowerPoint, present PowerPoint instruction for mathematics class, Design mathematics software package for teaching, Very good at Microsoft word, very good at Microsoft excel and very good at Corel which had the means below 2.50 and were not accepted by this study.

Research Question 3: what are the mean extent of mathematics teachers' utilization of computer resources in teaching Senior Secondary school students in Abuja Municipal Area Council?

Table 3: Mean and Standard Deviation of Mathematics Teachers' Utilization of Computer Resources for Teaching Senior Secondary School Students

S/N	Items	Mean	Standard Deviation	Decision
1.	Desktop/Laptop Computer	1.45	0.03	Not Accepted
2.	Projectors	1.60	0.05	Not Accepted
3.	Movable Projector' Board	0.60	0.05	Not Accepted
4.	Internet	0.00	0.00	Not Accepted
5.	Flash Drive			
6.	Mathematics Software Package	1.00	0.00	Not Accepted
7.	Power Saver (UPS)	0.00	0.00	Not Accepted
8.	Power supply (Standby Generator)	0.00	0.00	Not Accepted
9.	Air Conditioner	0.00	0.00	Not Accepted
10.	Graphical Calculator	2.67	0.51	Accepted
11.	Trace Board	0.00	0.00	Not Accepted
12.	Computer Pen	0.00	0.00	Not Accepted
13.	Computer External Speakers	0.60	0.05	Not Accepted
14.	Earphones	0.00	0.00	Not Accepted
15.	Public Address (P.A.) System	0.00	0.00	Not Accepted
16.	Plasma Television	0.00	0.00	Not Accepted
17.	DVD player	0.00	0.00	Not Accepted
18.	Scanner	0.00	0.00	Not Accepted
19.	Printer	0.00	0.00	Not Accepted
20.	Photocopier	0.00	0.00	Not Accepted

Table 3, reveals that the computer resources: Desktop/Laptop, Projector, Movable Projector Board, Internet, Flash Drive, Mathematics software package, Power Saver (UPS), Power Supply (standby generator), Air Conditioner, Trace Board, Computer Pen, Computer External Speakers, Earphones, Public Address System, Plasma Television, DVD player, Scanner, Printer and Photocopier had scored below the benchmark of 2.50 and were not accepted in use by the mathematics teachers to aid classroom teaching. However, Graphical Calculator had a mean score of at least 2.50 and was considered accepted in use by the mathematics teachers in this study.

Discussion of Findings

From the findings, some computer resources like the Computers, Computer External Speakers, Projectors, Standby Generators and Printers indicated availability in the Senior Secondary schools in Abuja Municipal Area Council. This study was in agreement with Muhammad and Calista (2022) that found availability of computers and projectors for teaching primary schools pupils in Gwale Local Government Area of Kano state.

Likewise, Nzwili (2016) confirmed that Computers and Power Supply were available in some schools in Kitui County in Kenya. However, this study has recorded lack of computer resources such as Movable Projector Board, Internet, Scanner, Photocopier, Flash Drive, Mathematics Software Packages, Power saver (UPS), Air Conditioner, Graphical Calculator, Trace Board, Computer Pen, Earphones, Public Addressed (P.A.) System and DVD were unavailable by findings of this study. Although this was contrary to the finding to Amuchie (2015) that found poor power supply in two local governments in Taraba state and as one of the needed computer resources to aid teaching and learning in secondary schools in Nigeria.

From the findings, it was noted that mathematics teachers' knowledge of computer resources in Senior Secondary schools in AMAC are to an extent able to boot a computer, save a document on the computer,

type a document, save a document, open a folder, save document on a folder, connect computer to a projector, connect computer to internet and command computer to print a documents. This study was contrary to that of Kamene (2014) who found that teachers' knowledge of computer resources was very low as a factor hindering implementation of its instructional practice. However, this study revealed the shortcomings of mathematics teachers' knowledge to source and scan resources from internet to enhance classroom instruction, save mathematics resources from internet, create or present PowerPoint instruction, design mathematics software package for teaching, mastery of Microsoft word, Microsoft excel and Corel Draw; which then supports Kamane (2014) as earlier stated.

From the findings, mathematics teachers were not utilizing the few available computer resources for classroom teaching of mathematics: Computer, Computer External Speakers, Standby Generators and Printers in AMAC. This finding is similar to that of Nwana, Egbe and Ofoegbu (2017) who

revealed that most computer resources are not used for teaching of computer science education in Anambra state, Nigeria were very rarely used by the teachers in secondary schools. But contrary to Ajeigbe, Ogunsakin and Shogbesan (2015) which revealed a high level of ICT facilities' usage in secondary schools by Computer Studies' teachers in Osun state. The fact that emphasis are constantly made to utilize computer resources in teaching and learning, mathematics teachers in AMAC Senior Secondary schools are to extent low in usage. However, it was found that mathematics teachers used graphical calculators as the only computer resources for teaching of mathematics in the classroom investigated by this study.

Conclusion

The conclusions drawn from the findings in the study area indicated that computer resources for teaching of mathematics in Senior Secondary schools in the FCT were mostly low available. Most mathematics teachers were unable to design software packages to aid mathematics instructions, demonstrate knowledge of PowerPoint presentation to support classroom teaching among others in the studied area. Hence, teachers have low knowledge of the computer resources that can enhance the quality of mathematics teaching. The few computer

resources found available were rare in use for teaching of mathematics in the studied area.

Recommendations

Based on the findings of this study, it is recommended that:

1. Government and stakeholders in education (FCT Education Secretariat, Education Resource

Centre) should device means of making computer resources functional and available for

teachers of mathematics to enhance teaching of mathematics in Senior Secondary school's in

the study area.

2. Education authorities should develop programmes, seminars, workshops and conferences to

improve mathematics teachers' knowledge on computer resources for more effective teaching

of mathematics.

3. Policy makers in education should create favourable policies to fund mathematics teachers to

develop skills and competencies for usability of computer resources to support computer

worthy environment in all Senior Secondary schools.

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