Impact of Smart Classroom Modification on Student Performance in Ekiti State Secondary Schools[1]

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Abstract

Until recently, education in Nigeria was delivered using ancient classroom techniques that required students to sit through lengthy teacher monologues. However, the advancements in science and technology to make learning more interactive, intelligent, and practical led to a paradigm shift in the educational system. The study strategy was a descriptive survey to gather primary data by creating pertinent questionnaires and employing a quantitative data-collection technique. As a result, the researcher discovered a reliability coefficient of 0.75. The population of this study consisted of students in public schools with cutting-edge learning environments. In addition, 277 male and female students were chosen for this study using random sampling methods. According to the findings, there is a strong connection between effective classroom instruction and students' academic performance. Therefore, smart classrooms should be promoted and implemented to close the knowledge gap between learners in rural and urban areas.

Keywords: Smart classroom, Modification, Intelligent, Students performance, Secondary schools, Ekiti State

Introduction

The main objective of educational modification is to change the way we instruct our students. This circumstance might involve anything from modifying how we assess and track student development to integrating cutting-edge technology into the classroom. The goal of any modifications should, of course, be to increase student performance generally. There are several

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benefits to switching to smart classrooms in education. It improves the learning outcomes for students, which is one advantage. Additionally, it increases school security by defending against online dangers. On the other hand, it aids in managing and meeting the IT requirements of a smart classroom learning environment. Ogunlade (2011) is aware that schools in the twenty-first century require complete solutions that can accommodate any public school, no matter how big or small, and educational technology assistance for their students, instructors, and staff.

Through the use of innovative teaching and communication techniques, schools have begun integrating technology to enhance the teaching and learning process. Additionally, technology is being used in schools for research and diagnostic purposes. As a result, the educational system's overall effectiveness is enhanced. One way that schools are utilizing technology is by implementing new teaching strategies. For instance, teachers can engage students using interactive whiteboards and smart boards. Teachers can also give students assignments online. In addition, many schools provide their students with computers or tablets to use the internet outside of class (Gazzola & Didriksson, 2018; Ogunlade et al., 2018; Fakuade, 2021).

The traditional learning method has evolved into a more intelligent approach with the advent of wireless, ubiquitous mobile, the Internet of Things (IoT), and other information and communication technology(Laru & Jarvela, 2015). Although the traditional classroom setup, which involves teachers standing on elevated platforms and students seated at fixed desks in long rows with their eyes glued to the instructor, has been effective for hundreds of years, more is needed for the information age.

Other technologies, including film strips, overhead projectors, desktop computers, interactive whiteboards, smartphones, tablets, and, most recently, sensor-based devices (IoT), have replaced the chalkboard since it was created in 1890. The "smart classroom" idea was created due to this paradigm shift using technologies like clickers, symposiums, multichannel audio systems, multimedia communication support systems and platforms, ambient intelligence, cloud computing, big data, artificial intelligence, and the Internet of Things. (Yang, Pan, Zhou, & Huang, 2018).

A smart classroom uses recent hardware, software, web technologies, and signal processing developments. A smart classroom design aims to improve the learning and teaching environment, close the communication gap between students and teachers, and help teachers teach more effectively. Implementing smart classrooms requires mobile technologies, learner mobile devices,

and automatic communications. In a smart classroom, digital content is displayed on projectors and interactive whiteboards. An innovative classroom design aims to improve the learning and teaching environment, close the communication gap between students and teachers, and help teachers teach more effectively. A sensor-enabled, bright physical environment that regulates temperature, humidity, air quality, and acoustics is also present, along with tools for interacting with the teacher and other students, automated assessment and feedback tools, cameras for recording and storing, and other technologies (Thivanka et al., 2020).

Most smart classrooms are outfitted with the following technology: An indispensable component of a smart classroom is a computer or laptop. In addition, presentations, graphics, or other forms of multimedia are used to teach in a smart classroom. The word "projector" describes an optical device. It uses a projector to show still or moving objects on a screen. They create images by beaming light through a clear lens or using a laser. A screen is a flat surface that displays images projected by a projector. Many screens are available, including wall-mounted, pull-down, fixed-frame, electrical, switchable projection, and portable. Sometimes, a microphone is called a "mic" or "mike." This gadget turns electrical signals into audio signals. The signs are then transmitted, improved upon, or recorded. Electronic devices that increase a sound's volume include amplifiers and speakers. Finally, a podium is a raised platform, typically made of wood that allows the audience to see the person using it.

Document cameras are visual presenters, visualizers, and digital overheads. They are applied when a large audience needs to see something. For instance, a document camera exhibits photos of two- and three-dimensional objects. The teacher will put the item in front of the document camera. The camera's image is transformed into a live shot.

Alternatively known as a smart board or a bright LCD, an intelligent podium is a type of smart podium. It is an interactive display with a pen that can be connected to a laptop or desktop computer through a USB or RGB port. It can be described as an external display with integrated digital-ink features. Annotate documents, presentations, and multimedia files using a digital pen on an intelligent podium. Even if many videos are available online, some have copyrights and require a purchase. Thus, a VCD or DVD player is still required. These often come on CDs or DVDs (Huang et al., 2015).

A translucent acetate sheet is the basis for an overhead projector, which projects larger images onto a screen. This method has been commonly employed recently, but computer-based projectors are slowly replacing it (Prakosa et al., 2018).

With the help of computer hardware, software, and other multimedia resources, students can learn in "smart classrooms," a technology-based educational resource that is becoming increasingly popular around the globe. It is among the simplest ways to employ modern technology to update outdated instructional strategies. Because of advancements in ICT, researchers focus more on smart classrooms, but more attention needs to be given to how these classrooms affect students' performance in Nigerian secondary schools.

Assessment and diagnosis are two more ways that schools use smart classrooms. Software applications that assess students' knowledge of the class content are now available in classrooms; additionally, these tools aid in locating any areas that would require extra teacher attention. To cut down on wasted time, some schools are also keeping track of the statistics of students on an activity or assignment (Li & Guo, 2021; Adewale et al., 2021).

Academic performance is how well students perform in academic areas covered in secondary education. As a metric of academic education, academic success is critical for individual and social prosperity. Academic achievement, however, is undoubtedly significant to student life. As a result, as predictors of student happiness and psychological development, researchers and policymakers are paying more attention to social and emotional factors and how they interact with one another. As a result, academic performance has long been regarded as the most crucial outcome of formal educational experiences (Noonoo, 2017).

Reviewing the research on academic performance has shown that several things affect how well students do in school. According to Ogunlade, Bahago, and Ogunmodede (2021), the physical environment significantly impacts any activity, improving its favorability, viability, and success. Several factors influence the classroom environment, including acoustics, visual appeal, lighting, physical layout, ventilation system, amenities, and teaching tools. The secondary school's ability to evaluate its objectives and instructional strategies to promote active interactions among groups of students determines the achievement of learning outcomes in an intelligent classroom culture (Li & Guo, 2021). Because they allow for multitasking and can accommodate more students in less time than traditional classrooms, smart classrooms offer multi-dimensional student evaluation. A

computer-based assessment or test is used to gauge the effectiveness of a specific learning process and track individual students' progress.

One problem with traditional ways of grading is that they do not show how well students understand ideas. Drill and practice, learning by rote, and learning without questioning are just a few issues that can result from this. Teachers can use digital platforms and devices to carry out various learning activities. The task-based simulations used in the qualitative teaching method allow students to apply their learning abilities and resources in a real-world setting (Akhigbe & Ogunlade, 2022).

Statement of the Problem

A "smart classroom" is a place to learn where technology is used to help students improve their skills. Educators can design engaging, more appealing, and participatory lessons with this teaching and learning approach.

The most recent research on the effects of smart classrooms has been done from the point of view of information and communication technology (ICT), focusing on validity, reliability, usability, flexibility, and user experiences. Nevertheless, more needs to be done to look at how academic skills are learned, achieved, and used from the user's point of view. Also, there is not enough research on how smart classrooms affect how well students do in school in Nigerian secondary schools.

This study examines the effects of smart classroom modifications on students' academic performance in secondary schools in Ekiti State, Nigeria. It accomplishes this by closing a knowledge gap and resolving the abovementioned issues.

Objectives of the Study

The objectives of this study include to;

i. links students' comfort and availability to their academic performance in the smart classroom.

ii. determine the decisive characteristics of a smart classroom that influence students' academic performance.

iii. assess the influence of smart classes on students' academic performance in school.

Research Questions

This research question underpin the current research:

1. What connection exists between academic performance and smart classroom elements that impact learning, such as availability?
2. How does a smart classroom comfortability affect student performance

2. Methodology

In this investigation, the researcher employed logical reasoning and analyzed data to evaluate a research question about the theoretical backdrop after determining the theoretical foundation. The population of this study consisted of students in public schools with cutting-edge learning environments. The study combined focus group sampling with a quantitative data collection method to collect primary data. A sample of 14 public schools in urban and rural areas was used, focusing on Ekiti State. To determine the effects of smart classroom comfort and availability on student performance, the parameters were examined using three scales and closed-ended questions in a survey questionnaire. The reliability of the items was assessed using the test-retest approach, and a coefficient of 0.75 was found.

The researcher collects primary data by constructing relevant questionnaires using a quantitative data collection method. There were 250 surveys distributed in total, and 240 usable responses were collected, representing 96.0% of respondents, which seems enough for this study.

3. Data Analysis

Research Question 1. What connection exists between academic performance and smart classroom elements that impact learning, such as availability?

The Modification of Education Setting of Smart Classroom Availability on Student Performance Table 1: The Impact of Smart Classroom Availability on Student Performance

Question	Variable					
	Yes		**No**		**Do not Know**	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Does having access to databases for learning improve what you learn in class?	238	99.0	1	0.4	1	0.4
Do the smart devices in your class make it simple for you to access the internet?	235	97.9	4	1.6	1	0.4
Do the smart devices in	239	99.5	-	-	1	0.4

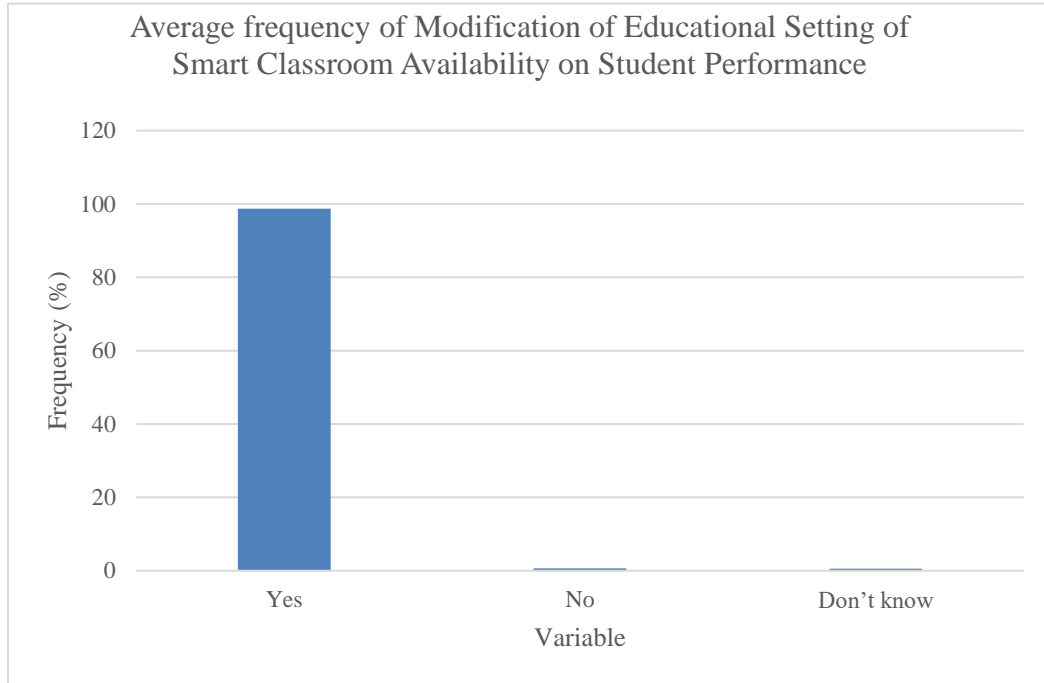|						
your class enable you to collaborate on digital projects with classmates?						
Can the smart gadgets in your classroom access the videos the teachers utilize?	238	99.1	-	-	2	0.8
Does having access to smart devices in class help you understand concepts better?	235	97.9	3	1.2	2	0.8
Average (%)		98.7		0.64		0.56

Figure 1 Impact of Smart Classroom Availability on Student Performance. From Table 1, and Figure 1 above according to Sandhya et al. (2018) and Thivanka et al. (2020), 98% of students who have used one type of smart classroom device agreed that having access to them improves learning, while 0.64 and 0.56% disagreed and said they were unsure. It could be challenging for students who have never used a smart device to gauge their significance (Adewale et al., 2021)

Research Question 2. How does a smart classroom comfortability affect student performance?

Modification of Education Setting of Smart Classroom Comfortability on Student Performance

Table 2: The Influence of Smart Classroom Comfortability on Student Performance

Question	Variable					
	Yes		**No**		**Do not Know**	
	Frequenc y	Percentag e (%)	Frequenc y	Percentag e (%)	Frequenc y	Percentage (

Does learning at your own pace with the smart devices in your class seem simple?	234	97.5	4	1.7	2	0.8
Do you notice any differences between a standard classroom and a smart classroom?	238	99.2	1	0.4	1	0.4
Do you pa closer attention when teacher use sma devices in th classroom?	238	99.2	2	0.8		-
Are visuals displayed on smart	239	99.6	1	0.4	-	-

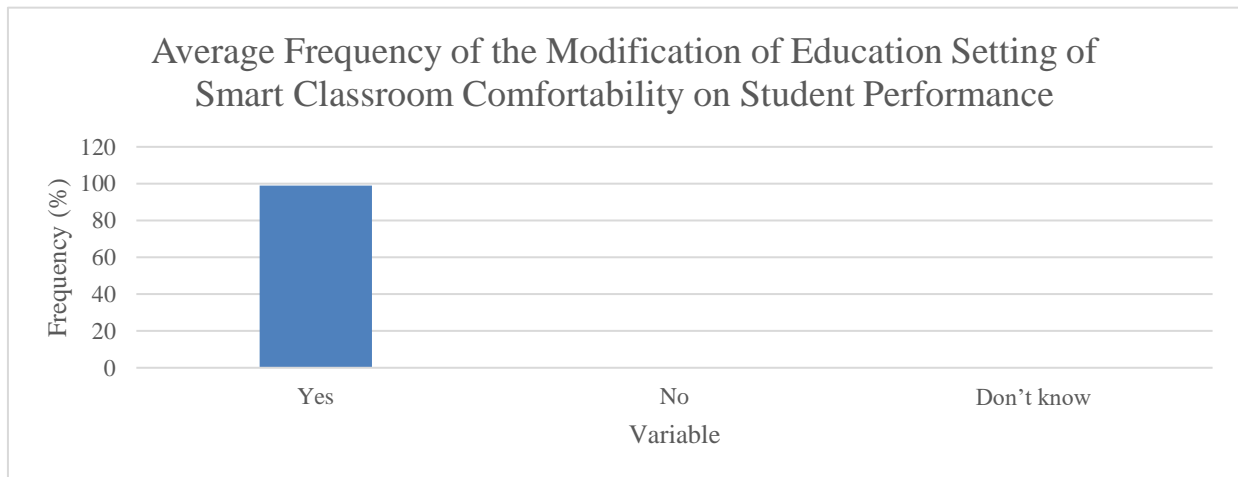|						
gadgets superior to drawings on chalkboards?						
Do you favour the smart classroom learning environment over the traditional classroom?	239	99.6	-	-	1	0.4
Average (%)	-	99.02	-	0.45		0.29

Figure 2 shows the average Frequency of the Influence of Smart Classroom Comfortability on Student Performance

From Table 2 and Figure 2, 99.02% of students accepted that the smart classroom is highly comfortable for learning and this enhances their performance greatly, which conforms with the work of Thivanka et al. (2020), whereas 0.45 and 0.29% opined that its comfortability has no influence on their performance and they do not know respectively.

Findings

The impact of smart classrooms on students' academic performance was evaluated in this study. The data gathered from students who learned in both a smart classroom and a traditional classroom revealed that a smart classroom improves student performances and aids teachers in making learning more interesting, enticing, and simple to understand while also offering a variety of opportunities for students to learn new skills (Thivanka et al., 2020). This study also demonstrated that smart classrooms could improve learning and teaching while reducing absenteeism. Out of 240 returned questionnaires, 152 students are delighted with using the smart classroom, 54 are of medium satisfaction, 20 are low satisfaction, seven are not satisfied, and seven have a reserved opinion.

This study found that learning in an innovative classroom is more effective than learning in a traditional classroom because students are more attentive and comfortable in a creative classroom environment.

Recommendations

The study proved a link between student comfort and academic progress. It is therefore recommended to consider students' comfort in constructing learning tools and environments. Training should be given to teachers for the pedagogical use of innovative classes. A technical assistant should be provided in schools to assist teachers with technical problems related to intelligence courses. The projects, seminars, and home assignments should be given while considering digital learning.

The study proved a considerable correlation between student availability and academic accomplishment. Therefore, smart classroom technology should be adopted to increase intellectual achievement, especially in African schools, as it limits the high absenteeism rate.

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