

An Assessment of Secondary School Teachers' Awareness and Utilization of Interactive Whiteboards in Teaching Computer Studies

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Abstract - The integration of information and communication technologies (ICT) into educational practices has gained significant attention, with Interactive Whiteboards (IWBs) being a key technological tool in enhancing teaching and learning processes. An IWB serves either as a standalone touchscreen computer or a touchpad connected to a computer and projector, serving as a modern alternative to traditional blackboards and whiteboards. Despite the Nigerian government's policy to incorporate IWBs into secondary school classrooms, several barriers such as inadequate infrastructure, unreliable power supply, limited internet connectivity, insufficiently trained personnel, and inadequate funding have hindered the successful implementation of this policy.

In the Nnewi Education Zone of Anambra State, IWBs are underutilized, despite their potential to improve educational outcomes in Computer Studies. This study aimed to investigate the level of awareness and the extent of utilization of IWBs among secondary school Computer Studies teachers in the region. The research specifically sought to determine the relationship between teachers' awareness and their usage of IWBs, and whether there were significant differences in these variables across public and private secondary schools.

The study employed a descriptive survey research design, targeting 20 Computer Studies teachers from both private and public secondary schools in the Nnewi Education Zone. A structured, closed-ended questionnaire was developed by the researcher to collect data. The instrument's reliability was established through Cronbach's Alpha. Four trained research assistants were involved in administering the questionnaire. Data were analyzed using descriptive statistics (mean, standard deviation, and weighted response average) to address the research questions, and an independent samples t-test was conducted at the 0.05 level of significance to test the hypothesis.

The results indicated that while the majority of teachers demonstrated an awareness of the potential advantages of IWBs in teaching and learning, the actual utilization of this technology was minimal. Furthermore, no significant difference was found in the levels of awareness and utilization of IWBs between teachers in public and private schools. The study concluded that while teachers are cognizant of the benefits of IWBs, the lack of practical application reflects a gap in training and resource availability. The study recommends that targeted professional development programs, including workshops and seminars, be organized to enhance teachers' competencies in effectively integrating IWBs into their instructional practices.

Keywords: Secondary School, School Teachers', Teachers' Awareness, Whiteboards, Computer Studies, Teaching.

I. INTRODUCTION

The integration of technology into educational practices has become a central focus of contemporary education, driven by the recognition that technology can significantly enhance teaching and learning outcomes. Among the various technological tools being introduced into classrooms, the Interactive Whiteboard (IWB) has emerged as one of the most promising innovations. An IWB, a digital display board that functions either as a standalone touch screen computer or a touchpad connected to a computer and projector, offers a versatile alternative to traditional blackboards and whiteboards (Imoke, Ushe & Ofem, 2024). IWBs enable dynamic interactions, allowing users to project and manipulate digital content, thus fostering an engaging and collaborative learning environment (Zittce, 2019). As a result, they have been widely adopted in various educational contexts, including secondary schools, to support interactive learning and improve educational outcomes (Ifamuywa & Akinsola, 2018).

The Nigerian government has recognized the transformative potential of IWBs in education and has incorporated their use into its ICT integration policies for schools (Anusiuba, Nweke & Osuafor, 2019). Efforts have been made to ensure that schools, particularly at the secondary level, adopt educational technologies such as IWBs in line with national ICT objectives. Despite these policy initiatives, challenges persist in fully realizing the potential of IWBs in Nigerian classrooms. These challenges include inadequate infrastructure, insufficient teacher training, limited access to reliable electricity and internet connectivity, and financial constraints (Khairnar, 2024). While some secondary schools have successfully integrated ICT into teaching and learning, the widespread adoption of IWBs remains hindered by various barriers, particularly in rural and under-resourced regions.

In particular, the Nnewi Education Zone in Anambra State has not seen widespread utilization of IWBs in secondary schools, despite their proven potential to enhance teaching and improve student engagement in subjects like Computer Studies. Research into the awareness and actual use of IWBs among secondary school teachers in this region is sparse, and there is a lack of empirical data on the extent to which teachers are incorporating IWBs into their instructional practices. The limited research on the subject has not adequately addressed the gap between teachers' awareness of IWBs and their practical use in classrooms, particularly in Computer Studies.

This study aims to assess the level of awareness and the extent of utilization of Interactive Whiteboards by secondary school Computer Studies teachers in the Nnewi Education Zone of Anambra State. Specifically, the study seeks to examine the factors influencing the adoption of IWBs, the barriers preventing their effective use, and the potential implications for teaching practices. By focusing on this region, the research intends to provide valuable insights into the challenges and opportunities associated with the integration of IWBs into secondary school education in Nigeria. The findings of this study are expected to contribute to the development of targeted interventions and professional development programs that can enhance the effective use of IWBs in teaching Computer Studies in Nigerian secondary schools.

1.1 Statement of the Problem

The integration of digital technologies into the education system has emerged as a transformative approach in enhancing teaching and learning processes globally. In particular, Interactive Whiteboards (IWBs) have gained increasing recognition for their potential to revolutionize the traditional classroom environment by offering interactive,

engaging, and collaborative learning experiences (Suman & Sinha, 2013). The capabilities of IWBs extend beyond those of traditional instructional tools, facilitating dynamic content delivery, real-time interaction with educational materials, and fostering active student participation. This paradigm shift towards digital technologies is gaining widespread acceptance in many educational systems around the world, particularly in developed nations, where the integration of Information and Communication Technology (ICT) has been well established as a cornerstone of modern education (Higgins, Beauchamp & Miller, 2017).

However, in developing countries like Nigeria, the widespread adoption and effective utilization of IWBs and other advanced ICT tools in classrooms remain a significant challenge. Despite the Nigerian government's considerable efforts at the federal and state levels to integrate ICT into the education system, substantial gaps persist in the availability and effective use of critical educational technologies, including IWBs, within schools. While government policies such as the Nigerian National Policy on Education have emphasized the importance of ICT in enhancing educational outcomes, the practical realization of these policies remains hindered by factors such as inadequate infrastructure, limited access to technological resources, and a lack of trained personnel to facilitate the integration of these tools in classrooms (Anusiuba, Nweke & Osuafor, 2019).

Specifically, within the Nnewi Education Zone of Anambra State, secondary schools face considerable barriers to the effective deployment of IWBs, which significantly affects the quality of Computer Studies instruction. While there is some evidence of government investment in ICT infrastructure, such as the provision of computer laboratories and internet connectivity, the integration of advanced technologies like IWBs is still markedly low in many schools within this region. The underutilization of IWBs, despite their demonstrated potential to enhance learning outcomes in Computer Studies, suggests that there may be insufficient awareness, training, or support for teachers to effectively incorporate these technologies into their teaching practices (Khairnar, 2024).

Moreover, it is worthy to note that apart from Anusiuba, 2024, although there is a growing body of literature highlighting the benefits of IWBs in educational settings, there is a notable lack of empirical research focusing on the awareness, perceptions, and actual utilization of IWBs by secondary school Computer Studies teachers in Nigeria, particularly in the Nnewi Education Zone. Existing studies primarily concentrate on technological infrastructure and policy implementation, with limited attention given to the specific dynamics that influence the adoption and usage of

IWBs by teachers at the classroom level. This gap in the literature underscores the need for an in-depth exploration of teachers' awareness and the factors influencing the use of IWBs, as well as the pedagogical implications of their integration into the teaching of Computer Studies. (Anusiuba, 2024).

Thus, the problem under investigation in this study is articulated in the following research question: *To what extent are secondary school Computer Studies teachers in the Nnewi Education Zone of Anambra State aware of, and utilizing, Interactive Whiteboards in their teaching practices?* This inquiry aims to assess the level of teachers' awareness of IWBs, identify the barriers to their effective utilization, and examine the factors that may contribute to or hinder their adoption in the classroom. By addressing these issues, the study seeks to provide valuable insights into the challenges and opportunities related to the integration of IWBs in secondary school Computer Studies education, which could inform policy, professional development, and instructional practices in the region.

1.2 Purpose of the Study

The primary objective of this study was to evaluate the level of awareness and the extent of utilization of Interactive Whiteboards (IWBs) by secondary school educators in the instruction of Computer Studies within the Nnewi Education Zone of Anambra State.

The specific aims of the study were to:

1. Assess the degree to which secondary school teachers are informed about the potential applications of Interactive Whiteboards (IWBs) in the teaching of Computer Studies.
2. Investigate the frequency and manner in which secondary school teachers integrate IWBs into the instructional delivery of Computer Studies lessons.
3. Examine potential variations in the mean response scores between educators in public and private secondary schools concerning their awareness and usage of IWBs in the teaching of Computer Studies.

1.3 Research Questions

The study was guided by the following research questions, which were formulated to investigate various aspects of the use of Interactive Whiteboards (IWBs) in the teaching and learning of Computer Studies in secondary schools within the Nnewi Education Zone:

1. **To what extent are secondary school teachers in the Nnewi Education Zone aware of the use of Interactive**

Whiteboards (IWBs) in the teaching and learning of Computer Studies?

This question seeks to determine the level of awareness that secondary school teachers possess regarding the use of IWBs as an instructional tool. Awareness encompasses not only knowledge of the existence of IWBs but also the recognition of their potential benefits in enhancing teaching and learning processes, particularly in the context of Computer Studies.

2. **To what extent do secondary school teachers in the Nnewi Education Zone utilize Interactive Whiteboards (IWBs) in their teaching and learning of Computer Studies?**

This research question aims to examine the actual usage patterns of IWBs by secondary school teachers. It focuses on how frequently and in what contexts teachers integrate IWBs into their lessons, especially in teaching Computer Studies. The question investigates the practical application of the technology in the classroom and whether it is fully utilized or underused.

3. **Is there a significant difference in the mean ratings of awareness and utilization of Interactive Whiteboards (IWBs) between teachers in public and private secondary schools in the Nnewi Education Zone with regard to the teaching and learning of Computer Studies?**

This question addresses potential disparities between teachers in public and private schools regarding their awareness and usage of IWBs. It aims to explore whether factors such as school type (public vs. private) have a statistically significant influence on how teachers perceive and employ this technology in their instructional practices.

1.4 Hypotheses

The study tested the following hypotheses at the 0.05 level of significance. These hypotheses were formulated based on the research questions and were tested to determine whether any significant differences existed between the groups under study:

1. **There is no statistically significant difference in the mean response ratings between public and private secondary school teachers concerning their awareness and utilization of Interactive Whiteboards (IWBs) in teaching and learning Computer Studies.**

This null hypothesis suggests that the level of awareness and usage of IWBs among teachers from both public and private schools would not differ significantly. The hypothesis is tested to determine if the type of

school—public or private—has any effect on the teachers' engagement with this technology.

II. METHODS AND RESEARCH DESIGN

2.1 Research Design

This study employed a descriptive survey research design, a methodology commonly used to gather detailed information about a population or phenomenon. According to Nworgu (2015), a survey design systematically collects data from a subset of a population to draw inferences that can be generalized to the broader group. In this context, the design was particularly suited for assessing the extent to which secondary school teachers in the Nnewi Education Zone are aware of and utilize Interactive Whiteboards (IWBs) in teaching Computer Studies. The descriptive nature of the research allows for a comprehensive understanding of the teachers' attitudes, practices, and experiences regarding IWB technology in the classroom.

This research design enabled the collection of quantitative data on teachers' awareness, the frequency of IWB use, and other variables such as gender, years of experience, and school type. Additionally, the use of structured questionnaires ensured that the data collected could be systematically analyzed to identify patterns and correlations.

2.2 Study Area

The study was conducted in the Nnewi Education Zone of Anambra State, Nigeria, a region consisting of four local government areas: Nnewi North, Nnewi South, Ekwusigo, and Ihiala. This zone was selected due to its strategic importance in the educational landscape of the state, as well as its ongoing commitment to technological integration in educational practices. Given the increasing use of ICT tools in education, the Nnewi Education Zone provides a relevant and representative setting for studying the adoption and integration of Interactive Whiteboards (IWBs) in teaching and learning.

The selection of this study area is particularly pertinent because of the significant efforts made by the state government to enhance the quality of education, especially in technological subjects such as Computer Studies. By focusing on this region, the study aims to provide insights that can inform local educational policies, improve teaching practices, and enhance the overall effectiveness of ICT tools like IWBs in the classroom.

2.3 Population of the Study

The target population for this study comprised 179 senior secondary school teachers of Computer Studies from both public and private secondary schools within the Nnewi

Education Zone. This population was identified through the Post Primary School Services Commission (PPSSC) of Anambra State in 2024, which oversees secondary education in the region. These teachers are responsible for delivering Computer Studies courses to senior secondary students and are considered the key participants in this study.

Given the central role these teachers play in shaping students' understanding of Computer Studies, it was essential to investigate their awareness and use of IWBs, which are crucial tools for modernizing instruction in ICT-related subjects. The study focused on senior secondary school teachers, as these educators are more likely to have experience with technological tools and a deeper understanding of the subjects they teach.

2.4 Sampling Procedure

A multi-stage sampling technique was employed to select a representative sample of secondary school teachers from the Nnewi Education Zone. This method was chosen to ensure that a diverse range of schools, both public and private, and different educational levels were represented. The sampling procedure consisted of two main stages:

1. Stage 1: Purposive Sampling

The first stage involved the purposive selection of 10 secondary schools, with 5 public and 5 private schools chosen. The selection criteria focused on schools that possessed functional computer laboratories, ensuring that these schools had the infrastructure to support the use of IWBs. The rationale behind this purposive selection was to ensure that the study captured the experiences of teachers in schools with the necessary technological resources, thus making the findings more relevant to the study's objectives.

2. Stage 2: Random Sampling

In the second stage, one Computer Studies teacher was randomly selected from each of the 10 schools. The random selection method ensured that each teacher had an equal chance of being chosen, eliminating any potential bias in the sample. The final sample consisted of 20 Computer Studies teachers (13 females and 7 males). This sample size was deemed sufficient for the study's scope and allowed for meaningful data analysis while ensuring practical manageability of the data collection process.

2.5 Instrument for Data Collection

The primary instrument for data collection was a structured, closed-ended questionnaire titled *Secondary School Teachers' Awareness and Use of Interactive Whiteboards (IWBs) in Teaching and Learning of Computer Studies*

(SSTAUIWBTLCS). This instrument was developed by the researcher to specifically assess teachers' awareness of IWBs, their frequency of usage in teaching, and the challenges they face when using the technology.

The questionnaire was divided into three sections:

1. Section A: Collected demographic information such as the teachers' gender, years of teaching experience, and educational qualifications. These variables were included to provide context to the data and allow for analysis based on teacher characteristics.

2. Section B: Focused on assessing teachers' awareness of IWBs. It contained 10 items designed to measure the extent to which teachers were informed about the technology, its perceived benefits, and its relevance to teaching Computer Studies.

3. Section C: Evaluated the actual use of IWBs in the classroom. This section included 10 items designed to capture how often teachers used IWBs in their lessons, what activities they used IWBs for, and what challenges or barriers they encountered in utilizing the technology.

The questionnaire used Likert-type scales for response options:

1. Section B: Awareness was measured using a four-point scale:

- a) Very Much Aware (VMA),
- b) Much Aware (MA),
- c) Aware (A),
- d) Unaware (U).

2. Section C: Frequency of use was measured using another four-point scale:

- a) Very Often (VO),
- b) Often (O),
- c) Seldom (S),
- d) Not at All (NA).

2.6 Validity of the Instrument

The content validity of the instrument was established through expert reviews. The draft questionnaire was reviewed by two senior lecturers from the Faculty of Education at the University of Nigeria Nsukka. These experts evaluated the instrument for clarity, relevance, and alignment with the research objectives. Based on their feedback, revisions were made to ensure that the questionnaire adequately captured the constructs being investigated, particularly the teachers' awareness and usage of IWBs.

2.7 Reliability of the Instrument

The reliability of the instrument was assessed using Cronbach's Alpha coefficient, which is appropriate for instruments utilizing multi-point Likert scales. A pre-test was conducted with 5 Computer Studies teachers from the Aguata Education Zone, which is not part of the study's target population. The reliability coefficients obtained were:

1. 0.89 for Section B (awareness),
2. 0.79 for Section C (usage),
3. 0.72 for the overall instrument.

These values indicate satisfactory internal consistency and suggest that the instrument is reliable for the purposes of this study.

2.8 Administration of the Instrument

The administration of the questionnaire was carried out by the researcher and four trained research assistants. The teachers were given ample time to complete the questionnaire, and the completed instruments were collected immediately to ensure a high response rate and minimize non-response bias.

2.9 Data Analysis

The data collected were analyzed using descriptive statistics (mean, standard deviation, and weighted response average) to address the research questions. For hypothesis testing, an independent sample t-test was employed at a significance level of 0.05 to compare the mean scores of teachers from public and private schools. The decision rule was based on the p-value obtained from the t-test: if the p-value was less than 0.05, the null hypothesis was rejected, indicating a significant difference between the two groups.

2.10 Interpretation of Mean Scores

To interpret the mean scores for the research questions, the following criteria were applied:

1. For Research Question 1 (Awareness):

1. 1.00 – 1.45: Unaware
2. 1.50 – 2.45: Aware
3. 2.50 – 3.45: Much Aware
4. 3.50 – 4.00: Very Much Aware

2. For Research Question 2 (Frequency of Use):

1. 1.00 – 1.45: Not at All
2. 1.50 – 2.45: Seldom
3. 2.50 – 3.45: Often
4. 3.50 – 4.00: Very Often

III. RESULTS

Research Question 1: To what extent are secondary school teachers aware of the use of Interactive Whiteboards (IWBs) in the teaching and learning of Computer Studies in the Nnewi Education Zone?

Table 1: Extent of Awareness of Secondary School Teachers on the use of Interactive White Board (IWB) in Teaching and Learning of Computer Studies

| S/N | Item I am aware that...; | Mean | SD | Remark |
|-------------------|---|-------------|------|--------------|
| 1 | Teachers use IWB to integrate various learning styles to enhance learning experience in computer studies | 1.41 | 0.84 | Unaware |
| 2 | Teachers use IWB to facilitate computer studies students' interaction with the learning materials | 1.73 | 0.53 | Unaware |
| 3 | Teachers use IWB to display various media that enrich computer studies learning | 1.05 | 0.50 | Unaware |
| 4 | Teacher use IWB to conduct out-of-class instructional delivery for computer studies classes | 2.01 | 2.31 | Unaware |
| 5 | Teachers use IWB to access various sources across the internet to support their computer studies lessons | 1.44 | 0.46 | Unaware |
| 6 | Teachers use IWB to integrate other technological accessories that further reduce the teaching work load for computer studies lessons | 1.35 | 0.44 | Unaware |
| 7 | Teachers use IWB to enhance classroom management during computer studies lessons | 2.73 | 1.31 | Aware |
| 8 | Teachers use IWB to gain and sustain students' attention during computer studies lessons | 3.28 | 1.02 | Aware |
| 9 | Teachers use IWB to administer class exercise during computer studies lessons | 1.65 | 0.63 | Unaware |
| 10 | Teachers use IWB to send assignments to computer studies students | 2.21 | 1.13 | Unaware |
| GRAND MEAN | | 2.21 | | Aware |

Table 1 shows that the grand mean of 2.21 fall within the range of 1.50 – 2.45 which indicated that the teachers is aware of the use of Interactive White Board (IWB) in teaching and learning of computer studies.

Research Question 2: To what extent do secondary school teachers utilize Interactive Whiteboards (IWBs) in the teaching and learning of Computer Studies in the Nnewi Education Zone?

Table 2: Extent of Secondary School Teachers use of Interactive White Board (IWB) in Teaching and Learning of Computer Studies

| S/N | Item | Mean | SD | Remark |
|-------------------|--|-------------|------|-------------------|
| 1 | I use IWB to integrate various learning styles to enhance learning experience in computer studies | 1.05 | 0.84 | Not at all |
| 2 | I use IWB to facilitate computer studies students' interaction with the learning materials | 1.21 | 0.53 | Not at all |
| 3 | I use IWB to display various media that enrich computer studies learning | 1.07 | 0.50 | Not at all |
| 4 | I use IWB to conduct out-of-class instructional delivery for computer studies classes | 1.01 | 2.31 | Not at all |
| 5 | I use IWB to access various sources across the internet to support their computer studies lessons | 1.09 | 0.46 | Not at all |
| 6 | I use IWB to integrate other technological accessories that further reduce the teaching work load for computer studies lessons | 1.00 | 0.44 | Not at all |
| 7 | I use IWB to enhance classroom management during computer studies lessons | 1.00 | 1.31 | Not at all |
| 8 | I use IWB to gain and sustain students' attention during computer studies lessons | 1.00 | 1.02 | Not at all |
| 9 | I use IWB to administer class exercise during computer studies lessons | 1.00 | 0.63 | Not at all |
| 10 | I use IWB to send assignments to computer studies students | 1.00 | 1.13 | Not at all |
| GRAND MEAN | | 1.04 | | Not at all |

Table 2 shows that the grand mean of 1.04 fall within the range of 1.50 – 2.45 which indicated that the teachers do not at all use Interactive White Board (IWB) in teaching and learning of computer studies.

Research Question 3: Is there a significant difference in the mean ratings of awareness and utilization of Interactive Whiteboards (IWBs) between public and private secondary school teachers in the Nnewi Education Zone regarding the teaching and learning of Computer Studies?

Table 3: Mean Response Rating of Public and Private Secondary School Teachers on the Extent of their Awareness and use of Interactive White Board (IWB) in Teaching and Learning of Computer Studies

| Variable | Gender | N | Mean | SD | Decision |
|-----------|---------|----|------|------|------------|
| Awareness | Public | 10 | 2.01 | 1.08 | Aware |
| | Private | 10 | 2.41 | 0.92 | Aware |
| Use | Public | 10 | 1.00 | 1.21 | Not at all |

| | | | | |
|---------|----|------|------|------------|
| Private | 10 | 1.08 | 1.02 | Not at all |
|---------|----|------|------|------------|

Table 3 shows that although public and private teachers are aware of the uses of IWB in teaching and learning computer studies, they do not use it at all.

Hypothesis 1: There is no significant difference in the mean response rating of public and private secondary school teachers on the extent of their awareness and use of Interactive White Board (IWB) in teaching and learning of computer studies.

Table 4: Summary of Paired Sample T-test on Significance of Difference in the Mean Response Rating of Public and Private Secondary School Teachers on the Extent of their Awareness and Use of Interactive White Board (IWB) in Teaching and Learning of Computer Studies

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|--------|------------------|--------------------|----------------|-----------------|---|-------|------|----|-----------------|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | | Lower | Upper | | | |
| Pair 1 | Public - Private | -0.40 | 1.01 | 1.022 | -2.753 | 1.318 | .702 | 19 | .485 |
| Pair 1 | Public - Private | -0.19 | 0.92 | 1.210 | -1.923 | 2.897 | .403 | 19 | .688 |

Analysis of Mean Response Ratings on the Awareness and Utilization of Interactive Whiteboards (IWBs) in Teaching Computer Studies

As presented in Table 4, the observed difference of 0.40 in the mean response ratings between public and private secondary school teachers regarding their awareness of Interactive Whiteboards (IWBs) in the teaching and learning of Computer Studies was found to be statistically insignificant. The independent samples t-test revealed no significant difference, with the test statistic $t(1, 19) = 0.702$ and a corresponding p-value of 0.485, which is greater than the 0.05 significance level. Consequently, the null hypothesis, which postulates that there is no significant difference between the two groups, was not rejected. This suggests that both public and private secondary school teachers exhibit similar levels of awareness concerning the use of IWBs in Computer Studies instruction.

Similarly, Table 4 indicates that the observed difference of 0.19 between the mean response ratings of public and private secondary school teachers regarding their utilization of Interactive Whiteboards (IWBs) in the teaching and learning of Computer Studies was also statistically insignificant. The independent samples t-test results showed $t(1, 19) = 0.403$, with a p-value of 0.688, which is again greater than 0.05. As a result, the null hypothesis was not rejected, indicating that there is no significant difference between the two groups in terms of their usage of IWBs in the teaching of Computer Studies.

In conclusion, both hypotheses—related to the awareness and utilization of IWBs by public and private secondary school teachers—were not rejected. Therefore, the findings suggest that there is no statistically significant difference between teachers from public and private schools regarding

their awareness and use of IWBs in teaching Computer Studies.

IV. DISCUSSION OF FINDINGS

The findings of this study indicated a high level of awareness among secondary school teachers in the Nnewi Education Zone regarding the potential applications of Interactive Whiteboards (IWBs) in the teaching and learning of computer studies. The teachers demonstrated an understanding of how IWBs can enhance classroom management and play a crucial role in gaining and maintaining students' attention during lessons. This awareness is likely a result of the teachers' exposure to the ways in which ICT tools, particularly IWBs, have been used to effectively facilitate presentations and engage audiences. Teachers recognize the capacity of IWBs to sustain students' attention through their interactive and visually stimulating features, which are seen as essential for keeping students focused and involved in lessons.

In terms of classroom management, the utilization of IWBs allows for more dynamic instructional strategies. For instance, teachers are able to engage students by using interactive tools such as random name generators or group assignment features, ensuring equal participation among all students, including those who might not typically volunteer. This approach addresses the challenge of student engagement and participation in large classes, promoting a more inclusive and collaborative learning environment. Given that today's students are often referred to as digital natives, teachers in the study demonstrated a heightened ability to leverage digital technologies such as IWBs, which are easily integrated into classroom practices. This is particularly important in the teaching of computer studies, where interactive digital tools enhance the learning experience by allowing students to visualize and interact with complex concepts in real time.

Moreover, the study revealed that when IWBs are paired with wireless pads or pens, teachers are empowered to control the board from anywhere within the classroom. This capability eliminates the need for teachers to turn their backs on the class during instruction, which has traditionally been a limitation of conventional teaching methods. Instead, teachers can move around the classroom, maintaining a continuous interaction with their students while overseeing the class activities. Additionally, the integration of tablet devices, such as iPads, with IWBs enables students to engage directly with the learning materials. For example, students can use apps like Ink2go to annotate, draw, and demonstrate their understanding of key concepts, such as labeling parts of a computer or solving computer studies problems. By using these interactive applications, students can actively participate in lessons while the teacher provides individualized support to other students, thereby optimizing both classroom management and learning outcomes. The combination of IWBs, tablet devices, and educational apps thus fosters a more interactive and student-centered learning environment.

The findings of this study align with previous research, particularly Modu (2018), which suggests that teachers who possess prior experience with ICT tools are more likely to be aware of and effectively integrate IWBs into their teaching practices. The current study further corroborates the findings of Imoke, Ushe, and Ofem (2024), who found no significant difference in the awareness and use of IWBs among different groups of teachers. This supports the argument that the adoption of IWBs is increasingly widespread across educational settings, regardless of the specific demographic characteristics of the teachers. Additionally, the findings suggest that despite the high level of awareness, actual utilization of the technology remains inconsistent, indicating that further support and professional development may be necessary to bridge the gap between awareness and practical application in the classroom. The results underscore the need for targeted interventions, such as professional development programs, that can provide teachers with the knowledge and skills required to fully exploit the potential of IWBs in enhancing the teaching and learning of computer studies.

V. CONCLUSION

In conclusion, this study assessed the awareness and utilization of Interactive Whiteboards (IWBs) in the teaching of Computer Studies in secondary schools within the Nnewi Education Zone of Anambra State. The conclusion established from the findings of the study is that secondary school teachers in both public and private secondary schools are aware of the use of IWBs in teaching and learning Computer Studies. However, they do not use IWBs at all in their teaching practices. The findings revealed a high level of

awareness among teachers regarding the potential benefits of IWBs, such as enhancing classroom management, engaging students, and improving overall teaching effectiveness. Despite this awareness, the actual utilization of IWBs in the teaching and learning process was limited, primarily due to barriers such as inadequate infrastructure, limited access to necessary resources, and insufficient training on how to effectively integrate IWBs into the curriculum.

The study further highlighted that while teachers recognize the value of IWBs, their lack of adequate resources and pedagogical knowledge hinders them from fully utilizing this technology in their classrooms. Teachers, although familiar with the interactive capabilities of IWBs and their potential to create engaging and dynamic learning environments, face significant challenges in implementing them due to infrastructural limitations and insufficient support for effective integration.

Given the growing importance of technology in education, the findings suggest that there is an urgent need for more focused professional development programs to enhance teachers' technological competence and their ability to incorporate IWBs into their teaching practices. Additionally, policymakers and educational authorities must prioritize the provision of necessary infrastructure, resources, and continuous support to ensure the effective adoption and use of IWBs in the secondary school curriculum. Addressing these issues will not only improve teaching outcomes but will also contribute to the overall enhancement of students' learning experiences and academic achievement in the region.

VI. RECOMMENDATIONS

Based on the findings of this study, the following recommendations are made to enhance the awareness and utilization of Interactive Whiteboards (IWBs) in secondary schools, particularly in the context of teaching Computer Studies:

1. Government and Private Sector Collaboration for Infrastructure Development: It is recommended that the Nigerian government, through the Ministry of Education, in collaboration with private sector partners, prioritize the installation and maintenance of Interactive Whiteboards (IWBs) within secondary school classrooms. This can be achieved by allocating sufficient funds for the procurement and installation of IWBs in schools, ensuring that schools are adequately equipped with the necessary infrastructure for effective teaching and learning. Additionally, an ongoing strategy should be developed to ensure these boards are properly maintained and updated to meet the needs of both teachers and students.

2. Capacity Building for Teachers through Professional Development: Given the observed gap between teachers' awareness and actual usage of IWBs in the classroom, it is crucial to invest in continuous professional development programs. Workshops and seminars should be organized for secondary school Computer Studies teachers, focusing on the effective integration of IWBs into their teaching strategies. These programs should emphasize lesson planning, instructional delivery techniques, and the pedagogical benefits of using IWBs for interactive and engaging learning. Training should also cover practical aspects, such as navigating interactive features, using software, and managing classroom interactions with the IWB.
3. School-Level Fundraising and Collaboration with PTAs: It is essential for school administrators to actively seek funding for the installation and maintenance of IWBs in classrooms. This can be achieved through collaborative efforts with Parents Teachers Associations (PTAs) and government sponsorship. Schools should be encouraged to organize fundraising initiatives, such as community events, to raise awareness of the importance of technology integration in education and garner support from local stakeholders. These initiatives will not only facilitate the procurement of IWBs but will also promote a sense of shared responsibility among the community, furthering the educational goals of the institution.
4. Integration of ICT in School Policies: Schools should consider incorporating the use of IWBs into their institutional policies to promote technology adoption. This includes developing clear guidelines on the integration of IWBs into the curriculum and ensuring that teachers are provided with sufficient time and resources to incorporate this technology into their teaching practices. Establishing a strategic plan for integrating IWBs within the school system will help foster a more coherent approach to technology use across all subjects.
5. Monitoring and Evaluation of IWB Usage: To ensure sustained impact, there should be a system in place for monitoring and evaluating the usage of IWBs in the classroom. Regular assessments should be conducted to track the effectiveness of IWB integration and identify areas where teachers may require further support. This data can then be used to inform future training programs and policy adjustments, ensuring that IWBs continue to be effectively utilized for teaching and learning.

By addressing these recommendations, educational authorities, school administrators, and other stakeholders can significantly enhance the adoption and effective use of IWBs in secondary schools, ultimately improving the teaching and learning of Computer Studies and other subjects.

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