Interactive Whiteboards Usage and Educational Technology student's Academic Performance in the University of Calabar. Nigeria

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Abstract

This study set out to investigate the difference in mean score of students' academic performance between those taught using interactive white board (IWB) and those taught using expository methods in the department of Educational Technology in the University of Calabar, Nigeria. The study adopted the quasi experimental approach, where 81 students of 3rd year Educational Technology form the sample for the study from a population of 124 students. Purposeful sampling was done since the population was fair enough for the researcher to manage comfortably well. 81 students actually participated in the study. The instrument for data collection was the Educational Technology Performance Test (ETPT). 41 students formed the experimental group, taught using interactive white board, while 40 students formed the control group taught using the expository methods. The instrument was validated and its reliability coefficient was done using split half and correlation analysis to establish the instrument's reliability of .949 for the Educational Technology Performance Test (ETPT). Using Analysis of Covariance (ANCOVA), the result obtained revealed the mean difference in academic performance of students taught using interactive whiteboard to be 25.91, while those taught with the expository Method was 16.58, implying that students taught with the interactive whiteboard performed better than students taught with the expository method. It was concluded that interactive whiteboard did enhance the academic performance of Educational Technology students' in the University of Calabar, Nigeria. It was recommended among others that Educational Technology lecturers should be exposed to the process and ways of using interactive white board for effective teaching and learning in the University of Calabar and beyond.

Key-words: Interactive White board, expository method, Educational Technology, Academic Performance, Animation

Introduction

In Nigerian educational institutions, the most common method adopted by teachers has been the expository teaching method where the transmission of knowledge and information requires the physical presence of both student and teacher. Teaching in the university level has been performed in a relatively similar manner for a long time and across culture over the years. University education and expository lectures in particular have been strongly criticized. The main criticism has cast light on the following: students are passive in expository lectures due to the lack of pedagogy that

ensures intellectual engagement with the material, lack of interaction with the course contents and context, therefore, students' attention wane quickly. If all learners do not grasp the concepts and knowledge in the same way, teachers must employ teaching methods that combine a mixture of strategies, including the use of multimedia and the Interactive Whiteboard (IWB)

In this current situation of technological growth, Nigeria's dream of educational change will not be achieved without upgrading the state of our educational system at all levels, because the present world is a global village. A grandeur transformation should be made through a variety of instructional techniques. That is, a paradigm shift from the expository method of teaching to the use of Information and Communication Technological (ICT) devices. Information and communication technology has enhanced teachers professional knowledge, skill and capabilities by extending their subject knowledge, enabling planning and preparation for teaching to be more efficient. Research has also shown that ICT is now recognized as an essential ingredient for creating 21st century learning environment. ICT equipment in the classroom has become a trend in many schools (Bui, 2023; Chirstopoulos, et al., 2020; Kaushik & Sugandha, 2022; Wong et al., 2020). The use of hardware like IWBs is believed to adapt to the atmosphere of 21st-century learning in the classroom.

According to Inyang-Abia, (2015), educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources. Educational Technology refers to hardware and software, which are being used in educational setting to enhance the teaching and learning environment. Interactive Whiteboard (IWB) is one of the technologies that transform classroom activities and teachers' role. Chalkboard has been developed into interactive electronic board. A learner can see and feel his/her achievement at the same time. By finger-touch, a user can write, draw, drag an object, manipulate a text or shape something. Effective teaching of Educational Technology courses can be achieved through higher interactive technologies like Interactive Whiteboard. Kwache (2017) supports this opinion by saying in concrete terms that using Interactive Whiteboard

technology enhances teaching and learning through its dynamic interactive, flexible and engaging contents.

A teacher can bring the outside world inside the classroom through the Internet. Technology, ever changing, has become more accessible to teachers in the last few years. Lecturers need to be able to use technology to increase their professional development and to have positive contact with students on a regular basis. The Interactive Whiteboard proved to be an exciting and fun bit of technology to integrate. It affects learning in several ways, including raising the level of students' retention ability level in a classroom, motivating students and promoting enthusiasm for learning as well as improving academic performance. Interactive whiteboards give their users the opportunity to highlight videos and animations that are present in their software, audio clips, colors, images, screening, zooming in an out, and thus they transform lessons into a more visual and more vivid form. Given their features, interactive/smart boards offer teachers the opportunity to access the desired point on the visual when teaching lessons that are hard to understand and when presenting information that is hard to reach (Bacon, 2015). Academic performance, which is measured by examination results, is one of the major goals of a school. Schools are established with the aim of imparting knowledge and skills to those who go through them and behind all these is the idea of enhancing good academic performance.

Interactive whiteboards support many different learning styles and are used in a variety of learning environments (Chapell, 2018).Current theories emphasize the importance of actively engaging learners in the learning process and recently there have been varieties of technologies, designed to support active interaction in learning. One of such technology is the interactive whiteboard. The interactive whiteboard is a technology medium that began to be used in the classrooms in the late 1990's. Whiteboards generally range in sizes from 1.1 meter to 1.8 meters diagonally. The boards can be wall-mounted or placed on a separately purchased stand. Interactive Whiteboards allow teachers and students to interact with technology in a manner that was not previously possible. The touch-sensitive board allows users to interact directly with

applications without having to be physically at the computer which is projecting the image onto the board. When the IWB is in computer control mode, a pen, or stylus, acts as the mouse, and a tap as a mouse click. In writing mode, the pen, or stylus, acts as an actual writing implement, with the computer producing digital ink on the projected image. Applications of the IWB are dependent on the software that is installed and used on the computer connected to the IWB. Some of the many applications available include hiding and revealing, writing and manipulating text, handwriting recognition, saving, retrieving, and printing notes, capturing and manipulating web content, shading, coloring, and animation.

The interactive whiteboard (IWB) has been used in many contexts in various ways. Effective use of IWBs in classrooms promises numerous advantages in terms of learning and instruction (Türel, 2010). However, to better understand how we can effectively use IWBs in classrooms, several questions should be considered: What instructional strategies can teachers use with IWBs and what kinds of benefits do IWBs have on teaching and learning. Successful instruction may be a result of various IWB features along with sound instructional strategies. Teachers can put a variety of strategies and techniques into practice using IWBs by considering the characteristics of the learning context including students' needs and interests, and technical facilities. Several IWB instructional strategies that have a positive effect on student learning include:

i. Highlighting, coloring, or annotating important content
ii. Using pictures for discussion and brainstorming, collaborative writing, shared reading, peer-teaching, and collaborative problem solving
iii. Hiding and revealing, drag and drop, and matching items activities
iv. Observing different media essential for visual learners
v. Touching and feeling the material good for tactile learners
vi. Accommodating lower ability and special needs zoom feature for visually impaired students

vii. Finding hidden part of a picture with spotlight or screen-shade

viii. Capturing screenshots from web pages synchronously and manipulating them

ix. Correcting mistakes in the materials

The whiteboard can be used to deliver instruction in a variety of ways that may be categorized based on three modalities of learning. The first modality is visual learning. Visual learning through the use of a whiteboard can range from the use of text and pictures to the use of animation and video. Auditory learning is a second modality. Activities that involve auditory learning include the use of words orally for pronunciation, speeches, and poems. The use of auditory learning might also include listening to sounds or music. The third modality of learning is tactile- allowing students to physically interact with the board can assist with meeting the needs of tactile learners. Elements of text, graphics, sound, animation, and video help teachers create lessons that interest and engage students during the learning process. Most IWBs have two modes: computer control mode and writing mode. Schuck and Kearney (2017) stated that lessons using IWBs were perceived as "better than" other class work. They relate this to the fact that IWBs can be perceived as easy to use, visual, interactive, immediate, and matching the students' digital culture.

The effect of the use of Interactive Whiteboard on academic performance of students as noted by Wealtherly (2013) is highly commended as an instructional delivery. Interactive Whiteboard presents information to students more effectively, more dynamically and more aesthetically. Furthermore, it makes the information readily available to students 24 hours per day. The reason for using Interactive Whiteboard could be in supporting the lecturers during the presentation of information, enhancing the success in the lesson, enhancing the performance of students, improving the interest and motivation of the students during the lesson (Sen, 2010)

According to Wei, *et al* (2024), study on interactive whiteboard, it effectiveness in academic achievement motivation and interest among early year students. This study aims to see the effectiveness of using interactive whiteboards (IWBs) in English on Year 3 students. The study's

objective was to identify the effectiveness of IWBs on the academic achievement level, motivation level, and interest level among Year 3 students in English subject. A quasi-experimental design was used in this study. Inquiry learning theory and constructivist learning theory were applied in this study. This study lasted for eight weeks and consisted of 39 respondents' and their various levels of academic achievement randomly distributed into two groups. Data was collected using post-achievement tests and questionnaires for motivation and interest levels. The study's findings show that the interactive multimedia method is more effective in increasing English language academic achievement, motivation, and interest among Year 3 students. Therefore, continuous research on IWBs in English should be carried out to obtain stronger and comprehensive evidence of its effectiveness.

One of the basic features of the whiteboard is the animation. Animation is the process of designing, drawing, making layout and preparation of photographic sequence which are integrated in the multimedia and gaming products. Animation involves the exploitation and management of still images to generate the illusion of movement. Well-designed animations may help students learn faster and easier, they are also excellent aid to lecturers when it comes to explaining difficult subject/course. Current educational use of animation suggests two main roles in learning. First purpose on animation in academics is to fulfill cognitive processes that ultimately result in their understanding of the subject matter. Instructors can use animation to demonstrate things and concepts visually and exactly how they want since they have control of every aspect of the animation. It can be used to show how things come together and work together. Secondly, as an affective learning tool that attracts attention, it engage the learners and sustains motivation aspect. The creative potential of animation is enormous and integrating animation activities into our instruction offer the possibility of meeting a range of educational objectives. According to Cunningham (2013), it is the animated visual nature of the interactive whiteboard that keeps students on task as everyone in the classroom becomes more attentive watching the acts.

Theoretical Framework

This study adopts the Dual-Coding Theory by Allan, 1971

Dual-coding theory, a theory of cognition, was hypothesized by Allan of the University of Western Ontario in 1971. Dual-coding theory states that there are two distinct information processing system, one for verbal information and the other for visual information. This theory predicts that learning improves when both system are employed. That is, students learn better from processes that are sensory, visual, inductive and active, while traditional method is verbal, deductive and passive.

This theory is related to the study on the use of smart whiteboard as a visual communication tool to arrest or capture attention and interest which can provide the learner with an interactive learning situation. By using interactive Whiteboard to teach, students have opportunities to acquire new ideas, knowledge and understanding of a particular topic through the visual presentation that has interplay of colours in the diagram, the use of animation, on-screen annotation and on-screen text-based features .When the attention of the learners are gained through this wonderful features of interactive whiteboard; they will concentrate and think critically in order to contribute to what is presented to them on the screen. This then will lead to effective academic performance.

Gagne and Driscoll (1988) created a basic model of learning and memory underlying modern information processing theories. It shows how animation works as an aid to dual coding and information processing. According to Mayer (2001) this theory integrates theories that focuses on presenting information in dual mode without increasing the cognitive load. This theory claimed that humans possess two separate but interdependent systems for processing verbal and pictorial materials. Each channel is limited in the amount of material that can be processed by the learners at one time. The active connections between verbal and pictorial representations ensures active learning and cognitive process. Learners will engage in selecting, organizing and integrating knowledge. Animation is processed as a part of the visual information. Animation as an attention gaining strategy helps to gain attention and reduce the processing demands in short term memory (STM), while animation as an elaboration strategy not only helps reduce the processing demands in

short term memory STM, but also facilitates encoding and retrieval processes by connecting information and providing alternative retrieval pathways.

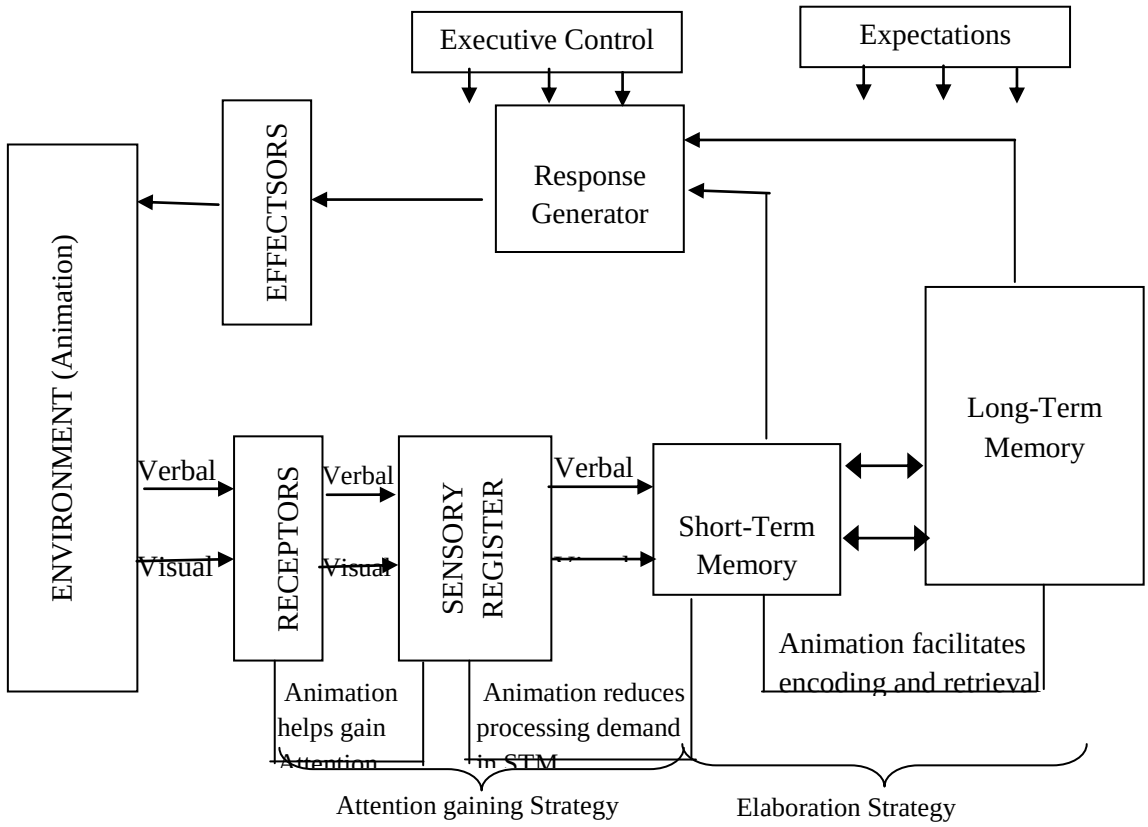

Fig. 1: *A Model of Animation, Dual Coding and Information Processing,(Gagne and Driscoll, 1988)*

Information processing theory discusses the mechanisms through which learning occurs. It focuses on the aspect of memory (encoding and retrieval). Information processing theory is like a computer in that it receives input, processes and deliver outputs. Information gathered from the sensory register (input) is stored and processed by the brain and finally brings out a behavioral response (output). The executive control system oversees all the working memory activity including selection of the information, method of processing, meaning and finally, deciding whether to transfer the information to long term memory or forget it. The sensory memory transfers information into the working memory (STM) for 15 – 20 seconds. Information is maintained in the working memory through elaborative strategy or rehearsal. Elaboration here refers to how information are arranged, so as teachers, we need to arrange our instructional content to actively show the connection between verbal and pictorial representation. With the animation strategy,

learners will be able to focus attention on information that are highly relevant and necessary, and this will help learners to engage in selecting, organizing and integrating knowledge

Geren and Ergul (2017) investigated the effect of using the interactive whiteboard in mathematics teaching process on the 7th-grade students' achievement. This study was conducted as experimental design. Experimental and control groups were composed of 58 7th-grade students from one school in the 2015-2016 educational year in Ankara. As a measurement tool, an achievement test developed by the researchers was used as the pre-test and post-test to elicit data for the study. An education program which included the activities with the interactive whiteboard was developed by researchers. This program was implemented to the experimental group 12 hours over 3 weeks. On the other hand, activities for the control group were limited to the blackboard usage. In the analysis of the data, "analysis of covariance (ANCOVA)" was used by defining the pre-test scores as "covariate" variable. According to the findings, it was observed that there was a significant difference between experimental and control groups average scores. The finding shows that using the interactive whiteboard in mathematics teaching process has positive effects on the students' academic achievement.

The result of a study by Ifeakor *et al* (2020) showed that students taught with interactive whiteboard perform significantly better in achievement test than their counterparts who were taught using the convectional teaching methods. Interactive whiteboards have brought significant improvements in Biology classrooms because it simplifies the learning processes, thereby improving students' achievement. According to Eztalks (2020), with interactive whiteboards, a Biology teacher can easily formulate and plan for the lesson beforehand. He/she can schedule for specific learning tasks like labeling parts of a picture and matching words with their respective meanings. This is where the benefits of interactive whiteboards in Biology class in secondary school come in handy. Students can understand how to handle naming tasks quite profoundly as the images are displayed right in front of them. IWB's capacity allows flip back, to review material by

the teacher as well as to assist lower ability groups in Biology class. This learning technology may lead to an increase in learners' motivation and task engagement.

Egbunu (2019) studied the Impact of using (IWBs) on students achievement and retention in biology in senior secondary school in Abuja . The study was conducted using two research objectives, research questions and hypotheses. The study adopted descriptive survey research design. The population was made up of 1,646 respondents; comprising 38 Biology teachers and 1,608 SS III Biology students in all the eighteen (18) public senior secondary schools in Abuja Municipal Area Council. The sample size of 108 respondents comprising 90 Biology students and 18 Biology teachers and 9 senior secondary schools were adopted for the study. The sample size was selected using the combinations of purposive and simple random sampling techniques. Eight (8) items structured questionnaire titled "Interactive Whiteboards and Academic Achievement and Retention Questionnaire (IWAARQ)" was used as instrument for data collection. Content validity was used. Test-retest method of reliability was used to obtain the internal consistency. The reliability index was obtained through Cornbrash's alpha (0.79). Data collected was imputed into the SPSS (25) software package. Mean score was used to answer the research questions and t-test was used to test the null hypotheses at 0.05 alpha level of significance. The results revealed among others that interactive whiteboards have positive impact on students' achievement and retention in Biology in senior secondary schools. Inadequacy of interactive whiteboards and lack of power supply were constraints to the use of IWBs in senior secondary schools.

Akbas and Pektas (2019) examined the effects of the use of an interactive whiteboard on the academic achievement of university students on the topic of electricity in a science and technology laboratory class. The study was designed as a pretest/posttest control group experimental study. Mean, standard deviation and t- tests were used for data analysis. An independent group's t-test was used to test for the differences between the pretest and posttest mean of experimental and control group. No significant difference was observed between the academic achievement of the students in the experimental group, who were taught with both interactive whiteboard and laboratory practices,

and the control students, who experienced only laboratory practices. The posttest standard deviation values in the experimental group were relatively lower than those in the control group. The electric motor, electric bell, and generation of the induction current models were prepared on the computer by the researchers using Macromedia Flash 8, and its application was undertaken by the students on the interactive whiteboard. It was seen that although interactive whiteboard use might not significantly alter students' academic achievement, it encouraged them to participate more in the lesson, created an interesting and enthusiastic atmosphere, and led to more enjoyable lessons. At the same time, many students from the experimental group stated that the interactive simulations and virtual experiments were superior to real experiments and enabled them to better visualize the topic.

Imoke, Ushe and Ofem (2024) investigated how student-teachers' academic performance was affected by the usage of interactive or smart whiteboard features in educational technology. To direct the study, research questions, and hypotheses were developed. A non-randomized pre-test post- test experimental design was utilized with a total of 110 second year educational technology students as sample. Data for the study were generated using the Educational Technology Performance Test (ETPT), which had a reliability coefficient of 0.75 using Kuder Richardson formula 21. The data was analyzed using mean, standard deviation, and analysis of covariance. The study's findings demonstrated that using an interactive whiteboard instead of a regular one improved students' performance. Additionally, the results demonstrated that there was no discernible difference in the academic achievement of male and female Smart Board users. According to the research findings, it was suggested that instructors should be trained on how to use interactive whiteboards for teaching and that university administration should put them in classrooms.

Obot (2017), carried out a study on impact of computer animation on student's academic performance in Educational Technology with different levels of achievement and learning styles. Two specific purposes and two research questions guided the study. This study utilizes a quasi-experimental design. A sample of one hundred and sixty 200 level students from six schools in the

College of Education, Afaha Nsit was selected for the study using purposive sampling technique. Three instruments were developed for the study: the Students' Performance Test (SPT), Students' Aptitude Test (SPT) as well as Animation instructional Test (ANIT). Data collected were later analyzed using inferential statistical methods, through Two-Sample t-test and One-way ANOVA. The findings from this study show that, the computer animation learning courseware had given a positive effect on student's academic performance. The findings from this study also showed that learning through computer animation has significant effects on students' achievement (high and low prior knowledge) and their learning styles. These results indicate that learning through computer animation, utilizing systematic theory and development design are able to bring positive effects on students, irrespective of the different learning styles and degree of achievement.

Scott et al. (2025) carried out a study on the impacts of using interactive whiteboards features on the accomplishment of higher secondary students in respect of English vocabulary teaching. The sample of the study included of 80 second year students of GCHSS No 1 Haripur District. Two groups participated in the study: the experimental group and the control group. Three sections from the second-year English textbook—Unit 3: Battle of Uhud, Lingkuan Gorge; Unit 4: Determination, The Man Who Planted Trees; and Unit 5: Technology and Society of the Future, Gender Inequality is Detrimental to Society—were the focus of the study. A conventional white board (TWB) was used to teach the vocabulary to the control group, while an interactive whiteboard (IWB) or electronic whiteboard was used to teach the experimental group. The success of both groups was examined using an English accomplishment test as a pre-test and post-test. The experimental group did better than the control group in terms of their accomplishments, according to the findings and results. Higher secondary students' performance in learning English vocabulary seemed to be significantly impacted by the IWB.

Ayo (2010) investigated the use of computer animation on the academic achievement of Nigerian senior secondary school students in biology. The moderating effects of mental ability and gender were also investigated. The pretest – posttest, control group, quasi experimental design with

a 2x2x2 factorial matrix was adopted for the study. One hundred and eighty-nine senior secondary school Year two biology students from two randomly selected Federal Government Colleges in two states in Southwestern Nigeria were the participants. Findings showed that there is a significant main effect of treatment on students' achievement in biology. The computer animation was effective in improving students' achievement, therefore, computer animation is recommended as a means of teaching biology to students in Nigerian secondary schools.

Teng, (2021) carried out a study on Interactive whiteboard technology -supported collaborative writing: writing achievement, metacognitive activities, and co-regulation patterns. The study considers the potential effects of collaborative writing supported by interactive whiteboard technology on students' writing performance. A total of 120 students who learned English as a foreign language (EFL) participated in this study. Quantitative results revealed that interactive whiteboard technology integrated with collaborative writing instruction resulted in greater improvement in students' writing performance, followed by traditional whiteboard–integrated collaborative writing and traditional collaborative writing instruction without whiteboard technology. Qualitative results further suggested that the patterns and timing of metacognitive activities varied across the three groups. Learners receiving interactive whiteboard–integrated collaborative writing instruction exhibited higher levels of metacognitive activities and were more engaged in coregulation.

Gallego et al (2024) carried out a research focusing on providing a research model to analyze the behavior towards the use of interactive digital whiteboards (IDWs) by teachers in the educational context, highlighting their impact on the intention to use IDWS. The proposed structural equation model is based on the model of goal-directed behavior and the theory of planned behavior, and it is formed by six constructs: (1) attitude, (2) subjective norms, (3) desire, (4) perceived behavioral control, (5) intentions, and (6) behavior. The methodology was adapted to two possible scenarios: (1) positive and (2) negative. The findings show that both theoretical frameworks offer a valid context to explain the motivations that drive the use of IDWs, although

there are no significant differences between the two scenarios. Thus, the present article contributes to the existing body of knowledge and provide insights for educators and policy makers and researchers to leverage the acceptance of IDW in education.

Kwasu and Ema (2015) in their study sought to reveal the importance of animated instructional visual in educational systems in Bauchi Nigeria. Piloted a total of 189 experimental and 189 of control respondents were studied. The study focused on the experimental, to compare among the zones. The experimental outperformed the control group. However, location II was found to have the highest impact with a mean performance of 57.8572 followed by location III with a mean performance of 56.1746 and lastly a mean performance of 54.9208 for location I. In all the locations their means performance falls within 'C' grade which is a good profile of information assimilation by the respondents.

Statement of the Problem

Teaching and learning of most courses especially Educational Technology is becoming so complex that most students do not always have interest. This could be attributed to the traditional mode of teaching which does not give room for students' interaction. The high level of abstraction associated with this expository method has negatively affected students' performance. The persistent poor academic performance of the Educational Technology students could be attributed to methods of teaching. An investigation into the performance of educational technology students in the University of Calabar, from 2021 to 2024 shows very poor performance in instructional media design and multimedia application (EDT 322) a course in educational technology programme.

For instance, in 2022/2023 academic session 33 students sat for the course EDT 322, 13 students passed resulting to percentage of 39% while 20 students failed resulting to a percentage of 61%. Since the percentage of students who failed is high as compared to the percentage of students who passed, it therefore means that students' performance in EDT 322 is low. Hence, it could be imputed that the nature of presenting instruction could lead to variations in students' performance. However, for learners to improve in EDT 322, lecturers must embrace the 21st century media rich

learning environment by employing new techniques which will make learning active, interesting and engaging. One of such media is the use of interactive whiteboard for instruction. In the opinion of the researcher, this problem can be effectively handled if lecturers easily adapt to the use of innovative instructional strategy.

The retrogression of the cumulative grade point average and class of degree of educational technology graduate over the years can be attributed to the fact that most lecturers are stereotype in their teaching methods, do not complement their teaching with modern technologies. It is against this backdrop that the researcher poses the question ‘‘to what extent could interactive whiteboard be used to improve students’ academic performance in Educational Technology in University of Calabar, Nigeria’’.

Purpose of the Study

The purpose of this study is to determine the effect of interactive whiteboard on academic performance of Educational Technology students’ in the University of Calabar, Nigeria. Specifically, the study seeks to:

1. Determine whether Students taught Educational technology using Interactive Whiteboard and those taught with Expository Method differ in their academic performance.

Research Questions

What is the difference in mean score of student’s academic achievement between those taught using Interactive Whiteboard and those taught using Expository Method?

Research Hypotheses

A null hypothesis was formulated to guide the study also.

Ho_1 There is no significant difference in mean score academic performance of Educational Technology students taught using Interactive Whiteboard and those taught using Expository method.

Research design and methods

The research design for this study is the Quasi-experimental design using pre-test post-test non-randomized control group design. Quasi experimental design is a design in which an independent variable is directly manipulated to measure its effect on a dependent variable and participants are not randomly assigned to comparison groups. Quasi-experimental design is considered most suitable for this study because the design establishes the effect of treatment (instructional interactive whiteboard) on students' academic performance and comprised of students' in their intact class setting.

This study was conducted in the University of Calabar, Calabar, Nigeria. The population of the study comprised of all year 3 Educational Technology students in the University of Calabar in the 2022/2023 academic session totaling 124. An intact class of 81 year three undergraduate Educational Technology students in University of Calabar were purposively selected and used for the study, comprising 41 students (15 males & 26 females) in experimental group and 40 students (12 males & 28 females) in control group). The researcher had the intention of using the complete 124 year three students, but during the administration of the instrument, there were only 81 students that were always active in class. The study used an instrument titled Educational Technology Performance Test (ETPT) developed by the researcher.

The content validation was based on the test blue print to ensure the questions reflect the content of the lesson taught. Spilt half method was used to establish the reliability coefficient for the instrument. The researcher administered the instrument on 25 Educational Technology students who were not part of the main study. The scores obtained were divided into two halves namely odd-numbered items and even-numbered items. Pearson Product Moment Co-relational Coefficient was used to correlate the two halves, after which the coefficient obtained was stepped up using Spearman-Brown Prophecy Formula to yield a reliability coefficient of .949 for the Educational Technology Performance Test (ETPT).

A comprehensive class list of year 3 students was obtained, and further divided into two groups (experimental and control), students' whose name falls under serial number 1 – 41 formed

experimental group while students' whose name fall under serial number 42 – 80 formed the control group. The experimental group was taught using the IWB features (animation) while the control group was taught using the conventional method. The treatment lasted for two weeks in the University of Calabar. Pre-test was administered on the subjects (Students) in all the groups (Control and experimental) by the researchers to make them equal. After which scores obtained from pre-test was collected and kept to be compared with the scores of the post-test after the introduction of the lesson package.

At the end of the learning programme, Educational Technology Performance Test (ETPT) was administered to the two groups (control and experimental) in two days from the day they were exposed to the lesson package. The researcher allow a time frame of one hour to the two groups (control and experimental) to respond to the instrument under close supervision by the researchers, after same were retrieved, and after 2weeks interval. Sheets from both groups were scored, and analyzed separately for the study. The entire procedure lasted for one month.

Mean and standard deviation was used to answer the research questions while analysis of covariance (ANCOVA) was used to test the hypotheses at 0.05level of significance. ANCOVA was used since the pre-test and protest scores administered were used in the analysis, to test the difference between two groups when having pairs of scores (pre-test-post-test)

Results and discussion of findings

Means was used in answering of research questions and the summary of the data are shown in the tables.

Research Question One

What is the difference in academic performance of educational Technology students when taught using Interactive Whiteboard and those taught using Expository method?

The result in Table 1 revealed the mean difference in academic performance of students taught using interactive whiteboard was 25.91 while that of the students taught with the expository Method

was 16.58. This means that students taught with the interactive whiteboard therefore, performed better than students taught with the Expository Method.

Table 1: Mean and Standard Deviation of the Academic Performance of Educational Technology Students when taught using Interactive Whiteboard and those Taught Using Expository Method

Instructional strategies	N	Pre-test		Post-test		Mean Difference
		Mean	SD	Mean	SD	
Treatment	41	41.10	5.92	67.01	5.87	25.91
Control	40	38.61	4.71	55.19	7.10	16.58

Testing of Hypothesis

ANCOVA statistical tool was used for testing all the hypotheses at .05 level of significance.

Hypothesis One

1. What is the difference in mean score of student's academic achievement between those taught using Interactive Whiteboard and those taught using Expository Method? The result of data analysis is presented on table 2.

The result in Table.3 reveals that the calculated F-value of 62.72 is greater than the critical F-value of 3.96 at 1 and 79 degrees of freedom and at .05 level of significance. With this result, the null hypothesis was rejected. This implies there is significant difference in academic performance of educational Technology students when taught using Interactive Whiteboard and those taught using Expository method

Table 2: Result of ANCOVA Analysis of the Academic Performance of Educational Technology Students when Taught Using Interactive Whiteboard and Those Taught Using Expository Method

Source	Type III Sum of Squares	Df	Mean Square	F-cal	Sig.

Corrected Model	2831.08[a]	2	1415.54	33.01	.00
Intercept	5270.55	1	5270.55	122.90	.00
Pretest	.09	1	.09	.00	.97
Instructional strategies	2689.74	1	2689.74	62.72	.00
Error	3345.00	78	42.89		
Total	309287.50	81			
Corrected Total	6176.08	80			

a. R Squared = .458 (Adjusted R Squared = .445) ; F-crit=3.96

Discussion of Findings

Academic Performance of Educational Technology Students when Taught using Interactive Whiteboard and those taught using Expository Method. The result of the analysis of the difference in mean academic performance of educational technology students when taught using interactive whiteboard and those taught using expository method revealed that there is significant difference in academic performance of educational technology students when taught using interactive whiteboard and those taught using expository method. This was as a result of the use of design elements such as Colour (gray, red, blue, light purple, black and mint green), animation and sound. All these were incorporated in the instructional package using interactive whiteboard which brought about students interaction as well as sustaining the interest of the students.

This observation underscores the effectiveness of interactive whiteboard instructional package in arousing and sustaining the interest of the learners during the teaching - leaning session, in effect their performances in the subject.The finding of the study lend credence to Meral and Ahmet (2014), who found that the use of IWB increases the student's English academic success when compared to the use of blackboard. The findings of this study also supports the study by Imoke, Ushe and Ofem (2024), they investigated how student-teachers' academic performance was affected by the usage of interactive or smart whiteboard features in educational technology. The study's findings demonstrated that using an interactive whiteboard instead of a regular one improved students' performance.

Academic Performance of Educational Technology Students When taught using Interactive Whiteboard Animation and those taught using Expository Method. The result of the analysis of the difference in mean academic performance of educational technology students when taught using interactive whiteboard animation and those taught using expository method revealed that there is significant difference in mean academic performance of educational technology students when taught using interactive whiteboard animation and those taught using expository method. This was greatly achieved through the use of Illustrative diagrams, colours (red, sky-blue and gray), sound, Animation, graphics and video clips. These design packages helped year three educational technology student to gain interest and be more focused in studying using interactive whiteboard instructional package.

The finding of the study lend credence to that of Ayo (2010), whose finding showed that there is a significant main effect of treatment on students' achievement in biology. The findings also support the findings of Scott et al (2025), they carried out a study on the impacts of using interactive whiteboards animated feature on the accomplishment of higher secondary students in respect of English vocabulary teaching. The findings revealed that Higher secondary students' performance in learning English vocabulary seemed to be significantly impacted by the IWB animated features.

Conclusion

Based on the findings of the study, it was concluded that interactive whiteboard do enhance the academic performance of Educational Technology students' in the University of Calabar, Nigeria more that the expository method of teaching and learning. It is therefore imperative that in this 21st century lass, instructional materials like interactive white board and other information, communication and technology teaching gadgets should be provided by the school authorities to enhance digital teaching and learning. This method is also observed to reach a wide audience and at a cheaper cost, thereby enhancing fast learning and easy teaching and learning in the department of educational technology and other departments in the university of Calabar and beyond.

Recommendations for policy directions

Based on the findings of the study, the following recommendations were made:

1. Educational Technology lecturers should be exposed on how to effectively use interactive whiteboard in teaching Educational Technology courses by incorporating interactive whiteboard features such as animation, graphics, video and diagrams that can secure interest and capture the attention of the learners.
2. The university management should encourage lecturers on the utilization of interactive whiteboard for presenting instruction by providing technological tools for effective teaching and learning process at all level.
3. Workshops and in-training programmes should be mounted for all lecturers not only in the department of educational technology, but all other departments to encourage them on how to set up and use interactive white board for teaching and learning
4. The university management should make available constant light and internet connectivity for lecturers to explore other teaching methods and materials that will enhance their teaching career.
5. The university management and other public spirited individuals should contribute laptops or computers to be mounted in all classes, for lecturers to use during their teaching exercise, even if they do not have one themselves.

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