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Examining Data-Driven Approach On The Potentiality Of Smart-Boards Boosting Students' Academic Performance: Comparison Of Ict And Traditional Teaching Methods

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Rapid advancements in information and communication technology have had a positive impact on education as well as every other aspect of life but the question remains if all gadgets are deemed necessary. In this study, the smart board is put up for consideration. Research areas related to the impact of smart board use on academic success were evaluated in the quantitative arm using the regression analysis method. This was acquired through existing literature and met the eligibility criteria defined by the research objective. In this quantitative-descriptive (structured questionnaires) approach aspect, a survey research methodology was adopted using a questionnaire with the sole intention of gathering information from respondents, the students at Landmark University, on how they felt about the impact of the deployment of the smartboard on their academic and learning experiences. The study's sample size was 342. Using the regression coefficient, the hypothesis was evaluated. This finding demonstrates that there was a strong correlation between the two variables and that using a smart board did not significantly affect students' academic performance. Based on the findings, the following suggestions were made: The

school administration could host seminars, symposiums, and conferences in collaboration with other professional organizations to introduce students.

Keywords: Smartboards, Student, Academic performance

SDG 8: Decent Work and Economic Growth
SDG 12: Responsible consumption and production
SDG 11: Sustainable Cities and Communities
SDG 4: Good health and Well-being

1.0 Introduction

Rapid advancements in information and communication technology have had a positive impact on education as well as every other aspect of life. They have also fundamentally altered conventional learning contexts and pedagogical approaches. (Erstad et al. 2023). Parallel to these developments, the introduction of mobile phones, camcorders, projectors, flash drives, computers, and tablet devices into the classroom had an impact on several educational areas, from student projects to lecture delivery. The smart board has experienced recent developments in the past 20 years to include a computer, projector, and touchpad digital board (Akar, 2020; Akbaş & Pektaş, 2011).

One of the most widely used instructional devices around the globe currently is smart boards (De Vita, Verschaffel & Elen, 2018). During the latter part of the 1990s, the first smart boards were employed in teaching spaces (Beeland, 2002), it was no coincidence that its adoption became widespread in several nations. Within the foreseeable future, their use is anticipated to increase (De Vita et al., 2018). A smartboard is a sizable electronic screen that resembles a whiteboard. It is often referred to as an interactive board or an interactive whiteboard (IWB). It may be a freestanding touchscreen system that is utilized autonomously to carry out duties and procedures, or it may be a networked device that serves as a touchpad to operate systems from a projector (Ahmed et al. 2024). In addition to being utilized in classrooms at all educational levels, conference rooms and project teams in corporations, coaching facilities for professional athletics, and broadcasting facilities, they are also employed in several other places. SmartScreen works by connecting a computer, a projector, and an electric board with a touch interface. According to Akar (2020), Pupils can take advantage of the touch-screen canvas to solve problems, and explore, draw on, and delete programs such as graphical demonstrations, visualizations, videos, and images. Depending on the computer applications employed by these smartboards, digital lenses, multimedia content, films, tables and graphs, CD ROMs, or the Net may be employed (Glower et al.,2005).

Numerous studies have looked at the use of smartboards in the classroom and how it affects student performance. Furthermore, Moffat (2010) discovered that employing an engaging display made it simple to comprehend geometry. He taught geometry concepts utilizing game-based learning on the screen. It must be noted that Moffat (2010) also looked into how this affected student comprehension. In their study to ascertain the opinions of instructors who utilized smart screens in the classroom, Ceren and Ergul (2017) found that using an electronic projector screen enhances students' attention, involvement, and enthusiasm. According to Ifeakor, Akujieze, and Erutujiro (2020), the use of a smart screen during the methodology of education and learning has a significant impact on students' academic performance, perceptions toward learning, and enthusiasm. Additionally, more issues have been resolved in

classes that make use of the participatory projector screen technology. The advantages of using new technologies in education, in addition to improving student achievement, are seen as significant in terms of developing positive inclinations toward learning, focusing attention, reducing anxiety when learning new material, reducing panic, and, most importantly, developing observational and productive cognitive behaviours (Mun, et al., 2019).

1.1 Research Rationale

In several studies, it has been determined how well smartboards work for teaching math, science, and language skills to students in elementary, basic and secondary schools, and universities. (Ariratana, Sirisookslip, and Ngang 2015), as well as how the educational setting enhances the smartboard's advantages (Oktay & Hüseyin, 2011). Unfortunately, the majority of these studies were conducted outside of Nigeria, where ICT advancements like the smartboard technology are lacking in schools due to a persistent financing crisis and the absence of clear institutions and reasons for the development of public education (Abdelhak et al. 2015). Nevertheless, some private investors have stepped in to bridge the gaps of government inefficiencies by establishing educational institutions with this they have invested in diverse learning gadgets and start-of-the-art facilities and modern technologies such as the smartboard technologies in the academic sector. (Mahmoudi and Bagheri Majd 2021). One such University in a developing society qualified for an empirical investigation is Landmark University situated at Omu-Aran Kwara State, in the North central region of Nigeria. Due to the dearth of research on the topic in Nigeria, this study examines how well smartboard technology at Landmark University may support students' academic success. It intends to advance the understanding of research, particularly in the context of Nigeria. Hence, this study hypothesizes that the utilization of smart boards has a tremendous influence on students' academic performance.

2.0 Literature review

An electronic whiteboard with ease of use is called a Smart Board (Guerreiro and Loureiro 2023). This board is connected to a projector that displays an image of a PC screen and a personal computer. Via a little programming, the smart board allows its users to use it for a variety of tasks (Ameen, Hosany, and Paul 2022). In the late 1990s, it was first applied in training. Nonetheless, it has gone by several names, such as Smart Board, Electronic White Board, and Interactive White Board. Smart boards are now widely used by schools. A touch-sensitive screen is known as a "smart board" that functions with a PC and projector (Yusof, Roddin, and Awang 2015). The board is a unique kind of engaging, touch-sensitive display that can be employed in places with power, a computer socket, and a projector to engage and converse with students in the school environment or with collaborators online. The quality of training can be improved by using a smart board to make lessons more explicit and detailed. Smart Board is a user-friendly digital canvas (Abdelhak et al. 2015). This board is coupled with a projector that shows an image of a computer screen and a computer. Through some coding, the smart board functions and may be employed by users for a variety of tasks (Akar, 2020). During lectures, smart boards are a huge advantage for teachers. With a stylus or a fingertip, the teacher can operate the screen by tapping the surface (Abdelhak et al. 2015; Antonietti, Cattaneo, and Amenduni 2022). The teacher can utilize the advanced board for several operations, such as inserting, cutting, and dragging objects; converting handwritten

notes into text and underlining it; commenting, remarks, as well as illustrations; archiving them for printing and sharing; depicting visuals and video content to the entire class; taking screenshots, retrieving them, reviewing them, and making required changes; and using the information of internet sites (Balta & Duran, 2015). Smart boards are embedded in it, it's unique programming (Zhang, Tang, and Han 2022). The Internet and other infrastructure components can be incorporated into the courses thanks to their use as a digital centre for teachers and students (Abdullah et al., 2020). The effectiveness of schooling is expected to be significantly impacted by all of these smart board features. This viewpoint is supported by research in the literature. When findings and research are examined, it becomes evident that employing smart boards in teaching produces a classroom experience rich in audio and visual characteristics and makes teaching activities more realistic (Ifeakor, Akujieze, & Erutujiro, 2020). Additionally, it enhances student engagement, enthusiasm, and focus on the lecture and has a beneficial impact on the connection between the instructor and students (Akar, 2020), promotes students' engagement and offers lasting understanding (Gündüz, & Kutluca, 2019), has a favourable impact on academic progress and disposition toward the course (Wang, Lam, & Chen, 2019), delivers more academic-related items (Cogill, 2002), plus it improves students' adoption of IT related applications (Manny-Ikan et al., 2011).

According to Blau (2012), the following three qualities make it an effective teaching instrument:

i. Adaptive education refers to the skill of smoothly transitioning between screen pages and the Internet. This skill mimics the associative structuring of the learner's brain, and it aids in the arrangement and intelligibility of the lecture as it is understood by the pupil.
ii. Smart boards are a cognitive device that broadens students' horizons as well as supports collaborative reasoning. Students have the opportunity to use higher reasoning abilities since some of their computational complexity is moved to the board.
iii. Smart boards' interactive features allow for engagements between course materials and students, both in-person and electronically.

It can therefore be ascertained that the linkage between the expected quality and the used instrument to attain such expertise is within reach and stands for the premised goal in the design of its usage. Though stated to be a positive item in the knowledge disbursement, it is therefore proven to have a side effect and this is discussed below.

Benefits and Downsides of Smart Boards

According to Noor, and Alnoori (2021) using a smartboard has some of the following benefits and drawbacks, which are discussed below as thus:

Smartboard innovation allows class presentations to play a vital role in making the entire class's presentations more engaging, and useful, together with being creative (Otrel-Cass 2022). Furthermore, smartboards give instructors more freedom to more effectively plan their activities. Teachers may also organize and better organize their lesson plans, as well as encourage students to use smartboards in clever ways (Fernández-Cárdenas, & Silveyra-De La Garza, 2010)

The smart board indirectly aids students' adaption through its instant commitment to quality of education, particularly via using sight and sound talents plus a rich array of sources (Beeland, 2002). It also enhances student involvement, motivation, and active participation in

exercises, real-world applications, teamwork, reflection, and individual comparisons, all of which encourage learning. However, studies have shown that crisp sheets make it possible for both tutors and pupils to participate in a range of learning activities. (Wang et al. 2022; Wong, Huang, and Lin 2024).

Teachers' efforts to assign students the right assignments are aided by the usage of a smart board. Instead of having to leave the classroom to use a computer, turn away from the kids, and concentrate more on the technology than how the children are learning, it allows tutors to carry out research from the board. (Rodríguez-González, Madrid-Guijarro, and Maldonado-Guzmán 2023). It can be slated to refer to the function of bringing the instructor face-to-face with the student as he peruses the board's enormous library. Smart Board has the advantage of enhancing discourse. It has also been noted to enable the tutor to focus on the growth and discussions of the younger pupils rather than on difficult subjects (Noor, & Alnoori, 2021).

The Smart Board function that enables the tutor to preserve the notes that students have written on the board in the course of the class is very helpful for the learning process. (Antonietti et al. 2022). This is premised on the notion that the teacher is more able to try bolstering each of the most recent features he has taught, with this teachers or tutors can remember such words and advance their fortification (Akar, 2020).

Instructors who use smart boards in class indicate that the quality of instruction has improved. This growth is aided by the instructor's ability to plan lessons that incorporate interactive technologies and capture students' attention as well as creativity in unique ways. The programmable smart board offers the benefit of adapting how the research content is taught to each student's unique learning style (Wang et al., 2019). The key promise of smart boards is that they will reduce decision-making costs, help students understand the material, generate knowledge, organize pertinent data, be self-sufficient in completing assignments in a group setting, increase learning efficiency across the board, and contribute to the depiction of elements that encourage a sense of progress, enjoyment, and a world that is gradually becoming better (Dori and Kurtz, 2015).

To ascertain the impact of combining innovation into instructional methods on instructors and students, the "Smart Project" study carried out that incorporates smart sheets into teaching as well as learning examined six schools. According to Hadad and Gazit (2012), the advantage is that instructors can write not just notes but explanations on the board, which records activities that can be used by students who were absent because of illness or absence.

Nevertheless, despite multiple research findings revealing that using a smart board aids performance and makes the rigour of teaching worthwhile, a study which did a comparison of students in savvy research auditoriums and students in study auditoriums with basic boards on the ability to handle problems and cognitive abilities discovered that the students who concentrated in study auditorium with basic boards were in the strongest position (Blau, 2012). Why Smart classroom participants thought that there were frequently mechanical complications and that the instructors had sufficient expertise.

However, in a survey on learning views, individuals in smart classrooms confirmed that the savvy board boosts the drive to learn, increase the concentration level, plus significantly influences behaviour (Noor, & Alnoori, 2021). When all is said and done, it seems that the challenges and interesting points are tied to how the educator and learners employ the smart board. Smart boards work best when teachers use them intelligently with the simple goal of making course materials comprehensible to the audience. Instructors have the honours of

explaining how smart the board is, appropriately setting up their workstations for each session, and using all of their assistance (Hadad & Gazit, 2012).

3.0 Methodology

Owing to the kind of participants required to accurately represent the study's reality, the researcher used a quantitative-descriptive (structured questionnaire) methodology. This is selected since it centres on developing an in-depth understanding of the subject and comprises measured variables without altering them. Considering that the investigation was restricted to employing the collected data, and a method that is objective was used in assessing the data gathered; positivism was one of the research philosophies adopted in this study. A survey research methodology was used to find out what the students' opinions were on the use of smartboards in a private tertiary institution in North Central Nigeria. The survey was designed to gather data from Landmark University students on their perceptions of the effects of smartboard implementation on their educational and learning experiences. The fact that this type of research employs questionnaire surveys often and extensively justifies their acceptance (Dauda and Akingbade, 2011). A structured questionnaire will be employed; Google forms was be made and distributed via university mail and social media. The completed surveys were retrieved from a backend repository by the survey participants. This method was selected given that it guarantees that respondent data is precisely and accurately captured while also making it easy for responders to finish the forms without misplacing them. (Adebanji et al. 2018). Students at Landmark University received questionnaires. The questionnaires were distributed by the researcher using an online portal. 3134 undergraduate students at the institution make up the study's population, and Yamane's method was used to determine the sample size of 342. For data analysis in this study, the Statistical Package for Social Sciences (SPSS) was utilized. The demographic data from the surveys will be presented in tabular and graphic form, and a correlation test will be performed to see how strongly the variables are related to one another. In the research, Cronbach's Alpha is used to assess the reliability of the research instrument. The table below displays the reliability data.

Table 3.1: Reliability Statistics

Cronbach's Alpha	**N of Items**
.744	15

Authors' computation, 2022

The reliability of the questionnaire's items is shown by the Cronbach's Alpha estimate. Research has demonstrated that an Alpha value of more than 0.7 indicates good reliability. As a result, the reliability test result of 0.744 suggests that 74% of the questionnaire is reliable.

Ethical considerations

Throughout the whole of the research project, the researcher made certain that the information provided by the participants remained anonymous and refrained from asking or making remarks that may be seen as misleading. Every step of the research process was broken out for the participants, and they were allowed to withdraw from the study if they felt they were no longer comfortable. The confidentiality and security of the data were preserved since the data

that were obtained were anonymized, inputted, and stored in a secure electronic platform. Ethical clearance with the protocol number LUCRID/112/2022 to conduct the study was obtained from the Landmark University Centre for Research, Innovation and Discoveries (LUCRID). The written informed consent form was given to each respondent to confirm their voluntary participation in the study. The entire research procedure was explained to the respondents with the option of withdrawal if they were no longer comfortable. Data anonymity and security were maintained, as data collected were anonymized, entered and kept in security.

4.0 Results and Analysis

4.1 Demographic Profile of the Respondents

Table 4.1 depicts 169 of the participants as Female (51.4%) while 158 of the participants were male (48.3%). The implication is that females make up the vast majority of the respondents. As it relates to ages, the table clearly shows that 14.6% of respondents are between 14 and 18; a higher proportion 63.8% are between 19 and 21; 17.9% are between 22 and 25; and 3.0% are over 26 of age. It was noted that ages 19 to 21 had the highest percentage, which implies that the institution gives preference to applicants who are new to the admissions process. This demonstrates that there is a youthful, driven labour force that allows for change, versatile in thinking, as well as sensitive to new ICT trends. The table shows 37.1 percent of responders are from the College of Business and Social Science (CBS), 4.0 percent from the College of Agricultural Sciences (CAS), 33.7 percent from the College of Engineering (COE), and 24.6 percent from the College of Pure and Applied Science (CPAS). Consequently, it can be concluded that the views expressed by the students who took part in the survey were distributed as intended and were fairly representative of the population at large. Additionally, the table reveals that the frequency distribution of respondents' levels at the university is as follows: 9.7% are in level 100, 14.9 are in level 200, 10.6 are in level 300, 52.3 percent are in level 400, and 11.9 are in level 500. This shows that the 400-level accounted for the bulk of study participants, and it implies that comments for the study were offered by informed individuals who were impartial. Apart from that, 75.4 percent of respondents only own laptops, 11.6 percent own tablets, and 3 percent own nothing at all, according to the statistics. It was discovered that 9.4% of people owned both devices. This implied that an average university student would have a device that is readily connected to the internet.

Table 4.1

VARIABLE	FREQUENCY	PERCENTAGE
Gender		
Male	158	48.3
Female	169	51.6
Age		
14-18 years	48	14.9
19-21 years	210	63.8
22-25 years	59	17.9
26yrs & above	10	3.0
College/Faculty of respondents		

CBS	122	37.1
CAS	13	4.0
COE	111	33.7
CPAS	81	24.6
College/Faculty Distribution		
100 Level	32	9.7
200 Level	49	14.9
300 Level	35	10.6
400 Level	172	52.3
500 Level	39	11.9
Gadget Owned		
Laptop	248	75.4
Tablet	38	11.6
None	10	3.0
Both Gadgets	31	9.4

Authors' computation, 2022

The respondents' descriptive data about the use of smart boards are displayed in Table 4.2. From the table, it can be discovered that the vast majority of those surveyed (64.7%) were in favor of the claim that " During lectures conducted on the smart board," they show greater engagement. When asked if their favorite lectures are from the adoption of smart boards, again a little above half of the respondents (51.3%) said yes to the claim. Going forward, the table shows that 24.0% of the respondents strongly disagreed, 38.3% disagreed and 17.3% were undecided about the statement that "Knowledge acquisition in their lectures is confused by the use of smart boards." However, 4.6% of respondents strongly agreed with the statement, while 13.1% of respondents agreed overall. A total of 233 respondents, or roughly 70.8% of the sample, disagreed with the statement when asked if they had trouble understanding how to use the smart board. Nevertheless, a few of the respondents favoured the claim. The table also shows that when the respondents were inquired if they would rather have lectures without a smart smartboard, most of them (61.7%) said they preferred lectures with a smartboard. Moving on, The chart indicates that the majority of respondents claimed that their lecturers had difficulty using the smart board. Lastly, the table further reveals that most of the respondents 247(75%) of the respondents favoured the statement that smart board is beneficial to their learning as a student.

Table 4.2 Descriptive Statistics of Responses on Smart Board Usage

	Statement	SD	D	U	A	SA
1	When lectures are conducted on the smart board, I pay closer attention.	12(3.6%)	14(4.3%)	80(24.3%)	150(45.6%)	63(19.1%)

2	The presentations with smart boards are my favourites.	11(3.3%)	49(14.9%)	91(27.7%)	113(34.3%)	56(17.0%)
3	The use of smart boards in my lectures makes it difficult to learn	79(24.0%)	126(38.3%)	57(17.3%)	43(13.1%)	15(4.6%)
4	I find it difficult to understand how the smart board is used.	102(31.0%)	131(39.8%)	41(12.5%)	33(10.0%)	11(3.3%)
5	I would like lectures not to use interactive whiteboards.	116(35.3%)	92(28.0%)	61(18.5%)	33(10.0%)	12(3.6%)
6	My instructors find it difficult to use the smart board.	65(19.8%)	87(26.4%)	91(27.7%)	58(17.6%)	14(4.3%)
7	The adoption of the smart board has helped me as a student study.	12(3.6%)	8(2.4%)	49(14.9%)	159(48.3%)	88(26.7%)

Authors' computation, 2022

The descriptive statistics for the respondents' answers regarding the academic performance of the students are displayed in Table 4.3. The chart reveals that the majority of respondents (67.5%) said they truly put an effort into every activity related to their subject. The table also indicates that most respondents (66%) agreed with the statement that they listen and pay attention in every debate. Moving forward, the table also displayed that 2.4% of respondents strongly disagreed with the claim that they desire to earn good grades in every topic, while 0.9% of respondents disagreed with it. The chart also reveals that while 118 respondents (35.9%) agreed and 177 respondents (53.8%) strongly agreed with the claim, 11 respondents (3.3%) were unsure about it. Additionally, a large portion (54.1%) replied in the affirmative when asked if they actively participated in every subject area. Moving forward, more than half of the respondents (67.1%) also supported the statement, " Every lecture activity includes self-reflection and feedback as standard procedures." The table also reveals that a higher proportion of participants concurred with the assertion that "When faced with challenging assignments, they put forth greater effort." Similarly, 59% of the respondents agreed with the statement "I enjoy my take-home assignment and activities since they help me enhance my skills in every topic." Finally, the chart demonstrates that 61.4% of respondents said that solving problems is a helpful activity for them.

Table 4.3 Descriptive Statistics of Responses on Students' Academic Performance

	Statement	SD	D	U	A	SA
1	I prepared myself for every activity in all of my studies.	7(2.1%)	32(9.7%)	57(17.3%)	148(45.0%)	74(22.5%)
2	I listen intently and pay attention during every conversation.	11(3.3%)	26(7.9%)	65(19.8%)	170(51.7%)	47(14.3%)
3	My goal is to excel in all of the subjects.	8(2.4%)	3(0.9%)	11(3.3%)	118(35.9%)	177(53.8%)
4	I take an active part in every conversation.	7(2.1%)	46(14.0%)	88(26.7%)	132(40.1%)	46(14.0%)
5	Every lecture activity includes self-reflection and feedback as standard procedures.	10(3.0%)	21(6.4%)	64(19.5%)	158(48.0%)	63(19.1%)
6	I like doing my take-home assignments and other elements because they help me get better at everything.	11(3.3%)	42(12.8%)	72(21.9%)	149(45.3%)	45(13.7%)
7	I work harder on challenging assignments.	7(2.1%)	25(7.6%)	46(14.0%)	151(45.9%)	88(26.7%)
8	For me, solving puzzles is a useful pastime.	16(4.9%)	29(8.8%)	68(20.7%)	152(46.2%)	50(15.2%)

Authors' computation, 2022

Regression result of hypothesis testing

Multiple regression was statistically used to test Hypothesis 1 to: (i) ascertain whether a relationship exists between smart board usage and students' academy performance; (ii) examine the strength of the correlation between both variables; (iii) obtain the significant effect of smart board usage on student academic performance.

The percentage of variance in the response variable (students' academy performance) that is predicted by the predictor variable (smart boards Usage) is displayed in Table 4.4 (model overview). In this instance, the R square (R2) exhibits a coefficient determination R square (R2) of around 0.003, or 0.3%, when stated as a percentage. This implies that the metrics of smart board usage can predict a 0.3% variance in students' academic achievement.

Smart boards' variability was demonstrated by the adjusted R square of 0.6 (0.006%), while the estimate's standard error of.59887 denotes an error term. This shows that smart boards account for 0.6% of the variability in students' academic achievement.

Table 4.4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.077[a]	.006	.003	.59887

a. Predictors: (Constant), students' academy performance

Authors' computation, 2022

In trying to test the significance of the model, the study used Analysis of Variance ANOVA (F test) for linearity between smartboard usage and student's academic performance. Table 4.5 provides an evaluation of the result's statistical significance. The F critical at a 5% level of significance was 1.876. Since the significance level calculated is greater than 0.05, this shows that the overall model was not significant. A non-statistically significant correlation between smartboard usage and student's academic performance is also shown in the table (p 0.172). This finding implies that the smart board has no significant effect on students' academic performance.

Table 4.5 ANOVA for Smartboard usage

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.673	1	.673	1.876	.172[b]
	Residual	113.691	317	.359		
	Total	114.364	318			

a. Dependent Variable: smart boards

b. Predictors: (Constant), students' academy performance

Authors' computation, 2022

The factors in the model contributed to the dependent variable's prediction to the extent that it was statistically significant, as indicated by the coefficient table above, and this can be seen if you look at the sig column in the table and check the model for multicollinearity. In a two-sided test, the level of significance was defined as the absolute value of the test statistics (T) greater than or equal to the critical value of 1.96. With Tval (1.370) less than 1.96 and strong beta values (beta =.077), the model demonstrated that the smart board had no statistically significant impact on student's academic performance (sig..000 p >.05). This indicates that the use of a smartboard during lectures at a university does not affect how well students do academically. This suggests that the performance of students in academics can increase by up to 077 units for every unit increase in smart board use. A statistical confidence level exceeding 95% is implied by a significance level below 0.05. This suggests that having a smartboard does not affect how well students perform in school. As a result, the normality assumption (Ha3), which claimed that the use of smart boards has a significant impact on student's academic performance, was rejected in favour of the null hypothesis (H03).

Table 4.61: Coefficient Table for the Independent Variable (smart boards)

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.

		B	Std. Error	Beta		
1	(Constant)	3.527	.187		18.887	.000
	SBU	.086	.063	.077	1.370	.172

a. Dependent Variable: students' academy performance

Authors' computation, 2022

5. Conclusion, Implications and Recommendations

The purpose of the study is to determine how students' academic performance at Landmark University in Omu-Aran, Kwara State, is affected by their use of smartboards. The following conclusions were made as a result of the data analysis and findings. Overall, the Smart Board was a terrible teaching tool in higher education. According to the study, smart boards have no appreciable impact on Landmark University students' academic performance. The study also demonstrates that while the usage of smart boards has no appreciable effect on students' academic performance at Landmark University, their presence does influence the learning culture of the student body. To stay ahead of students who are more digitally savvy and prevent the compromise and manipulation of academic resources, it is necessary to give priority to training programs for lecturers and facilitators as well as capacity development initiatives regarding the usage of smart boards. The school administration could host seminars, symposiums, and conferences in collaboration with other professional organizations to introduce students and instructors to more updated capabilities of the smartboard and how to use it to its best potential. As a result of the smart board's involvement in improving student accomplishment, additional research should be done on the smart board's effectiveness in teaching and learning across a range of educational levels and subject areas.

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Competing interests

There are no competing interests.

Author contributions

All listed authors were responsible for originating and developing the review. This included formulating research queries and selection criteria, doing data analysis, creating the paper, and addressing any shortcomings and barriers encountered in the field. Furthermore, they conducted data analysis and interpretation, authored the essay, and meticulously revised it. As the only individual responsible for providing final approval for the published version.

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Disclaimer

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Reference

1. Abdelhak, A., Talbi M., Radid M., Snadrou K., & Tragha A. (2015). 'Quality Management in Vocational Training: Evaluation of A Specialized Institution in ICT'. The Proceedings of 6th World Conference on Educational Sciences 191:1928–33. doi: 10.1016/j.sbspro.2015.04.261.
2. Abdullah, A. H., Soh, H. M., Mokhtar, M., Hamzah, M. H., Ashari, Z. M., Ali, D. F., ... & Abd Rahman, S. N. S. (2020). Does the use of a smart board increase students' higher-order thinking skills (HOTS)? IEEE Access, 9, 1833-1854
3. Abdelhak, A.T.M., Radid M., Snadrou K., & Tragha A. (2015). 'Quality Management in Vocational Training: Evaluation of A Specialized Institution in Ict'. The Proceedings of 6th World Conference on Educational Sciences 191:1928–33. doi: 10.1016/j.sbspro.2015.04.261
4. Adebanji, A., Ogunnaike, O.O., Iyiola, O. O., Ezenwoke, O. A. & Ibidunni. S. (2018). 'Data Article on Institutional Framework and Business Survivals of Informal Entrepreneurs in Electronics Market, Southwest, Nigeria'. Data in Brief 19:1297–1304
5. Akar, H. (2020). The effect of smart board use on academic achievement: A meta-analytical and thematic study. International Journal of Education in Mathematics, Science and Technology, 8(3), 261-273.
6. Akbaş, O., & Pektaş, H. M. (2011, December). The effects of using an interactive whiteboard on the academic achievement of university students. In Asia-Pacific Forum on Science Learning and Teaching (Vol. 12, No. 2, pp. 1-19). The Education University of Hong Kong, Department of Science and Environmental Studies.
7. Ahmed, A., Amit D., Ho Cheung B. L., and Nichalin S. (2024) . 'The Role of Commitment in Online Reputation Systems: An Empirical Study of Express Delivery Promise in an E-Commerce Platform'. Decision Support Systems 176:114061. doi: 10.1016/j.dss.2023.114061.
8. Ameen, N., Sameer, H., and Justin P. (2022). 'The Personalisation-Privacy Paradox: Consumer Interaction with Smart Technologies and Shopping Mall Loyalty'. Computers in Human Behavior 126:106976. doi: 10.1016/j.chb.2021.106976.
9. Antonietti, C., Alberto C., & Francesca A. (2022). 'Can Teachers' Digital Competence Influence Technology Acceptance in Vocational Education?' Computers in Human Behavior 132:107266. doi: 10.1016/j.chb.2022.107266.
10. Ariratana, W., Saowanee S., & Tang K., N., (2015). 'Development of Leadership Soft Skills Among Educational Administrators'. The Proceedings of 5th World Conference on Learning, Teaching and Educational Leadership 186:331–36. doi: 10.1016/j.sbspro.2015.04.016
11. Balta, N., & Duran, M. (2015). Attitudes of students and teachers towards the use of interactive whiteboards in elementary and secondary school classrooms. Turkish Online Journal of Educational Technology-TOJET, 14(2), 15-21.
12. Beeland Jr, W. D. (2002). Student engagement, visual learning and technology: can interactive whiteboards help?.
13. Blau, I. (2012). The quiet revolution: Interactive whiteboards in school as the foundation for an innovative pedagogy in the 21st century. In Ma'of Uma'aseh (pp. 139-156). Achva College. [in Hebrew].
14. Caspi, S.Eden, N. Geri, Y. Yair, & Y. Kalman (Eds.), Proceedings of the Chais Conference for the Study of Innovation and Learning Technologies. Raanana: Open University. [in Hebrew]
15. Ceren, T. & Ergül, D. (2017). The Effect of teaching supported by an interactive whiteboard on students' mathematical achievements in lower secondary education. Journal of Education and Learning; 6(1), 81-94.

16. Cogill, J. (2002). How is the interactive whiteboard being used in the primary school and how does this affect teachers and teaching? Retrieved November 6, 2009.
17. Dauda, Y. A., & Akingbade, W. A. (2011). Technology Innovation and Nigeria Banks Performance: The Assessment of Employee's and Customer's Responses. American Journal of Social and Management Sciences, 2, 329-340. https://doi.org/10.5251/ajsms.2011.2.3.329.340
18. De Vita, M., Verschaffel, L., & Elen, J. (2018). Towards a better understanding of the potential of interactive whiteboards in stimulating mathematics learning. Learning Environments Research, 21(1), 81-107.
19. Dori, S., & Kurtz, G. (2015). Student's perceptions of meaningful learning via ICT. Paper presented at the 2015 Chais Annual Meeting, Open University, Raanana.
20. Erstad, B., L., Colin G., B., Andrea R., Adrián A. P., & Gayle A. B., (2023). 'Best Practice Strategies for Retaining Faculty During Times of Rapid Change'. American Journal of Pharmaceutical Education 100579. doi: 10.1016/j.ajpe.2023.100579.
21. Fernández-Cárdenas, J. M., & Silveyra-De La Garza, M. L. (2010). Disciplinary knowledge and gesturing in communicative events: A comparative study between lessons using interactive whiteboards and traditional whiteboards in Mexican schools. Technology, Pedagogy and Education, 19(2), 173–193. https://doi.org/10.1080/1475939x.2010.491219
22. Glover, D., Miller, D., Averis, D., & Door, V. (2005). The interactive whiteboard: a literature survey. Technology, Pedagogy and Education, 14(2), 155-170.
23. Guerreiro, J., & Sandra M., Correia L., (2023. 'I Am Attracted to My Cool Smart Assistant! Analyzing Attachment-Aversion in AI-Human Relationships'. Journal of Business Research 161:113863. doi: 10.1016/j.jbusres.2023.113863.
24. Gündüz, S., & Kutluca, T. (2019). A meta-analysis study on the effect of the use of smart boards in the teaching of mathematics and science to students' academic achievements. Journal of Computer and Education Research, 7(13), 183-204.
25. Hadad, S., & Gazit, A. (2012). Is the interactive whiteboard only a gimmick? In Y. Eshet-Alkalai, A. Caspi, S.Eden, N. Geri, Y. Yair, & Y. Kalman (Eds.), Proceedings of the Chais Conference for the Study of Innovation and Learning Technologies. Raanana: Open University. [in Hebrew]
26. Ifeakor A C., Akujieze, M.O., &Erutujiro, G. (2020) Effect of interactive whiteboard on students' academic achievement in mathematics in Onitsha north LGA of Anambra state. Nnadiebube Journal of Education in Africa (NJEA) 6(1)
27. Mahmoudi, Fahimeh, and Rouhollah Bagheri Majd. 2021. 'The Effect of Lean Culture on the Reduction of Academic Corruption by the Mediating Role of Positive Organizational Politics in Higher Education'. International Journal of Educational Development 80:102319. doi: 10.1016/j.ijedudev.2020.102319.
28. Manny-Ikan, E., Dagan, O., Tikochinski, T., & Zorman, R. (2011). [Chais] Using the Interactive White Board in Teaching and Learning–An Evaluation of the SMART CLASSROOM Pilot Project. Interdisciplinary Journal of E-Learning and Learning Objects, 7(1), 249-273.
29. Moffat, H. (2010). The effects of using an interactive whiteboard on the academic achievement of secondary school students. Education Research, 12 (2), 1-19.
30. Mun, S. H., Abdullah, A. H., Mokhtar, M., Ali, D. F., Jumaat, N. F., Ashari, Z. M., Samah, N. A., & Rahman, K. A. A. (2019). Active Learning Using Digital Smart Board to Enhance Primary School Students' Learning. International Journal of Interactive Mobile Technologies (iJIM), 13(07), pp. 4–16. https://doi.org/10.3991/ijim.v13i07.1065
31. Noor, Q. M., & Alnoori, M. (2021). The effect of smart board on students' engagement and achievement. Unpublished Term paper. University of Baghdad retrieved from https://www.researchgate.net/publication/349350954_The_Effect_Of_Smart_Board_On_Students%27_Engagement_And_Achievement

32. Oktay A. & Hüseyin M. (2011) The effects of using an interactive whiteboard on the academic achievement of university students. Asia-Pacific Forum on Science Learning and Teaching, Volume 12, Issue 2, Article 13, p.1
33. Otrel-Cass, K., (2022). 'Presenting a Students' Tale: The Smartphone Manifesto'. International Journal of Educational Research 114:101999. doi: 10.1016/j.ijer.2022.101999.
34. Rodríguez-González, R. M., Antonia M., and Gonzalo M., (2023). 'Digital Organizational Culture and Absorptive Capacity as Precursors to Supply Chain Resilience and Sustainable Performance'. Journal of Cleaner Production 420:138411. doi: 10.1016/j.jclepro.2023.138411.
35. Wang, L. C. C., Lam, E. T., & Chen, Y. H. (2019). A case study of using the Smart Board as a Chinese learning application by elementary school students. International Journal of Technology Enhanced Learning, 11(1), 71-79.
36. Wang, S., Qiurui S., Ying S. & Xin L. (2022). 'Applications of Robotic Process Automation in Smart Governance to Empower COVID-19 Prevention'. International Conference on Identification, Information and Knowledge in the Internet of Things, 2021 202:320–23. doi: 10.1016/j.procs.2022.04.043.
37. Wong, I. Anthony, J. (Daisy) Huang, 7Zhiwei (CJ) Lin. 2024. 'Understanding Smart Service Failure: The Case of Smart Restaurants'. International Journal of Hospitality Management 119:103714. doi: 10.1016/j.ijhm.2024.103714.
38. Yusof, Yusmarwati, Rohayu Roddin, and Halizah Awang. 2015. 'What Students Need, and What Teacher Did: The Impact of Teacher's Teaching Approaches to the Development of Students' Generic Competences'. The 4th World Congress on Technical Vocational Education and Training (4thWoCTVET), 5-6 December 2014, Universiti Tun Hussein Onn Malaysia, MALAYSIA 204:36–44. doi: 10.1016/j.sbspro.2015.08.107.
39. Zhang, Tao, Zhongjun Tang, and Zhongya Han. 2022. 'Optimal Online Channel Structure for Multinational Firms Considering Live Streaming Shopping'. Electronic Commerce Research and Applications 56:101198. doi: 10.1016/j.elerap.2022.101198.