Secondary School Students Competence and Perception on Classroom Usage of Interactive White Board in Chemistry in Lagos State

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ABSTRACT: This research assessed senior Secondary school students' perception and competency on classroom usage of interactive white board for learning chemistry in Lagos State. It adopted a descriptive survey approach where purposive sampling techniques were used to select 150 chemistries from senior secondary schools 2 and 3. Two hypotheses were tested and both were rejected. The scope of the study was within the confinement of the six (6) educational districts of Lagos State. A researcher-designed questionnaire that reflected on the competency and perception of SS2 and SS 3 students in using IWB for learning chemistry based on class and gender were used as the research instrument. A descriptive analysis was used to explain the demographic data and the use of means and standard deviation was employed to answer research questions while inferential statistics of T-test was used to test the hypothesis at 0.05 significant levels. The results revealed that there was no significant difference in senior secondary schools 'student's competency in using IWB in learning chemistry in Lagos State secondary schools based on class. Also, there was no significant difference between the perceptions of senior secondary school students based on gender. Findings recommended among others that the government should make provision for enough IWB for the secondary schools also teachers and students should be trained in order to be adept with emerging technologies in order to meet up with the technological challenges in education.

KEYWORDS: Chemistry, Competency, Interactive White Board, Perception, Secondary School Students, Usage.

1. INTRODUCTION

The idea of an open, global, and flexible learning environment is fostered by the influence of computers in education in recent years. Within the context of the current educational landscape, the teacher's job is to manage students' learning through new instructional models in the classroom and to serve as both a guide and an instrument to ensure a comprehensive learning process via modern technologies. Due to shifts in teaching and learning paradigms, teachers will need to acquire abilities relevant to the learning contexts.

Information and communication technology (ICT) has been shown in literature to have the potential to improve teaching, help students learn, reorganize educational programs, and improve institutional administration (Moursund & Bielefedt, 1999; Collis & Moonen, 2001; Kirschner & Woperies, 2003; Derbyshire, 2003; Kazu & Yovulzalp, 2008; Yusuf & Balogun, 2011). The use of ICT as a catalyst for improving access to quality education in formal and non-formal settings has therefore become a necessity. These technologies include computers, the internet, broadcasting technologies (radio and television), and telephony.

Over the past ten years, there has been a noticeable shift away from traditional chalkboards to marker boards and, more recently, computers and digital learning resources. Children's active participation in the learning process is crucial, according to current theories of learning (Bransford, Brown, & Cocking, 1999). Moreover, a range of technologies have recently been developed to encourage active learning. Interactive whiteboards (IWBs) are one of the most modern instructional devices that have made their way into classrooms. Nations all over the world are very interested in devoting large sums of money to the process of integrating IWB into their educational institutions (Beeland, 2001).According to Kennewell and Higgins (2007), interactive whiteboards are also referred to as digital or electronic whiteboards.

Teachers can employ online educational games, Q&A sessions, group problem solving, and learning activities to make the lesson more enjoyable for the students thanks to the digital capabilities of interactive whiteboards. Many

references state that the inclusion of games in interactive whiteboard classes makes learning more fun and increases student willingness, excitement, and enthusiasm (Hall and Higgins, 2005; Beauchamp and Perkinson, 2005; Smith et al., 2006; Beeland, 2001).

It has been demonstrated that interactive whiteboards and smartboards provide more dynamic and interesting learning environments. Since primary school children typically have short attention spans, interactive elements on smart boards provide a plethora of chances to keep young pupils engaged.

Users using interactive whiteboards can access online resources and present them to the class at the same time, record content for later use, and display movies and other visual aids to aid in the teaching of topics. With the ability to highlight films and animations from their program, add audio clips, color photos, screen, and zoom in and out, interactive whiteboards allow users to make lessons more dynamic and visually appealing (Wall, Higgins & Smith, 2005). With interactive white boards (IWBs), educators and learners can engage with content that is projected from a computer screen onto a surface. An interactive white board can perform almost anything that can be done on a computer, with the added benefit that finger and pencils, making it more tactile. Any computer-based output can be drawn on, marked, and highlighted; class interactions can be followed by all students; and lectures can be recorded and played again. Put differently, Bennett and Lockyer (2008) state that it integrates "the functionality of audio-visual presentation and computer-based interactivity.

One of the fundamental scientific courses taught in schools, colleges, and universities is chemistry. Because it is a prerequisite for many other science courses, including those in medicine, pharmacy, textiles, clothing, biochemistry, microbiology, agriculture, metallurgy, and all engineering fields, chemistry is unquestionably important in modern societies (JAMB, 2004). Chemistry occupies a major place among the basic sciences because it offers the fundamental knowledge and comprehension of concepts whose application significantly improves the quality of life in a technologically based society (Abdullahi, 1982; Jegede, 2007). Chemistry is an important science in the exploration, extraction, and processing of oil and other related products. These factors have led to the discovery that chemistry is essential in the school curriculum.

As a result, it has been said that chemistry education in Nigeria is in appalling and uninspiring condition. Numerous variables, including inefficient teaching, intrinsic student traits, inadequate facilities for instruction, subpar pedagogical approaches, a shortage of competent teachers, and a poor learning environment, have been blamed for this state of affairs (Oyelekan, 2009; Musa, 2010; Olorunare, 2014). Numerous causes have been cited as contributing to this predicament, including the ineffectiveness of the teachers, the intrinsic qualities of the pupils, the absence of competent teachers, inadequate instructional facilities, bad pedagogical tactics, and a poor learning environment. However, this process has been noted to be sluggish despite the push for effective ICT integration in science instruction in Nigerian institutions.

Researchers like Smith (2007) and Jones (2008) found that interactive whiteboards have a positive impact on student achievement, particularly for average and high achievers in the past. Indeed, the findings demonstrated that many students' rate of advancement was significantly impacted by the regular and extended use of interactive whiteboards (British Educational Communication and Technology Agency (BECTA, 2007).

Today's students are visual learners, and they absorb knowledge best in classrooms when visual aids are used to present the material. Therefore, this study examined the competency and perception of senior high school students on the use of IWB in chemistry classroom.

2. RESEARCH QUESTIONS

The following questions were generated to guide the study:

1. How competent are senior secondary students in using interactive white board for chemistry instruction
2. There is no difference between the competency level of senior secondary school students in using IWB based on year of study
3. What is the perception of the senior secondary school students on the use of Interactive Whiteboard as a means of instruction in chemistry class?
4. What is the perception of the senior secondary school students on the use of Interactive Whiteboard as a means of instruction in chemistry class based on gender?

3. RESEARCH HYPOTHESES

$H0_1$: There is no significant difference between the perceptions of students on the use of interactive white board Approach in chemistry at the Senior Secondary School Level based on gender

$H0_2$: There is no significant difference between students competency using IWB approach in learning chemistry at the senior secondary school based on year of study

4. RESEARCH METHODOLOGY

The study employed a descriptive survey method to gather extensive data on the competency and perceptions of senior secondary school students regarding the use of Interactive Whiteboards (IWBs) in chemistry education in Lagos State. The target group consisted of chemistry students from all six educational districts of Lagos State: Agege, Maryland, Lagos Island, Mainland, Festac, and Ikeja. A multi-stage sampling technique was used, with schools and students selected randomly. A total of 150 chemistry students participated. Data were collected using a researcher-designed questionnaire titled "Competency and Perception of Senior Secondary School Students Using IWB in Chemistry," divided into two sections: Section A covered respondents' bio-data, and Section B focused on articles addressing competency and perception.

5. DATA ANALYSIS AND RESULTS

This is the analysis and results obtained from the data collected

Respondents Demographic Data

Table 1: Personal Information of Respondents Based on students Gender

Gender	Number of respondents	Percent
Male	80	53.3
Female	70	46.7
Total	150	100

Respondents' demographic information based on gender is revealed in Table 1. It was shown that 80 (53.3%) of the respondents are male and 70 (46.7%) of the respondents are female. This implied that male students have the largest respondents sampled when compare with their female counterpart.

Table 2: Personal Information of Respondents based on students year of study

Class	Frequency	Percent
SS2	75	50
SS3	75	50
Total	150	100

The total number of respondents is 150, which accounts for 100% of the sample. Table 2 indicates an equal distribution of respondents between SS2 and SS3, with each class representing half of the total respondents.

Results

1. How competent are senior secondary students using interactive white board for chemistry instruction

Table 3: Competency of senior secondary school students in using interactive white board for chemistry instruction in class.

No	Items	Mean	SD
1	I can share and collaborate with my colleagues using IWB.	3.05	0.76
2	I do not struggle with learning with IWB	3.20	0.90
3	IWB helps me to control my learning by drawing and writing directly on IWB.	3.01	0.61
4	Using IWB helps me to recall images easily than written text	3.04	0.96
5	I can access online interactive content using IWB	2.89	0.88
	Average Mean	3.04	

Table 3 revealed that students reported they can share and collaborate with their colleagues using interactive whiteboards (mean score of 3.05). They indicated that they do not struggle with learning when using interactive whiteboards (mean score of 3.20). Students mentioned that interactive whiteboards help them control their learning by allowing them to draw and write directly on the board (mean score of 3.01). Additionally, they noted that using interactive whiteboards helps them recall images more easily than written text (mean score of 3.04). They also reported being able to access online interactive content using interactive whiteboards (mean score of 2.89). An average mean score of 3.04 was established, indicating that senior secondary school students in chemistry class are competent in using interactive whiteboard technology.

2. What is the Perception of senior secondary school students in using interactive white board for chemistry instruction in class?

Table 4: Perception of Senior Secondary School Students Using Interactive White Board for Chemistry Instruction in Class

No	Items	Mean	SD
1	I respond better in class with the use of interactive white board and it has helped me to perform better	3.35	0.76
2	Using interactive white board for learning promotes active and engaging lesson for a better experience in class	3.07	0.90
3	Exposing me to interactive white board has largely influenced how I learn and fully understand chemistry concepts.	2.76	0.61
4	Learning through interactive white board allow me to be more creative and imaginative in my learning.	3.07	0.96
5	My performance in chemistry has greatly improved as a result of using interactive white board	2.99	0.88
	Average Mean	3.05	

Table 4 revealed that students reported responding better in class with the use of interactive whiteboards, which has helped them to perform better (mean score of 3.35). They also indicated that using interactive whiteboards for learning promotes active and engaging lessons, leading to a better classroom experience (mean score of 3.07). Students noted that exposure to interactive whiteboards has largely influenced their learning and understanding of chemistry concepts (mean score of 2.76). Additionally, they mentioned that learning through interactive whiteboards allows them to be more creative and imaginative in their learning (mean score of 3.07). Finally, students reported that their performance in chemistry has greatly improved as a result of using interactive whiteboards (mean score of 2.99).

$H0_1$: There is no significance difference between the perceptions of students on the use of interactive white board Approach in chemistry at the Senior Secondary School Level based on gender

Table 5: *T-test* Analysis of Male and Female students Perception on the use of IWB Approach in chemistry at the Senior Secondary School Level Based on Gender

Gender	No	X	SD	Df	T	Sig (2-tailed)	Remark
Male	89	18.90	10.507	148	0.07	0.14	H0
Female	61	17.03	8.930				Accepted
Total	150						

The results showed that $t(150) = 0.07$, $p > 0.05$, indicating that there is no significant difference between male and female students' perceptions of the use of the interactive whiteboard approach in learning chemistry at the senior secondary school level based on gender. This implies that gender does not influence students' perception on the use of IWB approach in learning chemistry at the senior secondary school level.

$H0_2$: There is no Significance Difference between Students Competency using IWB Approach in Learning Chemistry at the Senior Secondary School Based on Class

Table 6: Analysis of SS2 and SS3 students' competency using IWB at the senior secondary school based on class

	Sum of squares	Df	Mean square	F	Sig	Remark
Between Groups	272.607	2	106.304	2.26	0.103	H0 Accepted
Within Groups	1056.78	148	11.86441			
Total	1079.39	150				

The analysis in Table 5 shows that there is no significant difference in students' competency in using the interactive whiteboard approach for learning chemistry at the senior secondary school level based on class. The results indicated F (112, 265) = 2.26, p = .103 (p > 0.05) for students' competency based on class (SS2 and SS3). Hence, students' year of study does not have any influence on the competency of students using IWB for chemistry instruction.

5. DISCUSSION OF FINDINGS

The senior secondary school pupils were happy and enthusiastic about learning with the IWB, according to a review of their perceptions. This suggests that chemistry students thought IWB technology was very helpful. Students believe that their learning can be greatly enhanced and that their learning process can be better assisted when they are permitted to utilize the IWB, according to multiple researchers (Levy, 2002; Wall, Higgins &Smith, 2005; Torf & Tirotta 2010). In addition to verbal communication, teachers can connect and engage with students more when using IWB because of its high level of engagement. Additionally, IWB facilitates student cooperation and participatory teaching, which is easier for teachers to do. According to claims made by educators and students, and students are more motivated to concentrate and participate in educational activities (Homles 2009; Northcote, 2010).

6. CONCLUSION

The study reveals that students are enthusiastic and content about using Interactive White Boards (IWB) to learn chemistry. They find the IWB technology helpful, believing it greatly improves their learning and facilitates the learning process. The high level of involvement provided by IWBs allows teachers to interact more actively with students and encourages collaborative learning and interactive teaching. This enhanced interaction and engagement motivate students to pay more attention and participate in instructional activities, fostering a stronger connection between teachers and students.

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