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Assessment of Availability and Utilization of Computer-Managed Instruction Tools in Basic Technology Education in Junior Secondary Schools in Anambra State

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ABSTRACT:
This study examined the availability and utilization of Computer-Managed Instruction (CMI) tools in Basic Technology education within junior secondary schools in Anambra State. Employing a cross-sectional survey design, data were collected from 20 public junior secondary schools in the Onitsha Education Zone. A structured questionnaire was administered to 20 teachers and 840 students to gather information on the availability and usage of CMI tools. Statistical analysis, including mean comparison and hypothesis testing, was conducted to assess the differences in perceptions between teachers and students. Results indicate a moderate availability of CMI tools, with laptops and internet facilities being most prevalent, while digital blackboards, Moodle, and Canvas were notably scarce. Despite awareness and access, the utilization of these tools remains limited, highlighting a gap between availability and practical use in the classroom. Moreover, there were no significant differences in perceptions between teachers and students regarding the availability and utilization of CMI tools. The findings underscore the need for concerted efforts to enhance the integration of technology into Basic Technology education. Recommendations include increased investment in technology infrastructure, comprehensive teacher training, and curriculum integration strategies. Addressing these challenges can facilitate the effective use of CMI tools, ultimately improving teaching and learning outcomes in Basic Technology education within Anambra State's junior secondary schools.

Keywords: Computer-managed instruction, Basic Technology education, junior secondary schools, availability, utilization

INTRODUCTION:

The quest for improved methods of performing tasks with optimal efficiency has resulted in various stages of innovation that the computer has undergone. The advent of computer technology has significantly facilitated various aspects of human activities, spanning from Engineering, Medicine, and accounting to Education. Lucky (2022) defined a computer as a programmable machine that can store, retrieve, and process data. A computer responds to a specific set of instructions in a well-defined manner and can execute a prerecorded list of instructions (a programme). According to Rouse (2020), a computer is a programmable electronic device that accepts raw data as input and processes it with a set of instructions (a programme) to produce the result. Modern computers are electronic devices used for a variety of purposes, ranging from browsing the web, writing documents, editing videos, creating applications, playing video games, and many other aspects of an application. A computer, in a broader sense, is an electrical machine used for storing, organising, and retrieving text, numbers, and images, doing computations, and controlling other computers (Smith, 2013). The computer is made up of many parts. The physical components comprise a processor (CPU), memory, input and output devices, and a power cable. These are all common components on all computers.

The processor could be referred to as the computer's "brain". It executes programme instructions (Computer Hope, 2022). A computer has two types of Memory, which temporarily or permanently stores data. It also has input and output devices, such as a monitor, keyboard, mouse, and speakers, which allow users to interact with the computer. The power cable powers the computer. The computer has a case that houses the computer's internal components, such as the motherboard, hard drive, and graphics card. The motherboard is a circuit board that links all the other components. Computers emanated from analogue and advanced to digital computers which eventually birthed hybrid computers. This is a computer that combines digital and analogue components. Traditionally, analogue computer components conduct sophisticated mathematical computations (Smith,

2013). In addition to acting as the system's controller, the digital components handle logical and numerical operations. The analogue front end measures the physical quantities of the system, while the digital computer performs the necessary calculations to simulate its behaviour (Computer Hope, 2022).

Recently, computers have been widely used in education, from online learning platforms to educational software and interactive whiteboards. Computers can provide students with access to vast amounts of information, facilitate communication and collaboration, and offer personalised learning experiences. Additionally, computers can help teachers plan, grade, and track students' progress. According to Computer Hope (2022), computers can assist teaching and learning in several ways: access to information, personalised learning for collaboration and communication, and multimedia learning to assess feedback. Computers provide students with access to vast amounts of information through the Internet, digital libraries, and educational software. This allows students to carry out research, learn about topics that interest them, and explore new knowledge areas. Computers can be used to provide personalised learning experiences that cater to each student's individual needs and learning style. Educational software can adapt to a student's pace and level of understanding, providing additional support or challenges as needed. Computers can facilitate collaboration and communication between students and teachers. Online discussion forums, video conferencing, and collaborative software allow students to work together on projects and assignments even if they are in different locations. Computers can provide students with multimedia learning experiences that incorporate text, images, audio, and video. This can help students better understand complex concepts and engage with the material in a more interactive and immersive way. Lastly, computers can be used to assess students' learning and provide feedback to both students and teachers. Online quizzes, tests, and assignments can be automatically graded, and data analytics can be used to track students' progress and identify areas where additional support is needed.

These developments have given rise to educational tools that are necessary for teaching and learning, such as computer-assisted instruction (CAI), computer-managed instruction (CMI), and computer-mediated instruction (CMI). Edutech202 (2012) defines CAI as an automated instructional approach in which a computer is utilised to offer an educational programme to the students through an interactive procedure. According to Audu, and Agbo (2010), CAI is an educational approach in which the computer educates the students and has a stored instructional programme meant to inform, guide, control, and test the students until a certain level of competency is attained. According to Sharma (2017), CAI is an interactive instructional approach in which a computer is utilised to provide the instructional content and monitor the learning that occurs. CAI is also viewed as a self-learning approach by Eyo (2018), who views the computer as a tool to assist and improve training. Okebukola (2013) postulated that CAI can be applied to all ages and forms of education, from pre-school to professional school and even in many employment areas. It can also be used in a wide range of fields including all the main disciplines in elementary and secondary school. Edutech202 (2012) summarized the characteristics of CAI to include learner-controlled instruction, prompt feedback to the learner, self-pacing, adaptability of instruction, multiple-user approach and random access facilities. CAI uses diverse applications to present topics, test students' understanding, receive immediate feedback and summarise students' performance (Patel, 2013).

Computer Assisted Instruction is not quite different from Computer-managed instruction (CMI). CMI is an instructional strategy whereby the computer is used to provide learning objectives, learning resources, and assessments of learner performance. CMI aids the teacher in instructional management without actually doing the teaching. CMI is related to Computer-Assisted Instruction (CAI), and while CAI uses computer technology to enhance teaching and learning, CMI is used to control and track the educational process of learners. Nwanne and Agommuoh (2017) described computer-managed instruction (CMI) as a type of computer-based learning system that uses software to manage and track student progress. CMI systems typically include a database of instructional materials, such as lessons, quizzes, and assessments, that are delivered to students through a computer or other digital device. The software tracks student progress and provides feedback to both students and teachers, allowing for personalised learning experiences and targeted interventions when needed. CMI systems can be used in a variety of educational settings, from K–12 schools to higher education institutions and corporate training programmes (Madudili, 2020).According to Madudili (2020), the characteristics of CAI that were identified as having a positive impact on teaching and learning in Nigeria include learner-controlled instruction, prompt feedback to the learner, self-pacing, adaptability of instruction, a multiple-user approach, and random access facilities. Okebukola (2013) also identified some specific features of CAI that have a positive impact on teaching and learning in Nigeria, and they include learner-controlled instruction, prompt feedback to the learner, self-pacing, adaptability of instruction, a multiple-user approach, and random-access facilities. These elements help create a more personalised and dynamic learning environment for students by giving them greater control over their learning and instant feedback on their progress. They also allow for a more student-centred learning environment and can make the

learning process more engaging for both teachers and learners.

In Basic Education Certificate Examination (BECE); Basic Technology is part of the subject "Basic Science and Technology" which comprises Basic Science, Information Technology, Health and Physical Education, and Basic Technology. It has been noted that all instruction is teacher-centred. The student is kept on edge since the learning and instruction are more or less abstract. The possibility for students to witness firsthand the equipment used in managing the majority of the trade being taught has been taken away from teaching basic technology without the provision of necessary instruments. According to the Basic Technology Curriculum, teaching and learning of the topic should be both theoretical and practical (Federal Republic of Nigeria 2013). As a new curriculum, basic technology must offer students with practical skills that are relevant enough to allow them to contribute meaningfully to the development of their environment (Nigerian Educational Research and Development Council2014). As a skill-oriented course whose primary goal is to introduce students to the fundamentals of technology, it must be taught with the right tools. Furthermore, the more engaged the teaching and learning process is, the more effectively meaning is created out of it.

According to Klimov (2012), the use of new technologies has transformed traditional teaching practices in several ways. For example, it has shifted the focus from teacher-centred learning to student-centred learning, allowed for mass customization with instruction to fit individual student's needs, and enabled flexible pacing based on student's abilities. Additionally, new technologies have made distributed learning possible from any place and allowed for learning at any time, rather than just during school hours. The use of Computers in teaching and learning has several advantages, including enhancing classroom activities, restructuring course content, and giving students more independent and learner-centred learning possibilities. Teachers can also improve the quality of their instruction by utilising cutting-edge information technologies.

Theoretical framework:

This study was anchored on Behaviorist theory. The emergence of Behaviorism dates back to the early 20th century with Thorndike's Law of Effect. Ivan Pavlov's work on classical conditioning demonstrated how a neutral stimulus could elicit a reflex response, enriching behaviorist knowledge. John B. Watson expanded on Thorndike and Pavlov's findings, while B.F. Skinner, renowned for his empirical research, is considered the father of modern Behavior Analysis (Cooper, Heron & Heward, 2007). Behaviorism, also known as behavioral psychology, focuses on the influence of environmental and contextual factors on behavior. According to behaviorists, conditioning through environmental interaction is the basis for acquiring all behaviors, with environmental stimuli shaping our actions (Rogers, 2023). Baulo and Nabua (2016) state that behavior is intentionally molded by external forces, leading to deliberate design of a person's disposition and actions. Empiricism is linked with behaviorism, emphasizing scientific observation over subjective realities. Pavlov's discovery that bell sounds alone could elicit salivation in dogs laid the foundation for behaviorist approaches. Influential behaviorists include Skinner and Watson, who advocated for learning through conditioning, involving reinforcement or punishment (Danley, James, Mims, & Simms, 2011). Behaviorism focuses on observable behaviors and their correlation to stimuli and responses, seeking a causal connection between stimulus and response (Cherry, 2022). The theory evolved from methodological behaviorism based on realism to radical behaviorism based on pragmatism. Hung (2001) discusses behaviorism's role in computer-managed instruction (CMI), emphasizing its utility in developing instructional programs that reinforce desired responses. This framework supports the integration of CMI in Basic Technology education, relevant to assessing the availability and utilization of CMI tools in Junior Secondary Schools in Anambra State.

Objectives:

- examine the extent of availability of computer-managed instruction tools in the junior secondary schools in Anambra State.
- to determine how the tools are being used in teaching and learning Basic Technology in junior secondary schools.

Research Questions:

The following research questions will guide the study:

1. To what extent are computer-managed instruction tools available in the junior secondary schools in Anambra State?
2. To what extent are the tools being used in teaching and learning Basic Technology in junior secondary schools?

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Hypotheses

1. Null Hypothesis ($H_0$1): There is no significant difference in the mean responses of teachers and students on the availability of computer-managed instruction in teaching and learning Basic Technology.
2. Null Hypothesis ($H_0$2): There is no significant difference in the mean responses of teachers and students on the utilization of computer-managed instruction in teaching and learning Basic Technology.

METHODS:

The study adopted a cross-sectional survey design to investigate the impact and barriers of computer-managed instruction (CMI) in teaching basic technology in junior secondary schools in Anambra State. This design was chosen for its effectiveness in collecting data through questionnaires or interviews from a representative sample, providing comprehensive insights into respondents' opinions. The research was conducted in the Onitsha Education Zone, covering Onitsha North, Onitsha South, and Ogbaru. This zone, situated between 6°10'N/6°167'N and 6°47'E/6°783'E, is home to Igbo-speaking business people, civil servants, teachers, and professionals. Its mix of urban and rural characteristics, similar to other zones in Anambra State, made it a suitable area for the study.

The study targeted 1,092 junior secondary school students and teachers from 28 public junior secondary schools within the Onitsha Education Zone. A three-stage random sampling technique was employed. Initially, 70% of schools in each zone were randomly selected, resulting in 20 schools: 7 from Ogbaru, 9 from Onitsha North, and 4 from Onitsha South. Subsequently, one Basic Technology teacher and 10 students from each of Basic 1, 2, and 3 were randomly chosen from each school, totaling 20 teachers and 840 students. Data was gathered using a structured questionnaire titled "Impact of Computer-Managed Instruction in Teaching and Learning Basic Technology in Junior Secondary Schools Questionnaire" (ICMITLBTJSSQ). This tool, divided into sections for demographic information and CMI assessment, employed Likert-type scales to measure availability and impact.

The instrument was validated by experts from Nwafor Orizu College of Education and the University of Nigeria, Nsukka. A pilot test in neighboring schools showed a high reliability coefficient of 0.88. Questionnaires were administered and collected over a month, with research assistants' help. Responses were analyzed using SPSS (version 20), employing mean, standard deviation, and chi-square tests to interpret the data.

RESULTS:

Table 1: Demographic Characteristics of Teachers

Item	Frequency	Percentage (%)
Gender		
Male	8	44.4
Female	10	55.6
Class		
JSS1	6	33.3
JSS2	7	38.9
JSS3	5	27.8
Teaching Experience		
Less than 5 years	6	33.3
6-10 years	8	44.4
More than 10 years	4	22.2
Awareness of CMI		
Yes	18	100.0
No	0	0.0

Table 1 presents the frequency and percentage of gender, class, teaching experience, and awareness of CMI among the participants (teachers) of the study. There were 18 participants who were aware of CMI, and all of them were included in the study. The results show that 44.4% of the participants were males, while 55.6% were females. In respect to class, JSS2 students had the highest number of participants with 38.9%, followed by JSS1 students with 33.3% and JSS3 students with 27.8%. As for teaching experience 44.4% of the participants had teaching experience between 6-10 years, while 33.3% had less than 5 years of experience and 22.2% had more than 10 years of experience.

Table 4.2 Demographic Characteristics of Students

	Frequency	Percentage (%)
Gender		
Male	406	50.1
Female	404	49.9
Class		
JSS1	225	27.8
JSS2	387	47.8
JSS3	198	24.4
Awareness of CMI		
Yes	819	100.0
No	0	0.0

Table 2 presents data on gender, class, and awareness of CMI (Computer-Managed Instruction) among students. There iseven distribution of male (50.1%) and female (49.9%) students in the study. The majority of students were in JSS2 (47.8%), 27.8% in JSS1 and 24.4% in JSS3. The table shows that all students in the sample were aware of CMI.

Research Question 1: To what extent are computer-managed instruction tools available in the junior secondary schools in Anambra State?

Table 3 Extent of Availability of Computer-Managed Instruction Tools

Items	Great Extent	Little Extent	Not Available	Remarks
	F(%)	F(%)	F(%)	
Desktop	407 (49.2)	305 (36.8)	116 (14.0)	Moderate availability
Laptop	592 (71.5)	197 (23.8)	39 (4.7)	High availability
Tablet	96 (11.6)	236 (28.5)	496 (59.9)	Low availability
Digital Blackboard	0 (0.0)	209 (25.2)	619 (74.8)	Low availability
Moodle	0 (0.0)	158 (19.1)	670 (76.0)	Low availability
Canvas	0 (0.0)	201 (24.3)	627 (75.8)	Low availability
Power Supply	440 (53.1)	302 (36.5)	86 (10.4)	High availability
Smartphone	329 (39.7)	269 (32.5)	230 (27.8)	Moderate availability
Internet	454 (54.8)	121 (14.0)	253 (30.6)	High availability

The Table 3 shows the availability of various technological devices and tools for use in education. The devices/tools are categorized based on their availability to the participants of the study to a great extent, little extent, or not available. The results show that Laptops have the highest availability among the devices/tools listed, with 71.5% of participants reporting having access to them to a great extent. Tablets have the lowest availability, with only 11.6% of participants reporting having access to them to a great extent. Digital blackboards, Moodle, and Canvas are not widely available, with over 74% of participants reporting not having access to them. Power supply has high availability, with over 53% of participants reporting having access to it to a great extent. Internet is not available to a significant portion of participants, with 30.6% reporting not having access to it.

Research Question 2: To what extent are the tools being used in teaching and learning Basic Technology in junior secondary schools?

Table 4 Extent of Utilizing CMI Tools in Teaching/Learning Basic Technology in Schools

S/N	Items	To a great extent	To a little extent	Not used
		F (%)	F (%)	F (%)
1	Every student has access to a Desktop or laptop during Basic Tech lessons	263 (31.8)	313 (37.8)	252 (30.4)
2	Teachers deliver their lessons using computer technology	236 (28.5)	246 (29.7)	346 (41.8)
3	Students carry out Basic Tech assignments using computer	195 (23.6)	286 (34.5)	347 (41.9)
4	Teachers use the digital Blackboard technology to manage lessons, assess learners track the progress of students.	0 (0.0)	311 (37.6)	517 (62.4)
5	Teachers use the Moodle technology to create online courses	0 (0.0)	199 (24.0)	629 (76.0)
6	Teachers use the Canvas technology to manage the lessons, create subject content and evaluate students.	0 (0.0)	382 (46.1)	446 (53.9)
7	Students receive online Basic Tech assignments and lessons during holiday	317 (38.3)	307 (37.1)	204 (24.6)
8	Students carry out Basic Tech practical using computer technology	187 (22.6)	242 (29.2)	399 (48.2)

Table 4 shows the extent of utilizing computer-mediated instruction (CMI) in teaching and learning basic technology in schools. The table has 8 items related to the use of technology in teaching and learning, and for each item, the extent of utilization is categorized as "To a great extent", "To a little extent", or "Not used". The table also provides the frequency of each category for each item. The results in item 1 show that 31.8% of the students have access to a desktop or laptop during Basic Technology lessons to a great extent, while 37.8% have access to it to a little extent, and 30.4% do not use it. Item 2 shows that only 0.5% of the teachers deliver their lessons using computer technology to a great extent, while 29.7% do it to a little extent, and 41.8% do not use it.

Item 3 shows that 23.6% of the students carry out Basic Technology assignments using a computer to a great extent, while 3.5% do it to a little extent, and 41.9% do not use it. Item 4 shows that none of the teachers uses digital blackboard technology to manage lessons, assess learners, track the progress of students to a great extent, while 37.6% do it to a little extent, and 62.4% do not use it. Item 5 shows that none of the teachers uses Moodle technology to create online courses to a great extent, while 24.0% do it to a little extent, and 76.0% do not use it. Item 6 shows that none of the teachers uses Canvas technology to manage lessons, create subject content, and evaluate students to a great extent, while 46.1% do it to a little extent, and 53.9% do not use it.

Item 7 shows that 38.5% of the students receive online basic tech assignments and lessons during holidays to a great extent, while 37.1% receive it to a little extent, and 24.6% do not receive it. Item 8 shows that 22.6% of the students carry out basic tech practical using computer technology to a great extent, while 29.2% do it to a little extent, and 48.2% do not use it.

Null Hypothesis ($H_0$1): There is no significant difference in the mean responses of teachers and students on the availability of computer-managed instruction in teaching and learning Basic Technology

Table 5 Mean comparison of teachers and students on the availability of computer-managed instruction in teaching and learning Basic Technology

S/No	Item	Mean score of Teachers	Mean score of Students	T value	P value	Remarks
1	Desktop computer	1.83±0.86	1.64±0.71	1.11	.267	Not significant
2	Laptop computers	1.56±0.62	1.33±0.56	1.76	.366	Not significant
3	Tablets	2.39±0.78	2.49±0.69	0.52	.088	Not significant
4	Blackboard	2.17±0.92	2.04±0.86	0.69	.137	Not significant
5	Moodle	2.50±0.71	2.29±0.85	1.05	.561	Not significant
6	Internet facilities	2.11±0.90	1.75±0.89	1.70	.609	Not significant

7	Canvas	2.22±0.88	1.83±0.85	1.89	.529	Not significant
8	Stable power supply	1.77±0.73	1.57±0.67	1.05	.563	Not significant
9	Smart phones	2.11±0.83	1.88±0.81	1.21	.290	Not significant

Table 5 compares the mean scores of teachers and students on the availability of computer-managed instruction in teaching and learning Basic Technology. The items listed in the table include Desktop computer, laptop computers, tablets, blackboard, Moodle, internet facilities, cameras, stable power supply, and smart phones. The mean scores of teachers and students are provided for each item, along with the standard deviation, t-value, p-value, and remarks on the significance of the difference. The results show that for Desktop computer, laptop computers, tablets, Moodle, internet facilities, cameras, stable power supply, and smart phones, there was no significant difference between the mean scores of teachers and students. Also, for digital blackboard, the mean score of teachers is slightly higher than that of students, but the difference is not significant. Hypothesis 1 is therefore not rejected.

Null Hypothesis ($H_0$2): There is no significant difference in the mean responses of teachers and students on the utilization of computer-managed instruction in teaching and learning Basic Technology.

Table 6 Mean Comparison of Teachers and Students on the Utilization of Computer-Managed Instruction in Teaching and Learning Basic Technology

S/No	Item	Mean score of Teachers	Mean score of Students	T value	P value	Remarks
1	Every student has access to a Desktop or laptop during Basic Tech lessons	2.16 ± 0.79	1.98±0.79	0.98	.328	Not significant
2	Teachers deliver their lessons using computer technology	2.22±0.81	2.13±0.83	0.46	.339	Not significant
3	Students carry out Basic Tech assignments using computer	2.39±0.78	2.18±0.79	0.47	.644	Not significant
4	Teachers use the digital Blackboard technology to manage lessons, assess learners track the progress of students.	2.67±0.49	2.48±0.63	1.11	.641	Not significant
5	Teachers use the Moodle technology to create online courses	2.83±0.38	2.52±0.70	1.13	.264	Not significant
6	Teachers use the Canvas technology to manage the lessons, create subject content and evaluate students.	2.17±0.79	2.02±0.73	1.24	.273	Not significant
7	Students receive online Basic Tech assignments and lessons during holiday	2.06±0.87	1.86±0.78	1.58	.215	Not significant
8	Students carry out Basic Tech practical using computer technology	2.06±1.00	1.80±0.86	1.89	.131	Not significant

Table 6 compares the mean scores of teachers and students on the utilization of computer-managed instruction in teaching and learning Basic Technology. There are 8 items listed in the table, each with its own mean score for teachers and students, as well as a p-value and remarks columns. The results show that for all 8 items, the p-value is greater than 0.05, indicating that there is no significant difference between the mean scores of teachers and students. Hypothesis 2 is also not rejected. The mean scores for teachers are generally higher than those for students, but the differences are not statistically significant. The highest mean score for both teachers and students is for item 5, which is "Teachers use the Moodle technology to create online courses". The lowest mean score for both teachers and students is for item 7, which is "Students

receive online Basic Technology assignments and lessons during holiday".

DISCUSSION AND RESULTS:

The study involved a total of 18 teachers (55.6% males and 44.4% females) and 810 students (50.1% males and 49.9% females). The results of the tables indicate that the study achieved a well-balanced representation of both male and female participants among students and teachers. There were more teachers and students of JSS2 classes, suggesting a potential inclination or exposure to CMI within this particular class. Furthermore, a majority of the teachers possessed teaching experience ranging from 6 to 10 years, potentially indicating a heightened interest in CMI within this specific group. Further finding shows that all the teachers and students were aware of computer-managed instruction. This is in conformity with Madudili (2020) where it stated that the adoption of ICT (Information and Communication Technologies) in teaching and learning processes has led to the use of computers and other technological gadgets for curriculum content delivery in Nigeria. Hence, acknowledging the awareness of the CMI in the schools. This finding agrees that there is a very high awareness level of CMI among teachers and students of Basic Technology in secondary schools will make a profound impact in teaching and learning.

The findings regarding the availability of various technological devices and tools for use in the field of education indicates that laptops are the most widely accessible device/tool for educational purposes, followed by desktops and smartphones. However, tablets and digital blackboards are not as readily available, which may pose limitations to their utilization in education. Similarly, the availability of Moodle and Canvas, which are online education platforms, is also limited. This constraint may hinder their effective use in the context of online education. On a positive note, there is a high level of availability of power supply, which is crucial for ensuring uninterrupted usage of these devices/tools. Nonetheless, the poor accessibility of the internet remains a concern, as a significant proportion of participants reported a lack of access to it. Hypothesis which posited that there is no significant difference in the mean responses of teachers and students on the availability of CMI tools was not rejected indicating that both teachers and students agree that most of the CMI tools are not available. According to Habib, Muhammad, and Hajjakaltum (2019), it is argued that the recognition of Computer-Assisted Instruction (CAI) is growing; yet, its availability differs among educational institutions. Additionally, it has been revealed that a significant portion of the instructional materials necessary for computer education are not being effectively utilized by educators. Hence, it is imperative to acknowledge that the absence of computer-managed instruction, regardless of its usefulness and impact is a significant cause for concern.

Madudili (2020) while examining the concept of computer-aided instruction and its significance in the teaching and learning process within the educational system highlighted several obstacles that have been recognized as hindrances to the adoption and effective utilization of Computer-Assisted Instruction (CAI) in Nigerian schools, which include insufficient funding of the education sector, inconsistency in policy implementation, a deficient maintenance culture, inadequate computer skills among teachers, and an unreliable power supply. Furthermore, it is recommended that a comprehensive computer literacy training program be implemented on a national scale, specifically targeting teachers and learners. Additionally, it is crucial to allocate sufficient funds to the education sector and ensure the availability of necessary infrastructure to facilitate successful teaching and learning in Nigerian schools. Consequently, this could lead to a substantial transformation of the education sector. However, similar to the present study, Madudili (2020) acknowledged the existence of barriers that impede the widespread adoption and efficient utilization of CAI in Nigeria. These barriers include inadequate funding in the education sector, a poor maintenance culture, and an inconsistent power supply.

The finding on the degree to which computer-managed instruction (CMI) is employed in the education of Basic Technology in schools, revealed a limited use of CMI in this context. Hypothesis 2 is not rejected indicating that both teachers and students agree that the use of CMI in teaching Basic Technology is very limited. Notably, students have greater access to desktops or laptops compared to teachers who rely on computer technology for lesson delivery. In terms of managing lessons, creating subject content, and evaluating students, teachers do not extensively utilize digital blackboards, Moodle, or Canvas technology. Conversely, Students are given a significant amount of online homework and educational resources related to Basic Technology knowledge and skills during breaks from school. According to the findings of Akhmedova and Rahmatova, N. (2024), there is an observed upward trend in the implementation of Learning Management Systems (LMS) in Nigeria. This adoption is influenced by various factors, including social impact, conducive conditions, system quality, perceived ease of use, and perceived usefulness, all of which contribute to students' acceptance of these systems. The benefits of a Learning Management System (LMS) encompass improved instructional methods, increased availability of educational materials, broader prospects for learning, and less financial burdens (Sharifov, & Mustafa, 2020). Nevertheless, the investigation conducted by the researcher revealed that aside from traditional computing devices such as desktops, laptops, and

smartphones, teachers and students need more familiarity regarding specific Learning Management System (LMS) tools such as Blackboard, module, and Canvas. The result aligns with the challenges Sulaiman (2024)identified about utilising LMS, which encompasses limitations in infrastructure, insufficient awareness, and inadequate institutional preparedness. The lack of awareness of key Learning Management System (LMS) platforms such as LearnPress and Gopius is noteworthy. The usage of the Learning Management System (LMS), a technological platform that acts as the fundamental basis for computer-managed instruction, has been discovered to possess certain restrictions and constraints, thus rendering its full potential and benefits relatively limited and underutilized.

CONCLUSION:

This study assessed the availability and utilization of computer-managed instruction (CMI) tools in teaching and learning Basic Technology in junior secondary schools in Anambra State. The findings revealed a moderate overall availability of CMI tools, with notable disparities among different types of technology. Laptops and internet facilities were found to be highly available, while tablets, digital blackboards, Moodle, and Canvas were largely unavailable. Power supply, essential for the effective use of these tools, was also found to be highly available. The utilization of CMI tools was moderate, indicating a gap between availability and actual use in the classroom. A significant proportion of students and teachers reported limited use of digital blackboards, Moodle, and Canvas, despite their potential to enhance learning outcomes. Furthermore, while some students had access to desktops or laptops during lessons, a substantial number did not utilize these resources effectively for assignments or practical activities.

The analysis of the mean responses between teachers and students indicated no significant differences in perceptions regarding the availability and utilization of CMI tools. This uniformity in perception underscores the widespread nature of the challenges faced in integrating technology into Basic Technology education. In conclusion, while there is a reasonable level of awareness and some degree of availability of CMI tools in Anambra State's junior secondary schools, their utilization remains suboptimal. To bridge this gap, there is a need for increased investment in technology infrastructure, comprehensive training for teachers on the effective use of these tools, and a strategic focus on integrating CMI tools into the curriculum. By addressing these areas, the educational system can better leverage technology to improve teaching and learning outcomes in Basic Technology.

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