ASSESSMENT OF TEACHERS' UTILIZATION OF TECHNOLOGICAL TOOLS FOR TEACHING OF BASIC SCIENCE IN JUNIOR SECONDARY SCHOOL IN ONDO STATE

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Abstract
This study investigated teachers' utilization of technological tools in the teaching of Basic Science in junior secondary schools in Ondo State. It examined the availability of these tools, the extent of their utilization, and the challenges faced by teachers in utilizing them effectively. A descriptive survey research design was adopted, focusing on all Basic Science teachers in Ondo State. A total of 72 Basic Science teachers were selected through a multistage sampling technique. Three Local Government Areas were randomly chosen from each of the three senatorial districts, followed by the random selection of four public secondary schools from each area. Two Basic Science teachers were then purposively selected from each school. Data were collected using a structured research instrument. Findings revealed limited availability of technological tools (Mean = 2.34) and a very low level of utilization in teaching and learning (Mean = 2.06). Moreover, even when tools were available, teachers encountered significant challenges in their effective use (Mean = 2.85). The study concluded that the integration of technological tools in the teaching and learning of Basic Science in public junior secondary schools in Ondo State remains considerably low.

Keywords: basic science, junior secondary school, technological tools, utilization
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Introduction

Science and technology play a crucial role in the socio-economic development of all nations. In this context, developed countries emphasize the importance of breakthroughs in fundamental materials relevant to various scientific fields. Science, defined as the systematic acquisition of organized knowledge about the natural and physical world, relies on predictions, observations, and experimentation. Without this foundation, a nation's technological advancement becomes nearly unattainable. Basic science aims to spark interest in science and technology among learners, equipping them with essential knowledge and skills that can be applied to meet societal needs (Danmole, 2011). To fulfill these objectives, it is imperative to provide adequate technological tools to junior secondary schools in Nigeria for the teaching of basic science and to promote their effective use. Despite the acknowledged benefits of technology in the teaching and learning process, many students still struggle to grasp the subject of basic science in schools.

In today's technology-driven generation, capturing students' attention can be a challenge, especially when lessons lack connections to computer-related programs. There are instances where students struggle to engage in classroom discussions, leading to poor academic performance. Technology tools encompass electronic, digital, and physical resources that assist teachers in delivering and assessing content. These tools include apps, platforms, and software, which can be utilized in virtual, hybrid, or traditional learning environments. Acquiring technology skills is essential for 21st-century educators, as it enables them to meet the evolving needs of modern learners. A successful 21st-century teacher must be flexible and adaptable to changes in the industry. By incorporating various computer applications, teachers can motivate and engage students more effectively. Strengthening the use of computer-based technology is vital for cultivating

competent learners prepared for the future. Baterna (2020) emphasized that digital literacy will give students a significant advantage as they enter the workforce in this new industrial era. Furthermore, they highlighted the importance of teachers using digital devices and information both effectively and responsibly to foster the development of digitally literate citizens.

As electronic possibilities continue to expand, traditional teaching methods and textbooks are increasingly becoming obsolete. The integration of technological tools is likely to enhance students' interest, motivation, and academic achievement. Mobile and electronic learning have revolutionized the conventional classroom environment, transitioning it into a virtual space (Gikas & Grant, 2013). Despite the prevalent use of mobile devices, computers, and interactive technologies in today's educational settings, many teachers still lack the necessary skills and knowledge to effectively incorporate these technologies into their curricula (Ogwu & Ogwu, 2010). Pernia, as cited in Abubakar (2016), defined technology tools as devices and applications used to access, manage, integrate, evaluate, create, and communicate information and knowledge. These tools include technologies such as computers, the internet, telephones, television, radio, and audio-visual equipment, all of which facilitate communication and the dissemination of information. In education, understanding the significance of technology usage not only enhances students' daily lives but also helps them develop essential skills for professional and vocational purposes. Furthermore, it serves as an effective medium for teaching and learning, improving the overall educational process. While there has been significant focus on using technology to enhance the teaching of science subjects at the senior secondary level, it is crucial to assess the degree to which teachers are utilizing technology tools in the instruction of Basic Science. This study aims to address that gap.

Research Questions

This study was guided by the following research questions:

1. What is the level of availability of technological tools for teaching Basic Science in junior secondary schools in Ondo State?
2. To what extent do teachers utilize technological tools in the Basic science classroom
3. What are the challenges faced by Basic science teachers in the use of technological tools for teaching in Ondo State?

Methodology

The study adopted a descriptive survey research design. The target population comprised all Basic Science teachers in public junior secondary schools across Ondo State. A total of 72 teachers were selected using a multistage sampling technique. From each of the three senatorial districts in the state, three Local Government Areas (LGAs) were randomly selected using simple random sampling. Within each selected LGA, four public secondary schools were also chosen through simple random sampling. From each school, two Basic Science teachers were purposively selected, resulting in a total sample of 72 participants. Data were collected using a structured research instrument based on a four-point Likert scale, strongly agree (4), agree (3), disagree (2), and strongly disagree (1). Data collected were analyzed using descriptive statistics, specifically the mean.

Results

Research Question one: What is the level of availability of technological tools for teaching Basic Science in junior secondary schools in Ondo State?

Table 1: *The level of availability of technology tools in junior secondary school*

S/N	ITEMS	SA	A	D	SD	Mean	Decision
1	My school has the resources to purchase technology gadgets	10	10	40	12	2.22	Rejected
2	My school lack some electronic gadgets like electronic cameras, teleconferencing, and multimedia projectors	35	10	12	15	2.90	Rejected
3	There are computers, laptops and communication gadgets for teaching in my school	5	10	45	12	2.11	Rejected
4	The government always provides my school with different technology tools for the effective teaching of Basic science	15	7	35	15	2.40	Rejected
5	Internet facilities are available in my school for effective teaching of Basic science	5	7	50	10	2.09	Rejected

Grand mean = 2.34

The findings presented in Table 1 reveal that technological tools for teaching Basic Science are largely unavailable in junior secondary schools across Ondo State. All the items assessed had mean scores below the benchmark of 2.50, indicating a general lack of essential technological resources. Specifically, the respondents disagreed that their schools had the financial capacity to purchase technological gadgets (Mean = 2.22) or that such tools were adequately provided by the government (Mean = 2.40). Although some respondents acknowledged the absence of specific electronic gadgets like cameras, teleconferencing devices, and multimedia projectors (Mean = 2.90), the result still fell short of the benchmark, further emphasizing the inadequacy of such tools. Similarly, the availability of computers, laptops, and communication gadgets (Mean = 2.11), as well as internet facilities (Mean = 2.09), was reported to be very low. With an overall grand mean of 2.34, the result indicates that the availability of technological tools for effective teaching and learning of Basic Science in junior secondary schools in Ondo State is insufficient.

Research Question Two: To what extent do teachers utilize technological tools in the Basic science classroom?

Table 2: *The level of teachers' utilization of technological tools for the basic science classroom*

S/N	ITEMS	Very High	High	Low	Very Low	Mean	Decision
1	I use technological tools for teaching basic science	10	12	40	10	2.30	Rejected
2	I download teaching resources from websites to teach basic science	0	2	50	20	1.75	Rejected
3	The computer is a major technological facility that teachers use to teach basic science in my school	10	10	45	7	2.31	Rejected
4	We do make use of a projector to teach some complex topics in Basic science	3	-	57	12	1.91	Rejected

Grand Mean= 2.06

The results presented in Table 2 indicate that the extent to which technological tools are used in teaching Basic Science in public junior secondary schools in Ondo State is very low. All the items recorded mean scores below the accepted benchmark of 2.50, suggesting a minimal level of technology integration in classroom instruction. For instance, the use of technological tools for teaching Basic Science recorded a mean score of 2.30, showing that most teachers rarely incorporate such tools in their lessons. Similarly, the use of online platforms to download teaching resources was reported to be very low (Mean = 1.75), indicating that teachers do not frequently utilize internet-based educational content. Although computers were acknowledged as the most commonly used technological facility in schools, the reported usage was still low (Mean = 2.31). Furthermore, the use of projectors to teach complex topics also showed limited application (Mean = 1.91). With a grand mean of 2.06, the findings demonstrate that the extent of technological tool usage in the teaching and learning of Basic Science in Ondo State's junior secondary schools is significantly low, highlighting a need for greater integration and support for technology in education.

Research Question Three: What are the challenges faced by Basic science teachers in the use of technological tools for teaching in Ondo State?

Table 3: *Challenges faced by Teachers in utilization of Technological tools for teaching Basic science*

S/N	ITEMS	SA	A	D	SD	Mean	Decision
1	Non-availability of technological tools	40	15	10	7	3.2	Agreed
2	Inability of teachers to use technological tools	30	20	10	12	2.9	Agreed
3	Technological tools are expensive to purchase	20	20	17	15	2.6	Agreed
4	I find it difficult to handle and manipulate technological tools	20	20	22	10	2.6	Agreed
5	Large population of students does not encourage the use of technological tools	35	15	12	10	3.04	Agreed
6	Poor knowledge of teachers on the use of technological tools	30	25	13	12	3.23	Agreed
7	No source of power supply in the school	20	25	15	12	2.73	Agreed
8	Non-availability of funds to purchase and maintain technological tools	35	20	15	2	3.22	Agreed
9	Teachers undergo difficulty on setting-up of technological tools for teaching	25	25	10	12	2.87	Agreed

Grand Mean= 2.85

The results presented in Table 3 highlight the various challenges faced by Basic Science teachers in utilizing technological tools for instruction in junior secondary schools across Ondo State. All the listed items recorded mean scores above the benchmark of 2.50, indicating strong agreement among respondents that these challenges significantly hinder the effective use of technological tools in the classroom. The most prominent challenge identified is the non-availability of technological tools, with a mean score of 3.20. Teachers also reported poor knowledge and lack of competence in handling technological tools (Mean = 3.23) and inability to effectively use them (Mean = 2.90) as major barriers. Additionally, the high cost of purchasing technological tools (Mean = 2.60) and lack of funds for maintenance (Mean = 3.22) were identified as significant issues. Other notable challenges include large student populations that make the use of such tools difficult (Mean = 3.04), lack of stable electricity supply (Mean = 2.73), and difficulties in setting up and operating the tools (Mean = 2.87). The mean score of 2.60 for teachers' difficulty in handling the tools also reflects a need for more targeted training and support. With a grand mean of 2.85, the findings clearly show that Basic Science teachers in Ondo State face numerous and substantial challenges in the utilization of technological tools. These challenges must be addressed if technology is to be effectively integrated into science teaching and learning.

Discussion of Findings

The findings of the study revealed several significant challenges faced by teachers in the utilization of technological tools for the teaching and learning of Basic Science in junior secondary schools in Ondo State. These challenges include inadequate power supply, lack of competent teachers, poor maintenance of existing technological tools, difficulties in setting up and operating the tools, lack of motivation and support from the government, and the high cost of acquiring technological devices. These issues collectively hinder the effective integration of technology into classroom instruction. The problem of inadequate power supply continues to be a major barrier to the use of electronic teaching aids, as many schools lack reliable electricity

to power devices such as projectors, computers, and internet routers. Additionally, the lack of teacher competence in handling and manipulating technological tools was found to limit their use, underscoring the need for continuous professional development and training.

Furthermore, the high cost of purchasing and maintaining technological tools places a financial burden on schools, especially those in underserved areas. This challenge is compounded by the absence of consistent government support and motivation for teachers, which demoralizes educators and reduces their willingness to adopt innovative teaching strategies. These findings are consistent with the results of previous studies. For instance, Ezekoka (2017) and Tambari & Baridoolenu (2016) independently reported that major constraints to the effective use of ICT tools in schools include inadequate technical manpower, frequent power outages, and the high cost of acquiring and maintaining technological infrastructure. Their studies affirm the need for systemic interventions to address these long-standing barriers. In summary, the challenges identified in this study align with existing literature and point to the need for holistic strategies, including infrastructure development, teacher training, government support, and sustainable funding, to promote the effective use of technological tools in Basic Science education.

Conclusions

The study investigated the availability, utilization, and challenges associated with the use of technological tools in teaching Basic Science in junior secondary schools in Ondo State. The findings revealed that technological tools are largely unavailable in most schools, with a grand mean of 2.34, which falls below the acceptable benchmark. This lack of availability limits the capacity of teachers to incorporate modern instructional methods into their lessons. Furthermore, the extent of utilization of technological tools by Basic Science teachers was found to be very low, as reflected in the grand mean of 2.06. This suggests that even in cases where technological tools are present, they are not being actively or effectively used in classroom instruction.

The study also identified several critical challenges hindering the effective use of technology in Basic Science classrooms. These include non-availability of tools, lack of teacher competence, insufficient funding, poor electricity supply, large class sizes, and difficulties in setting up and operating devices. With a grand mean of 2.85, it is evident that these challenges are widespread and significantly affect teachers' ability to leverage technology in teaching. In conclusion, the integration of technological tools in the teaching and learning of Basic Science in Ondo State's junior secondary schools is still at a very low level. While the potential of these tools to enhance learning, improve student motivation, and support skill acquisition is widely acknowledged, their limited availability and the numerous challenges faced by teachers must be addressed to realize their full benefits.

Recommendations

Based on the findings of the study, the following recommendations are suggested;

- In-service training programs should be organized to help teachers learn how to utilize technology resources, design internet-based learning activities, plan ICT-assisted lessons, and integrate digital tools into their teaching practices.
- The Ministry of Education should seek technical partnerships and collaborative funding with both national and international organizations to equip schools with essential technological facilities such as computers (both hardware and software), internet access, laptops, projectors, interactive whiteboards, and other teaching aids.

- The government, corporate organizations, and well-meaning individuals should invest in the education sector by providing power-generating sets for schools and covering electricity bills. This will help address the persistent challenge of inadequate power supply, which hinders the effective use of technological tools.

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