

Perception of Undergraduate Students on Availability and Utilization of Interactive White Board on Performance In Biology

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ABSTRACT

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The aim of this research is to assess availability and utilization of Interactive White Boards (IWBs) in teaching and learning of Biology among Undergraduate students in Sokoto State. The research is a descriptive survey with a population of 587 and a sample size of 234 100 level students of Science and Vocational Education department who are offering biology courses at Usmanu Danfodiyo University Sokoto. A self-designed questionnaire tagged 'Assessment of the use of Interactive White Board in Teaching and Learning Biology' (AIWBTLB) and Biology Performance Test (BTP) were used as instruments for data collection. The instruments were validated by experts and exhibited reliability index of 0.87 and 0.79 using Cronbach alpha and split half method respectively. The data generated was statistically analyzed using descriptive statistics and Structural Equation Modeling (SEM). Findings revealed that the required IWBs for teaching and learning Biology were not available; and the available IWBs were not adequately utilized. Equally important, a positive relationship was found between IWBs utilization and undergraduate students' performance in biology. It was however recommended among others that, government; management of universities should as a matter of urgent importance provide adequate IWBs devices for the teaching and learning of Biology in the universities; and to provide modalities in which students are encouraged to make full use of IWBs in the teaching and learning of Biology.

Keywords : Interactive white board, availability, utilization, students' performance

I. INTRODUCTION

The teaching and learning of biology have experienced a renaissance in tertiary institutions in

recent years. The current focus on restructuring of tertiary institutions curricula is perhaps surpassed only by the emphasis placed on the development of scientific skills. [1], suggested that improvement of

student achievement has always been one of the main goals of education. In addition to student achievement, positive student attitudes toward learning science, biology inclusive are an important outcome of education.

Interactive white board (IWB) is a big pad, interactive touch screen LCD monitor delivers innovation to the world of education. It simply enhances visual communications by transforming presentations, training sessions, or classroom lectures into creative and interactive experiences. [2] defined an IWB as a 'large, touch sensitive board, which control a computer connected to a digital projector. Interactive boards were originally developed for office settings, and are therefore considered relatively new innovation to education. Research suggests that every school in the future will have an interactive whiteboard in every classroom and that the technology has revolutionised learning [3].

Availability here is whether someone or something can be accessed or adequately ready to use. Utilization on the other hand is the action of making practical and effective use of something available; the act of using something available; the manner in which something available is used.

According to [4], utilization has to do with the extent to when facilities are provided to schools, there are three possibilities, they are either used effectively or inefficiently or they may remain unused. When item of equipment is maximally used such equipment is effectively utilized. If the equipment is not maximally used it can be said to be under-utilized. When there is so much pressure on the use of equipment this may result to over utilization which could lead to breakdown of such item of equipment. [5] however reported that science facilities are only important when they are used. Similarly, [6] reported that the availability of resource input into the education system has no value for achieving educational objectives if they are not actually put to use. This is necessary because once the facilities are misused they cannot offer the best service required.

Today, teacher education is much improved than it was before and a few decades after independence. The NPE, released in 1977 and revised in 1981, 1998, 2004, 2007 and 2013 clearly articulates the importance attached to teacher education and affirms that 'no education system can rise above the quality of its teachers'. The policy makes it mandatory for all teachers in Nigeria to be trained and stipulates NCE as the minimum qualification for the profession [7]. It also provides that teacher education shall continue to take cognizance of changes in methodology and in the curriculum, even as it underscores the need for teachers to be regularly exposed to innovations in their profession. It further recognizes the need for in-service training as an integral part of continuing teacher education.

Unfortunately, teacher educators in Nigeria are faced with major challenges of insufficient knowledge and use of modern tools in a globalizing world. The knowledge, and use, of computer technology as well as the internet is a necessity for all teachers to guarantee the relevance of the system and its products in the 21st century. Many schools in Nigeria still operate the traditional education system with little or no adaptation to modern tools [8]. Facilities must be provided by government to enable teacher and their students' access to these remain uninterrupted, as the world is gradually becoming a global village. For future teachers to be able to operate effectively and efficiently, they must imbibe the new technologies and methodologies of the modern times.

Faculties of Education in universities are to prepare teachers that feed secondary schools and higher levels of education in Nigeria with manpower demands. Students are expected to encounter to a reasonable level the new technologies that will help them deliver in the classroom after graduation and eventually leave school and are gainfully employed as teachers. A modern tool like interactive board has the potential to transform the way education is delivered and promotes new opportunities therefore, enhancing scholarship and enquiries. This can only be attained

when teachers, who are still the key to learning, have developed and utilized the necessary pedagogical competencies for instructional delivery through IWB resource utilization. Of all the modern technology being introduced into the classroom, interactive white board (IWB) have been found to be the most promising for various reasons among these are the fact that the IWB uses all the three-learning style; visual, audio and kinaesthetic. The most widely claimed advantage of IBs is that they motivate student, because lessons are more enjoyable and interesting resulting in improved attitude and performance.

Biology is a science subject offered by pure science students or science education students from Faculties of Education across Nigeria. Biology as a Science subjects attracts the great number of both science oriented and art base students [9]. Biology provides a platform for teaching student the ability to apply learned concepts and principles in solving everyday science related problems. [8] stated that the cardinal objective of biology science education is that, the student at the end of the studies should acquire: adequate laboratory and field skills in science; meaningful and relevant knowledge in science; ability to apply biology knowledge to everyday life in matter of personal, community health, and agriculture; reasonable and functional scientific attitude and ability to teach these rudiments to lower level of education. Biology curriculum emphasizes an experimental science with its root in laboratory and request that teachers should be guided by this philosophy in the teaching and learning process [10]. Modern pedagogical theory and practice stem from the notion that school was created for learners, not vice versa. This notion conditions the teaching to be based on knowledge, interests and experiences of the learners that are amended and improved along with their development in school. [11]: In modern teaching, the focus of teaching and learning shifts from the learning of ready knowledge towards the process of knowledge acquisition. The role of the teacher is more responsible than in traditional

teaching, due to the fact that he/she must find out what the interests of students are and then monitor and properly direct them. Instruction must be directed to the student's activity, while the teacher has to 'teach as little as possible' and act so that 'the student discovers as much as possible'. [3], emphasised that teachers and students must follow the schedule of procedures:

- ❖ Observation and recording,
- ❖ Open (interactive) communication and cooperation,
- ❖ Monitoring, researching, realizing, experimenting,
- ❖ Application of the acquired knowledge and experience in new situations,

These procedures, among other things, provide proper mental development (cognitive, emotional) and proper socialization of the student. Traditionally, teachers have emphasized lecture, text, and demonstration, with the intent that students would comprehend and recall this information at the conclusion of a unit or chapter. However, teachers practicing modern gadgets-based instruction place less emphasis on these traditional approaches and greater emphasis on fostering inquiry in student cantered ways.

[12] as the profounder of the theory was quoted in [13], to proposed the activity theory through dual coding of memory, he explained the power effect of imaginary, that he had uncovered, he emphasise on application of imageries for accelerating the acquisition of knowledge. This theory supported by [13], that said the use of modern gadgets in teaching and learning processes yield positive result. His theory placed considerable influence on identifying the appropriate sequence of instructional events that promote successful learning. In essence manipulation of these ideas (gain attention, inform learners of objective of the lesson, provide guidance etc.) when coupled with appropriate external condition of leaning can stimulate the presumed internal process in short and long-term memory and cause learning to

occur. Within activity theory, signs and tools mediate learning. So, in this study, the IWBs were seen as artefacts that shape the ways in which learning can occur. The teachers found the resources that were available through the IWB – such as pre-planned lessons and digital tools (protractors, rulers, etc.) – offered different ways of working with the students. Not only where the resources shaping the ways in which teachers taught and planned, but also, they impacted on other aspects of their work.

Activity theory above or activity learning are prevalent in the use of IWB's in the classroom. IWBs allow for this learning environment to flourish as they provide students with opportunities to interact and engage in a student-centred approach. Activity learning is learning that is an active process and student-cantered in the sense that, with the teacher's help, learners select and transform information, construct, and make decisions [14]. Therefore, this work hinged on this theory because when teachers use IWB's appropriately they seek to engage students with interactions in a student-centred learning environment, that looks to scaffold learning with the assistance of teachers. The theory is found relevant to this study.

II. PROBLEM STATEMENT

An existing problem is the lack of data-based research on the interactive white board's impact on students' attitude and academic performance in tertiary institutions, level of availability and the extent of its usage is not yet ascertained. This warrants the need to explore the ways teachers use these tools. This is because IWB may not be available, in some cases, teachers are not use to it, or students' attitude to its usage is not encouraging. It was also observed that some schools do not have IWB that can meet up the number of biology class/ lesson taking place at a time and it is not clear if the schools that have IWB use it adequately. Recent reports indicated unfavourable academic performance in science

related subjects, Biology inclusive. Though, the report does not separate the results of students who were exposed to IWB in the analysis if any. Based on the above-mentioned problems, this research assessed the availability and utilization of IWBs in teaching learning Biology among undergraduate science education students in Usmanu Danfodiyo University, Sokoto

III. RESEARCH AREA

This research was conducted in Sokoto state. Sokoto state is located in the extreme North- West of Nigeria, located immediate to the confluence of the Sokoto River and the Rima River. The state has 23 local government area. There are two major indigenous tribes in the state, which are the Hausa and Fulani and others include Gobirawa, Zabarmawa, Kabawa, Yorubas, Igbos and others. A large number of the Hausas' are farmers while Fulani's are nomadic cattle rearers (Sokoto state diary of the ministry of education, 2008). The state had approximately population of 3,696,999, as at 2006 census.

IV. OBJECTIVE OF THE RESEARCH

The general objective of this study is to assess the availability and utilization of Interactive Board in teaching learning Biology among undergraduate science education students in Usmanu Danfodiyo University, Sokoto

The specific objectives are to:

- i. Assess the availability of interactive board in Usmanu Danfodiyo University, Sokoto
- ii. Evaluate the extent of utilization of interactive white board in Usmanu Danfodiyo University, Sokoto
- iii. Assess the relationship between the use of IWB and student academic performance in biology

V. RESEARCH QUESTIONS

The following research question guided the research

- i. Are there interactive white board in Usmanu Danfodiyo University, Sokoto?
- ii. What is extent of utilization of interactive white board in Usmanu Danfodiyo University, Sokoto?
- iii. Will there be an impact of interactive white board on students' academic performance in biology?

VI. RESEARCH HYPOTHESES

The following null hypotheses were proposed for the study:

There is no significant relationship between interactive board and academic performance biology students

VII. SIGNIFICANCE OF THE STUDY

The paramount concern of this research is attached to the impact of IWB in teaching biology among undergraduate students. This provides bases for some assessment of the availability and possible utilization of IWB in teaching and learning of biology subject in teacher training institutions and within the Faculties of Education.

The device is designs mainly to engage students and assist teachers to deliver unique presentation through creating a wide range of learning opportunities which could be an investment in modernizing classroom to meet the need of the digital generation of nowadays. This is supported by the view of [15], They found that, although interactive whiteboards are theoretically more than a computer if it is only being used as an adjunct to biology teaching its potential remains unrealized. This study is of great significance to the educational policy planners, curriculum designers, management of tertiary institutions, and the department of higher education in the sense that, the result obtained from the study can help the

department to know the standard of use of modern tools skills among the students.

It is significant to parents, since the study design to find out the impact of interactive white board on student attitude and academic performance, if it happened that the performance is low then proper measures will be taken to improve the student performance and learning conditions so as to improved their potentialities and attitude positively towards learning. Moreover, the study can help students in their learning by adopting different skills and experience provided by the use of interactive white board after taking corrective measures of teaching of the problems realised from influence of interactive board on students' performance it will enable him to learn effectively and improved his performance.

Finally, the problems that may surface as a result of the study would give room for further research in this area, and it would serve as a reference material to other researchers in the future.

VIII. METHODOLOGY

Descriptive survey research design was used in this study. Survey design is a plan in which a sample is taken from a well-defined population; data is collected from the sample and used to make decision for the entire population. [16] further asserted that simple survey research design is considered the best as it is interested in collecting original data for the purpose of describing condition as they exist in their natural form. Survey can elicit information about attitude that otherwise difficult to measure using other technique.

Population of the Study

The population of this study comprises all 100 Level students of the Department of Science and Vocational Education, Faculty of Education and

Extension Services, Usmanu Danfodiyo University, Sokoto, Nigeria in 2019/2020 academic year. They are 587 and within the age of 16-25, and are both male and female students.

Sample and Sampling Techniques

A sample size of 234 was used in this study as it is the required sample in accordance with the research advisors (2006). Meanwhile, purposive sampling technique was used to select only Biology/Education students among other combinations such as Chemistry/Education, Physics/Education and Mathematics/Education. According to [16] purposive sampling is a non-probability which is characterized by the use of judgment and deliberate effort to obtain representative sample. The researcher's judgments are based on: Students who have used interactive board for biology lectures only were selected for the study.

Instruments for Data Collection

A self-design questionnaire titled 'Assessment of the use of Interactive White Board in teaching and learning Biology' (AIWBTLB), was used as the instrument for data collection on students' views about IWB utilization and the level of availability of interactive board and its accessories in the University. Equally important, Biology Performance Test (BTP) was used to ascertain the academic performance of selected UGI Education/Biology students. The content of the BPT was from the UGI content of general biology course. To ensure the validity of the research instruments, the instruments were given to experts in the Department of Science and Vocational Education and Department of Biology, Faculty of Education and Extension Services and Faculty of Science Usmanu Danfodiyo University Sokoto for validation. The observations made by these experts were in areas of language, appropriateness of the items and relevance of the items in relation to the objectives of the study. All the observations were incorporated in to the instruments and adjustments were made accordingly.

The researcher established the reliability of the instruments by trial tested the instruments at University of Science and Technology, Aliero, Kebbi state which was not part of the sampled institution. Questionnaires were administered on 30 students and Cronbach alpha was used to determine the reliability coefficient of 0.87 which signified that the instrument was reliable. Also the BPT was administered to 30 students, split half method was the reliability index of 0.79 was obtained.

IX. RESULT

The researcher analyzed the data collected for this study and the results were presented in the form of frequency counts and simple percentage while Structural Equation Modelling (SEM) was used to test the null hypotheses. The reason for using SEM was because the researcher correlates the impact on the two variables which were inform of scale. At alpha level of 0.05 level of significance using SPSS- version 23.0

Data Presentation

This section presented the data collected from the study.

Answering research questions: the research question was answered using descriptive statistic as follows:

Research question 1: Are there interactive boards in the Usmanu Danfodiyo University?

TABLE 1
AVAILABILITY OF IBS

s/ no	Variables	Frequenc y	Percentag e (%)
A	Not Available	122	62.90
B	Available	112	37.10
C	Total	234	100.00

Source: Field work (2021)

Table 1 above shows 122 (62.90%) items on the checklist of IBs are not available, while only 112 items of IBs are available representing 37.10% out of 234 items of IBs used in the University. This implies that there is unavailability of IB facilities in the University.

Research question 2: What is extent of utilization of interactive white board in Usmanu Danfodiyo University, Sokoto?

TABLE 2

UTILIZATION OF INTERACTIVE BOARD

S/no	Variables	F	Percentage
A	Not Utilized	118	54.3
B	Utilized	116	45.7 100%

Source: Field work (2021)

Table 2 above indicated that 118 items with 54.3% been observed by the researcher are not utilized in various Biology lesson. While 116 items with 45.7% utilized. This means there is underutilization of IBs in the study area.

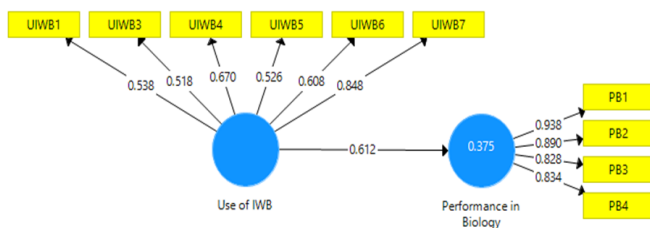


FIGURE 1 : VALIDATED MODEL OF RELATIONSHIP BETWEEN IWB ON PB

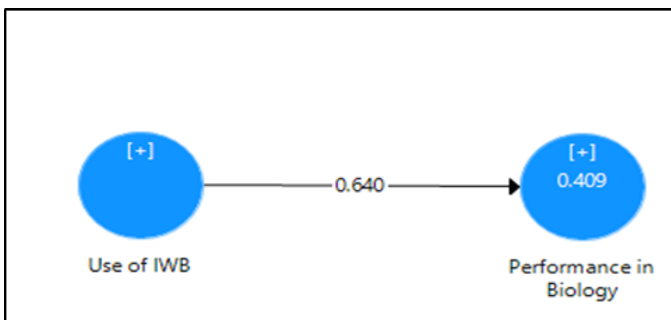


FIGURE 2: PATH ANALYSIS OF IWB on PB

TABLE 3

T-STATISTICS AND P-VALUE OF INTERACTIVE WHITE BOARD ON PERFORMANCE IN BIOLOGY

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
UIWB -> PB	0.612	0.618	0.118	5.178	0

The result of the path analysis shows that Interactive white Board (IWB) has significant direct positive relationship on students' performance in Biology (PB). The relationship is positive with a path coefficient ($\beta = 0.640$, $t \geq \pm 1.96$). According to [17] "The standard decision rule for a relationship between constructs to be significant is ($t\text{-value} \geq 1.96$ and $p\text{-value is} \leq 0.05$). This was applied here to decide the significances of the path coefficient between dependent variable and independent variable. So, since the $t\text{-value}$ is $> \pm 1.96$, it therefore, means the relationship between interactive white board and student performance in Biology is significant and interactive white board has influence on students' performance in Biology. Thus, the hypothesis is not rejected. In this study the interactive white board accounts .40% variance on performance in Biology.

X. SUMMARY OF MAJOR FINDINGS

It has been envisaged that science education especially Biology can only be achieved through quality and adequate provision of modern equipment like IWB for teaching and learning, conducive learning environment, proper science teaching method as well as students' right attitude to learning [18]. The major objective of this study was to assess and find out the availability, utilization and impact of interactive board on students' attitude to learning biology and academic performance among undergraduate students of Usmanu Danfodiyo

University, Sokoto. Thus, the summary of the major findings was given below:

1. IWBs were not adequately available in the university
2. IWBs were found to be underutilized for biology class. It has been observed that, there was no effective utilization of IWB by lecturers and students in the teaching and learning of Biology in the selected courses
3. There is significant relationship between IWBs and students' academic performance

XI. DISCUSSION OF FINDINGS

In the course of assessing the availability and utilization of IWBs in the teaching and learning of Biology in Usmanu Danfodiyo University, Sokoto, finding of the study on availability of IWB in the university, revealed that 122 out of 234 (59%) of IWB system were not available, only 133 (41%) available. The finding agrees with the work of Okobia [19], who conducted a research on Availability and Teachers' Use of IWB as modern Resources in the Implementation of Basic science in Junior Secondary Schools in Edo State". The results showed that IB and resources were not adequately available. The study also revealed that most IWB materials and resources were not available in the schools for the teaching of biology. This finding is also in line with that of [20] on Availability of IWB in Teaching and Learning of English Language in Secondary Schools in Okigwe Educational Zone, Imo State, Nigeria. The findings revealed that the IWB facilities found in the schools were very few, except for hand-sets. Equally Richard, Mathew and [21], in a research, Assessing Undergraduate Students Accessibility to and Utilization of Internet Services using IWB in Cross Rivers University of Technology Multi Campus System, found out that, the campuses had no efficient internet services for the students to learn from, and inadequate IWBs for other learning activities. In another support to this finding, [22], in a study, An

Assessment of Students Usage and Availability of IBs Facilities in Colleges of Education: Problems and Prospects concluded that there was unavailability of IWB resources in the colleges' classes.

Finding on utilization of IWB in the university revealed that, there was underutilization of IWBs by teachers and students in the process of teaching and learning of Biology in the university. Only some few were found to be utilized as agreed to by both the lecturers and student. The finding agrees with [23] who reported that computer teachers in secondary schools do not utilize IWBs hard ware and internet applications in lessons; and at times teachers lack the required skills to operate IWBs; secondary schools lack the necessary infrastructures required for utilization of the IWBs resources and applications. Similarly, [24], in a study on Access and Utilization of IWB among Lecturers and Students in South West Nigerian Public Universities, found that 89% of the respondents claimed that they had no access to IWB facilities. [25], also studied on teacher IWB utilization competencies in sub-Saharan Africa, found out that teachers were not well trained in using IWBs in teaching. In further support of the present finding, [26], in a study on Utilization of Internet information using IB by Nigerian Scientist in 10 Universities observed that, scientists in Nigeria are not using modern gadgets on information services still rely on print materials for information services. Furthermore, view was provided by a study conducted by [20] on utilization of IWB in teaching and learning of English language in Okigwe educational zone, Imo State, Nigeria, which revealed that the available IB facilities were not to a great extent used by the teachers in the schools.

XII. CONCLUSION

Based on the findings from the analysis of the data collected for this study and results of the tested hypothesis, the study concludes that, the required IWB system for the effective teaching and learning of

biology in the universities were averagely not available; only a few of the IWB system were found to be available, only a few of the supposed IWB were found to be available. The lack of IWB facilities can be attributed to government lack of funding and encouraging lecturers through provision and training in IWB facilities. In terms of utilization, the study confirms that, students do not effectively utilize the available IWB in the process of learning Biology. Underutilization can be as a result of lack personal or supply of the IWBs accessories in biology class. It was also established that, lecturers were not motivated adequately in the use of the IWB in teaching due to several factors. This can be attributed to lack of sponsorship to train in IWB application. As a result of the findings, it was also established that, problems of human and material resources, and lack administrative policies regarding the use of IWBs for the teaching and learning of biology has been the major constraints in the application of IWBs devices in the process of learning in the tertiary institutions.

XIII. RECOMMENDATIONS

From the analysis of the data collected for this study and result of the tested hypotheses, the following recommendations are made:

- i. Stakeholders of in the management universities should as a matter for urgent importance provide adequate IWB devices for the teaching and learning of Biology in the institutions.
- ii. There is need for effective utilizations of the IWB that are available in the institutions. This is because despite inadequacy of these gadgets but still impacted in the students learning and academic performance in biology.

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