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Enhancing Mathematics Education with Modern Teaching Equipment in Junior Secondary Schools in Nigeria

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Abstract

Mathematics is mainly considered a difficult subject for students, but when the teaching is simplified, assimilation becomes effortless as well. This study examined the role of modern teaching equipment in achieving mathematics education objectives in schools. Four research questions were raised to guide the study. This study aimed to see how modern technological equipment can ease the teaching and learning of Mathematics in junior secondary schools. The study employed a descriptive survey research design, focusing on Nigeria's junior secondary school mathematics teachers. A purposive sampling technique was used to select 100 teachers to participate in the study. Data were analyzed using descriptive statistics, including frequency counts and simple percentages. The findings indicated that modern teaching equipment enhances teaching by making it more engaging, improves the efficiency and effectiveness of mathematics education instructors, and highlights important aspects of learning, thus reducing rote memorization. It also facilitates school management's access to real-time pupil and school data, strengthens the professional image of mathematics teachers, and helps maximize students' attentiveness. However, many teachers reported challenges such as insufficient modern teaching equipment, frequent power interruptions, high costs of equipment, limited skills among teachers in using these technologies, lack of curriculum experts, and inadequate funding for teaching equipment. Despite these challenges, the use of modern teaching equipment in mathematics education is generally on the rise. Based on these findings, the study recommends that schools prioritize providing adequate ICT resources, maintain equipment properly, and employ well-qualified ICT teachers to foster the effective use of modern teaching equipment in mathematics education.

Keywords: *Mathematics; Education; Modern Teaching Equipment; Information; Communication; Technology.*

Introduction and Background to the Study

Education is universally recognized as a key driver of social, political, scientific, and technological progress. For this reason, no society can afford to neglect the education of its citizens, as it could lead to slow development (Rybak, 2021). Education encompasses all processes through which children and young adults develop the skills, attitudes, and behaviours that are valuable to society. This ongoing importance of education has sparked growing concerns over the quality of education, including mathematics education, offered in schools.

Mathematics education aims to develop the skills, competencies, and attitudes necessary for economic efficiency (Damrongpanit, 2019). It covers a wide range of subjects: at the junior secondary level, it is called mathematics; at the senior secondary level, it includes commerce and economics; and at the tertiary level, it is mathematics education (Ubulom, 2012). Mathematics education aims to equip students with practical and vocational skills, attitudes, knowledge, and competencies for self-employment or effective social participation (Ghory & Ghafory, 2021). De and Rogge (2014)) state that mathematics education empowers individuals with personal, consumer, clerical, and managerial skills to create wealth and jobs rather than merely seeking them.

Mathematics education involves using numbers and figures to solve real-life problems and the training required to acquire special skills (Esene, 2012). Okoli (2010) describes it as an educational program that provides knowledge, skills, and attitudes necessary for individuals to perform effectively in the world, whether as producers or consumers. It plays a vital role in general education, focusing on teaching-related

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skills and offering two key components: teaching education (for teaching careers) and general mathematics education, which covers personal management and engagement with the broader world (Wiest, 2024).

Mathematics education also fosters entrepreneurship, which is especially crucial in an economic downturn and rising unemployment (Zhao, et al., 2021). The American Vocational Association (AVA, 1980) describes mathematics education as a broad discipline that includes the knowledge, skills, and aptitudes required to manage personal businesses and participate in the economy effectively.

In modern businesses, accuracy and quick decision-making are critical. The role of teaching workers, including secretaries, has evolved from manual tasks like dictation and typing to utilizing advanced technology like word processors, personal computers, and electronic communication tools (Vankúš, 2021)). These technological advancements, such as photocopiers, printers, and fax machines, have transformed teaching procedures, allowing workers to enhance productivity and access goods and services more efficiently (Güler, et al., 2022).

Today's mathematics education integrates modern teaching equipment and technology, including the internet, simplifying tasks and enhancing knowledge accessibility (Edwin, 2008). Advanced teaching gadgets like photocopy machines, printers, and email systems are now essential tools that improve proficiency and global service access (Pan, 2022). Technological advancements in teaching equipment have also streamlined teaching functions, incorporating tools such as computers, voice mail, and the Internet.

To improve the teaching of ICT in mathematics education, Niyibizi, and Mutarutinya, (2024) suggest strategies like providing one computer per student during classes, along with essential equipment such as photocopiers, fax machines, word processing labs with air conditioning and proper lighting, and well-equipped teaching practice labs. These tools increase students' interest in learning, school expansion, and economic growth.

The main goal of mathematics education is to shape students' thinking patterns and instil attitudes and values that become ingrained over time (Olanrewaju, et al. 2021). Effective teaching in mathematics education makes learning meaningful, engaging, and applicable to real-world demands (Khan et al., 2010; Malik et al., 2011).

Statement of the Problem

In today's rapidly advancing technological landscape, the availability and effective use of modern instructional facilities and equipment are crucial. However, Udu et al. (2021) highlight that students in mathematics education face challenges in acquiring essential skills due to inadequate resources. Nkundabakura (2023) further reveals that students perform poorly in ICT courses, especially when it concerns numbers or figures, with many graduates lacking competence in using modern teaching equipment, which could hinder entrepreneurial success and employable skills. Abubakar et al. (2023) identify factors such as insufficient funding, poor maintenance, outdated technology, and traditional teaching methods contributing to these challenges. Ayanwale et al. (2022) also point out that teachers and lecturers are often not trained to use modern equipment effectively.

With globalization, computers have become indispensable in workplaces, economies, education, and daily life. In response, the Federal Republic of Nigeria (FRN) established the National Committee on Computer Education in 1998 to integrate modern teaching equipment into the educational system (Sirajo and Abdullahi, 2023). The committee's policy emphasizes the importance of exposing Nigerians at all educational levels to modern tools, enabling them to understand, use, and apply them to solve real-world problems (Agyei, 2022). As innovation in teaching and learning becomes a focal point of modern education (Balogun & Mayowa, 2014), experts agree that when properly implemented, ICT advancements can significantly enhance teaching and learning while also creating more job opportunities. Against this backdrop, this study examines modern teaching equipment's role in achieving Mathematics education's objectives in schools.

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Purpose of the Study

The primary aim of this study is to explore how modern teaching equipment is utilized to achieve the objectives of mathematics education in schools. The specific goals of the study are to:

1. Assess the potential benefits of using modern teaching equipment in teaching Mathematics

2. Identify the challenges hindering the effective use of modern teaching equipment in Mathematics

3. Evaluate the knowledge and usage of modern teaching technology and equipment

4. Propose strategies to improve the utilization of modern teaching equipment in Mathematics.

Research Questions

The following research questions are raised to guide the study.

1) What are the benefits and opportunities of modern teaching equipment in Mathematics education?

2) What are the key challenges or barriers hindering the effective utilization of modern teaching equipment in Mathematics education programs?

3) What is the awareness, knowledge, and practical use of modern teaching technology and equipment among educators and students in Mathematics education programs?

4) What strategies can be implemented to enhance the integration and utilization of ICT in Mathematics education programs?

Significance of the Study

The discussion on the global adoption of modern instructional facilities and teaching equipment aims to provide readers, especially stakeholders, with valuable insights into the factors that contribute to effectively utilising these resources in achieving the objectives of Mathematics in schools. This research is particularly timely and relevant, as ICT is a key driver behind the educational advancement of several nations. When modern instructional facilities are properly integrated into the education system, they can transform the region and the nation, making it more progressive.

Additionally, the study will serve as an inquiry into the application of new technology in education, helping administrators assess teachers' competencies and understand the perceptions of both instructors and learners regarding the use of modern instructional facilities in teaching and learning practices. The research will also identify any weaknesses in the instructional materials, providing valuable feedback for policymakers. This information can be a foundation for creating policies and strategies to incorporate modern teaching equipment and ICT into academic activities.

Moreover, the study will be instrumental in pinpointing the reasons for the underutilization of modern tools and facilities in schools and national exams, allowing for implementing remedial measures. This will also present an opportunity to seek additional support and intervention from the federal government and relevant donor agencies to address these challenges.

Materials And Methods

Concept of Teaching Equipment

Modern teaching equipment, including computers, fax machines, calculators, and scientific tools, has significantly improved workplace efficiency. These devices enable tasks to be completed much faster than

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before when everything had to be done manually. The automation provided by electronics reduces labour and operational costs, eliminating the need for manual data filing and printing. Communication is also streamlined, with teleconferencing allowing virtual face-to-face meetings, saving time and travel expenses. Today, electronic teaching equipment, including home teaching, is essential for all levels of education and types.

The teaching equipment industry is a major global sector, continually evolving with technological advancements. It's cyclical, with sales influenced by consumer confidence, corporate profits, and seasonal trends, such as back-to-school and holiday shopping. The industry is not capital intensive, though substantial research and development costs are involved. It is divided into two main segments: companies that produce digital teaching equipment (like computers, copiers and printers), primarily serving financial institutions, small businesses, and government agencies, and teaching supply distributors, whose sales come from retail chains, stationery businesses, and international operations.

Teachers Teaching Effectiveness

The teaching profession in Nigeria has faced numerous challenges for over a decade, negatively affecting the quality of education and the status of teachers. Teachers play a central role in education as they plan, organize, design, and inspire students using effective teaching techniques to impart knowledge. According to Rybak,(2021), citing Wiest (2024), teaching involves imparting knowledge, skills, and attitudes to students to foster desirable changes in their learning. Ghory and Ghafory (2021) emphasize that teachers are the core of the educational system, and their influence on students' learning is second only to that of the students themselves.

The effectiveness of teachers, including their application of pedagogical knowledge and classroom strategies, is crucial for the success of the school and the education system. Education can transform students' learning culture, mindset, and values. However, such transformation can only occur if teachers have a strong grasp of the subject matter, follow well-prepared lesson plans, maintain effective classroom control, engage students, and utilize various assessment techniques.

Zhao et al (2021) argues that Nigeria cannot achieve the goals of Vision 20:20 without strengthening its educational system. The education system's success, especially at the secondary school level, depends on factors such as government support, societal involvement, student engagement, teacher effectiveness, and the quality of teaching. For instance, teacher effectiveness in mathematics can be evaluated based on the teacher's ability to use appropriate techniques to impart knowledge and skills that lead to positive learning outcomes. Vankúš, (2021) defines teacher effectiveness as the teacher's ability to maximize learning and produce desired results.

Effective teaching involves setting clear objectives, providing illustrations that help students apply knowledge to real-life problems, and using effective evaluation techniques. Akomolefe (2010) identifies several key characteristics of effective teaching, including a focus on student achievement, quality teaching responsive to learning processes, and pedagogy that fosters cohesive learning communities. Pan et al. (2022) further highlight traits of effective teachers, such as professionalism, subject competence, lifelong learning, and diverse teaching strategies.

In today's rapidly changing knowledge-based society, teachers must focus on preparing students for the future. The success of educational goals depends on effective school management and leadership (Güler, et al. 2022). The principal's role includes supervision, planning, and evaluation of teachers' effectiveness, mainly through classroom observation and microteaching. Assessing teachers' effectiveness in lesson preparation, classroom management, and time management is vital, especially given the poor academic performance of mathematics students in some States in Nigeria. The problem this study addresses is the poor academic performance of mathematics students in internal and external examinations in the region.

Learning Theories and Their Correlation with Modern Teaching Equipment

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Four theories guided the study. These are behaviourism, Cognitivism, Connectivism and the constructivist theory. Behaviourism is a learning theory focusing solely on observable behaviours, disregarding internal mental processes. It defines learning as acquiring new behaviours in response to environmental changes. Prominent psychologists like John B. Watson and Ivan Pavlov, B.F. Skinner and E.L. Thorndike concluded that behaviourism views the learner as a passive entity reacting to environmental stimuli. According to this theory, learners begin as blank slates, with positive and negative reinforcements shaping their behaviours.

Learning is thus seen as a process of instruction that results in observable changes in behaviour. These behaviours include active participation in class activities, such as both physical tasks and those involving technology, like simulations or online tasks. Modern technology tools, such as digital cameras and learning management systems, have proven invaluable for tracking and observing student behaviour over time. These tools allow instructors to monitor and assess student actions, offering a means for ongoing evaluation and refinement of perceptions about student conduct (Kuter, 2012).

Cognitivism is a learning theory that conceptualizes the learning process as an internal and active mental activity that evolves within the learner. As mental capacity and skills improve, learning becomes more effective. This theory emphasizes the role of memory, critical thinking, abilities, and prior knowledge in the learning process. By the 1960s, cognitivism had replaced behaviourism as the dominant paradigm, focusing on the internal mental processes involved in learning. Key contributors to this theory include Morrill, Reigeluth, Gagne, Briggs, Wager, and Bruner.

According to this theory, the learner is seen as an information processor akin to a computer. In this context, tools and technologies such as computer games, simulations, online tutors, and other digital resources can enhance learners' ability to process information and solve problems, thereby improving their cognitive framework (Beauty of Katapang, 2012).

Constructivism refers to the theory that learners actively build knowledge in their unique ways, individually and socially, as they engage in the learning process. In this view, learning is seen as the construction of new knowledge by the learner. Key contributors to this theory include Jean Piaget. Abik and Ajhoun (2012) emphasized that students construct knowledge by forming their own experiences. The core idea is that individuals develop their understanding and perception of the world through interactions and experiences. This concept encourages using active technological tools like smartboards, digital videos, audio, and computer programs to explore real-world issues and problem-solving. Students can reflect on and discuss their learning processes by engaging with these tools, further enhancing their understanding.

Connectivism is a learning theory (though not widely accepted) that explains how internet technology opens new opportunities for students and instructors to learn and share information globally. These technologies include web browsers, email, YouTube, wikis, blogs, and other tools that enable users to connect and exchange knowledge. Often referred to as the "learning theory for the digital age," it was developed by Stephen Downes and George Siemens (George, 2005). This theory aims to explain learning in a fast-changing, digital world, emphasizing the importance of connecting various information sets through computer networks. In this context, recognising patterns and connections is just as crucial as acquiring new knowledge. Technological tools like digital databases allow students and teachers to easily access vast information, supporting learning and research (Patrick, 2013).

Modern Teaching Equipment Facilities and their Effective use in Teaching and Learning

The integration of computers into education has become crucial due to its role in national development and the growing school population. When embraced by educators, ICT enhances education delivery and improves classroom management, collaborative learning, self-study, and communication between students and teachers. Modern teaching methods encourage active student participation, unlike the traditional approach, where teachers solely deliver lectures without student input (Niyibizi & Mutarutinya, 2024).

As identified by Olanrewaju, (2021), various ICT tools used in schools include audio systems, TVs, computers, projectors, mobile devices, fax machines, the internet, and digital multimedia. However, many

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of these resources are not fully integrated into teaching and learning in Nigerian public schools. Ud et al. (2021) note that effective ICT use requires computer-based operations, video and audio conferencing, and Computer Assisted Instruction (CAI). The success of ICT integration largely depends on the availability of these resources and the teacher's ability to use them effectively.

Today, computer literacy is essential in fields like accounting, business management, and engineering, where software tools like word processors, spreadsheets, and databases are integral (Nkundabakura, 2023). As job security increasingly depends on ICT proficiency, the demand for computer and ICT literacy has surged. The use of ICT in schools has proven beneficial in improving education in Nigerian public schools, helping to develop skilled human capital (Abubakar, 2023).

Advances in affordable computer technology and mass storage media, like optical discs and cloud storage, have provided educators with powerful tools. Modern computer memory, now measured in terabytes, can store vast amounts of data. However, the effective use of ICT in teaching depends on the availability of resources and teachers' competency in using them. Research indicates that schools in northern Nigeria face challenges such as a lack of functional ICT facilities, insufficient teacher skills, power supply issues, insecurity, and inadequate funding.

Perception of the use of ICT in Teaching and Learning by both Students and Teachers

Students are central to any academic community, and their perspectives should be valued. Psychologists argue that students should be seen as active participants, not just passive recipients of education. Ayanwale,i (2022) highlights that ICT breaks down time and space barriers, allowing students to interact with teachers and access global knowledge anytime, anywhere. ICT fosters collaboration, enhances critical thinking, and deepens understanding of learning tools. It also creates a more inclusive environment, benefiting students with special needs and enabling complex concepts to be visualized.

Sirajo, and Abdullahi, (2023), notes that ICT supports independent and collaborative learning, while research by Yunus, Salehi, and John (2013) shows that visual aids engage students. Sweeny (2010) adds that ICT enhances communication skills by enabling global interaction through computer-mediated communication (CMC).

However, challenges remain in ICT integration, such as poor electricity, lack of trained personnel, high costs, and inadequate government funding. If the government fulfils its ICT policy goals, resources for students and teachers in northeastern Nigeria could improve (Amuchie, 2015). Limited ICT resources in Nigerian schools hinder accessibility and instructional development, as Agyei, et al. (2022) noted.

Summary of Literature Reviewed

The reviewed literature highlights that modern teaching equipment reduces operational costs by eliminating the need for manual data filing and paper printing. Additionally, advancements in communication technology, such as teleconferencing, facilitate easier and cost-effective communication between distant teachings, saving time and travel expenses.

It was also noted that mathematics contributes significantly to national, technological, and economic progress, serving as a foundation for higher education (N.P.E, 1981, revised in 2004; FRN, 2008). These studies equip individuals with essential personal, consumer, clerical, and managerial skills, empowering them to create wealth and jobs rather than seek them (Ayanwale, et al., 2022). Nkundabakura et al. (2023) emphasizes that mathematics education focuses on vocational and professional preparation for careers in the global world.

Furthermore, the literature reveals that integrating computers in education has become essential. It enhances teaching methods, supports classroom management, encourages collaborative learning, and improves communication between students and teachers, fostering a more effective learning environment.

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Research Design

The study adopted a descriptive survey research design. It is designed to know the utilization of modern teaching equipment in realising school teaching objectives.

Population and Sampling

This study's population comprised junior secondary school teachers in southwest Nigeria. The study sample comprised one hundred (100) junior secondary school mathematics teachers selected using a purposive sampling technique. According to Odoh (2015), the purposive sampling technique is a non-probability sampling technique whereby the respondents or participants are chosen based on prior judgment about their relevance in the study.

Research Instrument

The instrument that the researcher used for data collection is the Questionnaire. The questionnaire was divided into five (5) significant sections, A to E. Section A covers the respondents' bio-data. Section B collected data on the prospects of using modern teaching equipment in teaching. Section C gathered data on the constraints facing the utilization of modern teaching equipment in the school system. Section D gathered data on the knowledge and the usage of modern teaching technology and equipment. The last Section collected data on strategies for enhancing the utilization of modern teaching equipment in the school system. Every item/statement in the questionnaire is on a four-point Likert scale of Strongly Agreed - SA, Agreed – A, Disagreed - D, Strongly Disagreed – SD.

Validity of the Instrument

Ilogu (2005) opined that validity deals with the ability of a test/an instrument to measure what it is supposed to measure. Therefore, to ascertain the instrument's validity, an expert in the faculty of education made necessary corrections and modifications to ensure the face and content validity of the instrument.

Reliability of the Instrument

The reliability of the questionnaire was ensured by using the test-re-test method to determine the suitability of the questionnaire items for the study. The coefficient of reliability was determined by correlating the overall scores obtained from each of the sampled groups of respondents on the first and second occasions. A coefficient of 0.75 was obtained, which adjudged the questionnaire items suitable for the study.

Administration of the Instrument

The researcher personally administered copies of the questionnaire to the teachers in the selected secondary schools in Akoko South West Local Government. The researcher employed a spontaneous collection of the complete questionnaire, while those participants who could not comply were visited the next day to collect the completed questionnaire. This strategy enables the researcher to achieve a 100% rate of returns.

Method of Data Analysis

The data collected was analyzed using descriptive statistics of frequency count and simple percentages. In analyzing the data, the researcher used mean score and standard deviation to answer this study's research question. The degree of strongly agreed and disagreed were determined by finding the mean of the values assigned to the options. The criterion mean 2.50 was obtained by summing up the weighted options (4+3+2+1= 10) and dividing it by the total number of response options (4): 10/4=2.50. In rating, the computed mean scores that range from 2.50 and above were regarded as being of great extent, while the item that falls below 2.50 was regarded as having a low extent.

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Results

The collated data via questionnaires were analyzed, summarized and interpreted in this section. Frequency count and simple percentage were used to answer the research questions. The results are presented in the tables below.

Descriptive Analysis of Respondents' Demographic Data

Table 1: Distribution of Respondents by AGE

ITEMS	FREQUENCY	PERCENTAGE %
16-20	0	0
21-25	23	23
26-30	75	75
30 and above	2	2
TOTAL	**100**	**100**

Table 1 above shows the distribution of the age of respondents. The table showed that 0 (0%) of the respondents are 16-20 years, 23 (23%) of the respondents are 21-25 years, 75 (75%) of the respondents are 26-30 years, while 2 (2%) of the respondents are 30 years and above. It showed that most respondents are 26-30 years old.

Table 2: Distribution of Respondents by SEX

ITEMS	FREQUENCY	PERCENTAGE %
MALE	62	62
FEMALE	38	38
TOTAL	**100**	**100**

Table 2 above shows the distribution of the sex of respondents. It revealed that 62 (62%) of the respondents are male while 38 (38%) are female, implying that male respondents are more than female.

Table 3: Distribution of Respondents by MARITAL STATUS

ITEMS	FREQUENCY	PERCENTAGE %
Single	37	37
Married	50	50
Divorced	13	13
Widowed	0	0
TOTAL	**100**	**100**

Table 3 above shows the distribution of the marital status of respondents. It revealed that 37 (37%) of the respondents are single, 50 (50%) of the respondents are married, 13 (13%) of the respondents are divorced, and 0 (0%) are widowed, which implies that the majority of the respondents are married.

Table 4: Distribution of Respondents by YEARS OF EXPERIENCE

ITEMS	FREQUENCY	PERCENTAGE %
1-5 years	8	8

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6-10 years	88	88
11-15 years	0	0
16-20 years	4	4
TOTAL	**100**	**100**

Table 4 above shows the distribution of respondents' years of experience. The table showed that 8 (8%) of the respondents have 1- 5 years of working experience, 88 (88%) of the respondents have 6- 10 years of working experience, 0 (0%) of the respondents have 11- 15 years of working experience while 4 (4%) of the respondents have 16- 20 years of working experience. It showed that the majority of the respondents have 6-10 years of working experience

Table 5: Distribution of Respondents by QUALIFICATION

ITEMS	FREQUENCY	PERCENTAGE %
HND	8	8
B.Sc	59	59
M.Sc./M.Phil.	17	17
Ph.D	16	16
TOTAL	**100**	**100**

Table 5 The above shows the distribution of respondents' qualifications. It revealed that 8 (8%) of the respondents are HND holders, and 59 (59%) of the respondents are B.17 (17%) of the respondents are M.Sc/M. Phil, while 16 (16%) are PhD holders. This implies that the majority of the respondents are B.Sc. holders.

Analysis Of Research Questions

Research Question 1: What is the prospect of using modern teaching equipment in Mathematics education?

Table 6: Prospect of utilization of modern teaching equipment in Mathematics Education

S/N	ITEMS	SA		A		D		SD	
		F	%	F	%	F	%	F	%
1.	Modern teaching equipment resources utilization makes teaching to be stimulating	36	36	56	56	4	4	4	4
2.	Modern teaching equipment emphasizes important aspects of learning, thereby discouraging rote learning among students	30	30	54	54	16	16	0	0
3.	Modern teaching equipment improves both the efficiency and effectiveness of Mathematics education lecturers	32	32	64	64	4	4	0	0
4.	Modern teaching equipment helps school management to access up-to-date pupil and school data anytime and anywhere	32	32	60	60	8	8	0	0
5.	Modern teaching equipment helps to enhance the professional image of Mathematics education teachers	32	32	64	64	4	4	0	0

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6	Modern teaching equipment helps to maximize students' attentiveness to instruction	31	31	53	53	12	12	4	4

Table 6 shows the respondents' response to using modern teaching equipment in teaching Mathematics. 36 (36%) of the respondents strongly agreed that modern teaching equipment resource utilization makes teaching to be stimulating, 56 (56%) agreed as well, 4 (4%) disagreed, and 4 (4%) strongly disagreed. For item 2, 30 (30%) strongly agreed that modern teaching equipment emphasizes important aspects of learning, thereby discouraging rote learning among students; 54 (54%) agreed, 16 (16%) disagreed, and 0 (0%) strongly disagreed. For item 3, 32 (32%) strongly agreed that modern teaching equipment improves both the efficiency and effectiveness of mathematics teachers, 64 (64%) agreed to this, 4 (4%) disagreed, and 0 (0%) strongly disagreed. For item 4, 32 (32%) of the respondents strongly agreed that modern teaching equipment helps school management to access up-to-date pupil and school data anytime and anywhere, 60 (60%) agreed to this as well, and 8 (8%) disagreed. In comparison, 0 (0%) strongly disagreed. For item 5, 32 (32%) of the respondents strongly agreed that modern teaching equipment helps to enhance the professional image of Mathematics teachers, 64 (64%) agreed to this, 4 (4%) disagreed, and 0 (0%) strongly disagreed. For item 6, 31 (31%) of the respondents strongly agreed that Modern teaching equipment helps to maximize students' attentiveness to instruction, 53 (53%) agreed to this, 12 (12%) disagreed, and 4 (4%) strongly disagreed.

Research Question 2: What are the constraints facing using modern teaching equipment in learning Mathematics?

Table 7: Constraints facing the utilization of modern teaching equipment in the learning of Mathematics

S/N	ITEMS	SA		A		D		SD	
		F	%	F	%	F	%	F	%
7.	Inadequate modern teaching equipment in Mathematics	43	43	40	40	17	17	0	0
8.	Frequent electricity interruption of modern teaching equipment facilities in Mathematics	39	39	48	48	13	13	0	0
9.	High cost of modern teaching equipment, facilities and components in Mathematics	31	31	53	53	12	12	4	4
10.	Limited modern teaching equipment skills among teachers in Mathematics	23	23	49	49	24	24	4	4
11.	Lack of modern teaching equipment curriculum experts in Mathematics	31	31	53	53	12	12	4	4
12.	Inadequate funding of modern teaching equipment facilities in Mathematics	43	43	43	43	8	8	4	4

Table 7 shows the response to constraints facing the utilization of modern teaching equipment in learning Mathematics. 43 (43%) of the respondents strongly agreed to inadequate modern teaching equipment in learning Mathematics 40 (40%) agreed as well, 17 (17%) disagreed, and 0 (0%) strongly disagreed. For item 8, 39 (39%) strongly agreed to frequent electricity interruption of modern teaching equipment facilities in learning mathematics, 53 (53%) agreed, 12 (12%) disagreed, and 0 (0%) strongly disagreed. For item 9, 31 (31%) strongly agreed to the high cost of modern teaching equipment facilities and components in learning mathematics, 53 (53%) agreed to this, 12 (12%) disagreed, and 4 (4%) strongly disagreed. For item 10, 23 (23%) of the respondents strongly agreed to limited modern teaching equipment skills among teachers in Mathematics, 49 (49%) agreed to this as well, 24 (24%) disagreed, and 4 (4%) strongly disagreed. For item 11, 31 (31%) of the respondents strongly agreed to the lack of modern teaching equipment curriculum experts in mathematics, 53 (53%) agreed to this, 12 (12%) disagreed, and 4 (4%) strongly disagreed. For

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item 12, 45 (45%) of the respondents strongly agreed to inadequate funding of modern teaching equipment facilities in mathematics, 43 (43%) agreed to this, 12 (12%) disagreed, and 4 (4%) strongly disagreed.

Research Question 3: What are the level of knowledge and the usage of modern teaching technology and equipment?

Table 8: Level of knowledge and the usage of modern teaching technology and equipment

S/N	ITEMS	SA		A		D		SD	
		F	%	F	%	F	%	F	%
13.	I use modern teaching equipment in the formulation of my lesson notes to achieve clarity	40	40	48	48	4	4	8	8
14.	I am highly learned in ICT and other modern teaching equipment used in Mathematics	37	37	46	46	9	9	8	8
15.	Use modern teaching equipment facilities in Mathematics in school is on a high note	40	40	36	36	16	16	8	8
16.	ICT and other modern teaching equipment help me to present my lessons sequentially through steps	36	36	43	43	13	13	8	8
17.	I am not skilled in ICT and other modern teaching equipment and so I do not use it	39	39	37	37	12	12	12	12
18.	I am just a beginner in the usage of modern teaching equipment facilities in Mathematics	40	40	39	39	17	17	4	4

Table 8 shows the response to the level of knowledge and the usage of modern teaching technology and equipment. 40 (40%) of the respondents strongly agreed that they use modern teaching equipment in the formulation of their lesson notes to achieve clarity, 48 (48%) agreed as well, 4 (4%) disagreed, and 8 (8%) strongly disagreed. For item 14, 37 (37%) strongly agreed that they are highly learned in ICT and other modern teaching equipment used in Mathematics, 46 (46%) agreed, 9 (9%) disagreed, and 8 (8%) strongly disagreed. For item 15, 40 (40%) strongly agreed that they use modern teaching equipment facilities in mathematics education in school, 36 (36%) agreed to this, 16 (16%) disagreed, and 8 (8%) strongly disagreed. For item 16, 36 (36%) of the respondents strongly agreed that ICT and other modern teaching equipment help them to present their lessons sequentially through steps, 43 (43%) agreed to this as well, and 13 (13%) disagreed. In comparison, 8 (8%) strongly disagreed. For item 17, 39 (39%) of the respondents strongly agreed that they are not skilled in ICT and other modern teaching equipment and so they do not use it; 37 (37%) agreed to this, 12 (12%) disagreed while 12 (12%) strongly disagreed. For item 18, 40 (40%) of the respondents strongly agreed that they are just a beginner in the usage of modern teaching equipment facilities in teaching mathematics, 49 (49%) agreed to this, and 17 (17%) disagreed. In comparison, 4 (4%) strongly disagreed.

Research Question 4: What are the strategies for enhancing the utilization of ICT in Mathematics?

Table 9: Strategies for enhancing the utilization of ICT in Mathematics

S/N	ITEMS	SA		A		D		SD	
		F	%	F	%	F	%	F	%

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19.	Provision of adequate electricity supply by school authorities can enhance the utilization of ICT in Mathematics	52	52	40	40	8	8	0	0
20.	Provision of adequate ICT equipment by school authorities can enhance the utilization of ICT in Mathematics	36	36	60	60	4	4	0	0
21.	Reduction in cost of ICT equipment can enhance the teaching of ICT in Mathematics	52	52	44	44	4	4	0	0
22.	Good maintenance culture of ICT by school authorities can enhance the utilization of ICT in Mathematics	40	40	47	47	9	9	4	4
23.	Employment of adequate qualified ICT teachers by school authorities can enhance the utilization of ICT in Mathematics	44	44	48	48	4	4	4	4
24.	Provisions of reprographic machines such as copiers and duplicators by school authorities can enhance the utilization of ICT in Mathematics	53	53	39	39	4	4	4	4

Table 9 shows responses to strategies for enhancing the utilization of ICT in mathematics education programs. 52 (52%) of the respondents strongly agreed that the provision of adequate electricity supply by school authorities could enhance the utilization of ICT in mathematics education, 40 (40%) agreed as well, 8 (8%) disagreed, and 0 (0%) strongly disagreed. For item 20, 36 (36%) strongly agreed that the provision of adequate ICT equipment by school authorities could enhance the utilization of ICT in mathematics education, 60 (60%) agreed, 4 (4%) disagreed, and 0 (0%) strongly disagreed. For item 21, 52 (52%) strongly agreed that a reduction in the cost of ICT equipment could enhance the teaching of ICT in mathematics education, 44 (44%) agreed to this, 4 (4%) disagreed, and 0 (0%) strongly disagreed. For item 22, 40 (40%) of the respondents strongly agreed that a good maintenance culture of ICT by school authorities can enhance the utilization of ICT in Mathematics Education, 47 (47%) agreed to this as well, and 9 (9%) disagreed. In comparison, 4 (4%) strongly disagreed. For item 23, 44 (44%) of the respondents strongly agreed that the employment of adequately qualified ICT teachers by school authorities could enhance the utilization of ICT in mathematics education; 48 (48%) agreed to this, and 4 (4%) disagreed. In comparison, 4 (4%) strongly disagreed. For item 24, 53 (53%) of the respondents strongly agreed that provisions of reprographic machines such as copiers and duplicators by school authorities could enhance the utilization of ICT in mathematics education, 39 (39%) agreed to this, 4 (4%) disagreed. In comparison, 4 (4%) strongly disagreed.

Discussion of Findings

The first key finding of this study highlighted the potential benefits of incorporating modern teaching equipment into mathematics education. The results indicated that using modern teaching resources makes lessons more engaging, enhances the efficiency and effectiveness of mathematics instruction and focuses on crucial aspects of learning. This approach helps prevent rote memorization among students, allows school management to access real-time student and school data, supports the professional development of mathematics teachers, and increases student attentiveness during lessons. These findings align with Abubakar, et al (2023) view that ICT promotes effective classroom management, collaborative learning, independent study, course organization, and improved communication between teachers, students, and peers. Modern teaching methods encourage active student participation, contrasting with traditional lecture-based teaching, where students are passive recipients of information.

The second finding of this study identified several challenges to the effective use of modern teaching equipment in school programs. It was found that most students agreed that the lack of sufficient modern

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teaching resources, frequent power interruptions, high costs of teaching equipment, limited ICT skills among teachers, lack of specialized curriculum experts in ICT for mathematics, and inadequate funding are significant barriers to the effective use of technology in mathematics education. This is consistent with Sirajo, and Abdullahi (2023) assertion that the successful use of ICT in education depends mainly on the availability of the necessary tools and the teachers' ability to utilize them effectively. Research has also highlighted that schools in northern Nigeria lack functional ICT facilities, which hampers teachers' ability to integrate technology into their teaching. Other challenges include inadequate teacher competency, unreliable power supply, insecurity, and limited financial resources.

The third finding revealed the extent of knowledge and usage of modern teaching technology. The results indicated that the use of modern teaching equipment in schools is relatively high, contradicting Udu et al. (2021) finding that ICT resources were largely unavailable in primary and secondary schools.

The fourth finding focused on strategies for improving the use of ICT in school programs. It was revealed that enhancing ICT utilization could be achieved through consistent electricity supply, adequate provision of ICT equipment, reduced technology costs, reprographic machines like copiers and duplicators, a strong maintenance culture, and the hiring of qualified ICT teachers. These strategies reflect the Agyei et al. (2022) perspective, which emphasizes the importance of integrating various technologies, such as audio-visual equipment, mobile devices, telecommunication tools, and digital media, into teaching to improve ICT use in the classroom.

Conclusion

In conclusion, this study demonstrates the potential benefits and challenges of incorporating modern teaching equipment into mathematics education. The positive impact of modern teaching resources on student engagement, lesson effectiveness, and professional development for teachers is clear, supporting the notion that ICT enhances classroom dynamics and promotes active learning. However, several barriers, such as limited resources, inadequate teacher training, and infrastructure challenges, particularly in northern Nigeria, hinder the full integration of technology in education. Despite these obstacles, the study suggests that increasing access to ICT resources, improving the electricity supply, and investing in teacher development could significantly improve the utilization of modern teaching technologies in schools. Overall, while the use of modern teaching equipment is relatively high, addressing these challenges and adopting targeted strategies will be key to fully realizing the benefits of ICT in mathematics education.

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