



Availability and Utilisation of Interactive Whiteboard Among University Lecturers in Katsina State, Nigeria

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ABSTRACT

This study examined the Availability and Utilisation of Interactive Whiteboard Among University Lecturers in Katsina State, Nigeria. The study was guided by three research questions and two hypotheses. The sample of this study was six hundred and sixty-four (664) lecturers drawn from three Universities in Katsina State, Nigeria using research advisor (2006). Two research instruments - Availability and Utilisation of Interactive Whiteboard for Instructional Purposes Questionnaire (AUIWBIPQ) with a reliability coefficient of 0.82 and an observation check list were used for data collection. The study established that Interactive whiteboard were not adequately available for instructional purposes among universities in Katsina state, Nigeria, and that lecturers perceived interactive whiteboard as a useful tool for instructional delivery which motivates them and enhance instructional delivery with irregular power supply, inadequate supply of IWB and overcrowded lecture rooms identified as major challenges in the utilization of interactive whiteboard for instructional purposes among universities in Katsina state. The study recommends there is need for increase in funding of education with emphasis on ICT infrastructure in Universities, training of lecturers through workshops and seminars and provision of adequate power supply with alternative sources should be put in place to facilitate the use of interactive whiteboard (IWB) for instructional purposes.

Keywords: interactive Whiteboard, Availability, Utilisation, University Lecturers

INTRODUCTION

The application of technology in teaching and learning process is known as “Technology in Education”. Technology in Education is the component of education technology that involve the use of machine, gadget or equipment to improve the quality of education. Technology in education (Instructive Technology) involve the use of media in teaching and learning process and the media can be audio, visual or audio-visual among others (Daramola, 2014). With the technological advancement, the application of machine, gadget or equipment keep changing in order to improve teaching and learning process. These processes of advancement began from application of slate, chalkboard, whiteboard and other latest technology to improve teaching and learning process.

The use of technological innovation tools in teaching and learning is aimed at making teaching and learning easy and stress-free for both teachers and learners. An IWB, also known as an interactive board

or smart board, is a large interactive display board in form of a whiteboard. It can either be an impartial touch screen computer used independently to perform tasks and operations, or a connectable gadget used as a touchpad to control computers from a projector. They are used in a multiplicity of settings, including classrooms at all levels of education, corporate board rooms and work groups, training rooms for professional sports coaching, broadcasting studios, and others (Hennessy & London, 2013).

The IWB technology combines a large, touch-sensitive electronic board with a data projector, specialized software, and a computer. The board displays the projected computer image and allows direct input via finger or stylus (Hillier, Beauchamp & Whyte, 2013). The software provides a variety of functions, including those that replicate non-digital technologies such as flipcharts, dry-wipe boards, overhead projectors, slide projectors, and video players (Hennessy & London, 2013). The IWB is particularly well-suited for supporting a dialogic pedagogy because it expands the possible modes of classroom dialogue beyond talk and gesture.

Morgan (2008) established that the use of the interactive whiteboard as an instructional tool has a beneficial effect on student engagement in classroom lessons. Similarly, Chen and Tsai (2013) found that using the interactive whiteboard in the lower grades increases the students' interest in reading at school and improves their level of literacy. Genesi, (2009), posits that many teachers perceived IWB as a powerful, extra resource to support their teaching. The IWB allowed them to be more creative with their lesson presentations classroom organisation and time management. Jang and Tsai, (2012) holds that using IWBs can easily get students' attention and help them to concentrate on learning, help teachers explain complex and abstract concepts and making teaching process smoother and effective.

In spite of its pedagogical benefits, Ibrahim, Abdullahi, and Abubakar, (2023) also established that there is no availability of IWB in the classrooms of public tertiary institutions in Sokoto State, Nigeria. Interactive whiteboards are not adequately available and are not sufficiently utilized, therefore they are not part of classroom technology in most tertiary institutions in Nigeria. Meanwhile, Romina, (2014) found that institutions of higher learning in some states of Nigeria have low level of availability of ICTs like internet connectivity, electronic lecture rooms, laboratories, electronic whiteboards, data projectors and office automation for lecturers. Interactive Whiteboard is one of the ICT tools that is adequately not available for instructions in tertiary institutions in Nigeria (Lawrence & Naghdipour, 2013; Zubairu, S. A. 2014). Egoma, Enyi and Tah, (2012) also established that the availability of ICT tools in tertiary institutions in the state is relatively low.

The Successful utilization of digital technology like interactive whiteboard depends not just upon sufficient access to equipment, tools and resources, but also on its availability (Hillier, Beauchamp, & Whyte, 2013). Muhammad, (2017) posits that utilization has to do with the extent to which facilities are provided to schools, there are three possibilities, they are either used effectively or inefficiently or they may remain unused. When item of equipment is maximally used such equipment is effectively utilized. If the equipment is not maximally used it can be said to be underutilized. When there is so much pressure on the use of equipment this may result to over utilization which could lead to breakdown of such item of equipment. Similarly, Awoniyo (1999) reported that the availability of resource input into the education system has no value for achieving educational objectives if they are not actually put to use. This is necessary because once the facilities are misused, they cannot offer the best service required. Ertan et al., (2010) note that effective utilization of IWB eliminate the spaces occupied by bookshelves in the classroom, by granting students access to and use of thousands of electronic books and academic materials stored on the teachers' computers.

Available literatures shows that there is limited use of interactive whiteboards for teaching and learning. According to Ibrahim et al., (2023) lecturers of public tertiary institutions in Sokoto State, Nigeria did not have access to IWB for teaching and learning. Similarly, Lawrence and Naghdipour (2013) established that the overall usage of IWBs is very minimal with four IWBs being the largest amount installed in any one university in northern Cyprus. According to Onu, Ugwoke, Agboeze, and Ikehi, (2014), established that interactive whiteboard Technology (IWT) is poorly utilized by the lecturers, and many lecturers in the studies universities lack the skills for effective use of interactive whiteboard technology, in the South-Eastern Universities in Nigeria. Gambari, Balogun, and Alfa, (2014) maintain that there are problems of

availability, accessibility and usability of the Interactive Whiteboard (IWB) in Nigeria. Interactive Whiteboards were also found not accessible and utilized by most instructors even in the developed world (Stephen, 2016; Benoit 2018).

In a developing nation like Nigeria there are challenges that impedes the utilization of new technologies like interactive whiteboard. The challenges includes limited availability of IWB, technophobia by some lecturers, reorient/recalibrate (Calibration), freezing’ or ‘crashing, lack of adequately trained and qualified teacher’s, inadequate ICT infrastructure, inadequate funding, lack of access to utilize ICT resources and power failure. Romina, (2014) laments that incessant power failure in Nigeria is a serious impediment to the implementation of ICT integration in educational activities. According to Onojetah, (2012), inadequate ICT infrastructure, inadequate funding, acute shortage of manpower, lack of access to utilize ICT resources at will and non-availability of computer laboratories are constraints to teaching ICT in education systems. Based on the aforementioned, the study therefore focused the availability and utilization of interactive whiteboard among university lecturers in Katsina State, Nigeria.

Research Questions

The following research questions were raised to guide the study:

4. What is the extent of availability of interactive whiteboard (IWB) in universities of Katsina State, Nigeria?
5. What is the lecturers’ perceived usefulness of interactive whiteboard (IWB) in universities of Katsina State, Nigeria?
6. What are the challenges faced by lecturers in using interactive whiteboard (IWB) for instructional purposes in universities of Katsina State, Nigeria?

Research Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

HO₁: There is no significant difference in the availability of interactive whiteboard (IWB) among universities in Katsina State, Nigeria.

HO₂: There is no significant difference on lecturer’s perceived usefulness of interactive whiteboard (IWB) for instructional purposes among universities in Katsina State, Nigeria.

METHODOLOGY

The study adopts survey research design in order to address the research problem. This is because the research fulfils some of the characteristics of Survey research which are: represents a wide target population, generates numerical data, provides descriptive, inferential and explanatory information, manipulates key factors and variables to derive frequencies (the numbers registering a particular opinion or test score), gathers data which can be processed statistically, and Usually relies on large-scale data gathering from a wide population in order to enable generalizations to be made about given factors or variables among others (Cohen, Manion, & Morrison, 2017). The target population of this study is one thousand seven hundred and twenty-four (1,724) lecturers from three universities in Katsina State, Nigeria.

Table 1: Population of lecturers in Universities of Katsina State, Nigeria

University	Number of lecturers
University A	825
University B	584
University C	315
Total	1,724

Source: Universities’ MIS (2025)

University A, has a total of eight hundred and twenty-five (825) lecturers while the University B has a total of five hundred and eighty-four (584) lecturers and University C has a total number of three hundred and fifteen (315) lecturers. The total population of this study therefore is one thousand seven hundred and twenty-four (1,724) lecturers.

The sample of this study is six hundred and sixty-four (664) lecturers from three Universities in Katsina State, Nigeria. The sample is the subset of the larger population from which data for the study is to be collected. To determine the sample size of lecturers for this study, a random sampling technique was used. Random sampling technique is the selection of individual randomly from the population, in which all have an equal chance of being selected from the population.

Table 2: Sample from the Population of lecturers in Universities of Katsina State, Nigeria.

University	Sample Frame	Sample Size
University A	825	261
University B	584	232
University C	315	171
Total	1,724	664

The sample of lecturers was taken from the three Universities randomly making a total number of six hundred and sixty-four (664) respondents using research advisor (2006). According to Asuzu, (2015) sample is a portion of a study population of interest selected in such a way that it is complete representative of that study population and so, inference data obtained from it will be as true as if the entire population had been studied.

Instrumentation

The first instrument was adapted from Idris (2018) titled Availability and Utilisation of Interactive Whiteboard for Instructional Purposes Questionnaire (AUIWBIPQ) was used for data collection. The questionnaire was used to assess the availability and lecturer’s perceive usefulness and challenges of using interactive whiteboard for instructional purposes. The questionnaire had three (3) section A, B and C. Section A: contain eight (8) items designed to elicit information from the respondents about availability of Interactive whiteboards in their institutions. Section B: contain seventeen (17) items designed to elicit information from the respondents on the perceive usefulness of Interactive Whiteboard. Section C: had seventeen (17) items designed to elicit information from the respondents about challenges facing by lecturers for effective utilization of Interactive Whiteboard for instructional purposes. A reliability coefficient index of 0.82 using cronbach’s Alpha was obtained from a pilot study conducted at university of transportation Daura. This is in line with the proposition of Fulekar, (2009) “an instrument is said to be reliable when the reliability co-efficient can be approximated to one (1).” Thus, this instrument can be said to be satisfactory for use in the study.

Secondly, an observation checklist was used to elicit information from the institutions about the availability of Interactive Whiteboard in universities of Katsina State, Nigeria. The researcher used the checklist in observing the availability of Interactive Whiteboard in the universities under study. The checklist used three Likert scale under the following keys: highly Available = (3), Not Available = (0) and Not Adequately Available = (2). The checklist had two (2) section A and B. Section A: contain Background Information of the university. Section B: contain four (4) items designed to elicit information about the availability of Interactive Whiteboard in the institution.

PRESENTATION OF RESULTS

Research Question 1: *What is the extent of availability of interactive whiteboard (IWB) in universities of Katsina State, Nigeria?*

Table 3a: Response of Lecturers on the availability of interactive whiteboard (IWB)

S/N	Items	Mean	SD	Decision
1	Interactive whiteboards are available in your institution.	2.32	0.78	Disagree
2	Interactive whiteboards software are installed in the IWBs in our institution.	2.25	1.44	Disagree
3	Interactive whiteboards are available for instructional purposes in your institution.	2.68	1.28	Agree
4	Interactive whiteboards are adequately place/fixed in lecture rooms/theatres.	1.93	1.07	Disagree
5	There is a special academic department dedicated to the pedagogical use of Interactive whiteboards in your institution.	2.06	1.00	Disagree
6	There is adequate internet services available in my university	2.54	1.22	Agree
7	The internet services in my university is fast, efficient and always accessible	2.03	1.30	Disagree
8	Lecturers can easily get access to all the lecture rooms/theatres equipped with interactive whiteboard	2.80	1.00	Agree
Cumulative Mean		2.33		Disagree

Decision mean=2.5

Data from table 3a shows the response of lecturers on the availability of interactive whiteboard (IWB) universities of Katsina state, Nigeria. As observed, majority of the respondents are not in agreement that interactive whiteboard (IWB) are available in their institutions. Five (5) out of the eight items (item 1,2,4,5&7) had a mean score less than 2.50 which indicate disagreement in the availability of IWB, with only three (3) in agreement (item 3,6 & 8) having the average mean above 2.50. Moreover, the cumulative mean of lecturers' responses on the availability of interactive whiteboard was 2.33 which fall short of the decision mean of 2.50.

Table 3b Observation using checklist on the availability of interactive whiteboard (IWB)

SN	Items	Mean	SD	Decision
1	Interactive whiteboard available in the university	1.03	0.00	Disagree
2	Interactive whiteboards for instructional purposes	1.30	0.00	Disagree
3	Interactive whiteboards available for other purposes	1.01	0.00	Disagree
Cumulative Mean		1.11		Disagree

Decision mean=2.0

Table 3b shows the observation using checklist on the availability of interactive whiteboard (IWB) in universities of Katsina state. It was observed that interactive whiteboard are Not adequately available in the universities. The cumulative mean of 1.11 was below the decision mean of 2.00.

Research Question 2: *What is the lecturers' perceived usefulness of interactive whiteboard (IWB) in universities of Katsina State, Nigeria?*

Table 4: Responses of lecturers on perceived usefulness of interactive whiteboard (IWB)

S/N	Items	Mean	SD	Decision
1	Application of interactive whiteboard (IWB) enhances instructional delivery.	3.22	1.17	Agree
2	Effective utilization of interactive whiteboard (IWB) ensures accuracy in lecture presentation.	2.82	1.20	Agree
3	Effective utilization of interactive whiteboard (IWB) ensures time management in delivering lectures.	2.77	1.26	Agree
4	Applications of interactive whiteboard (IWB) motivate lecturers in instructional delivery.	2.91	1.06	Agree
5	Interactive Whiteboard (IWB) as a tool promotes effective instructional delivery.	3.04	0.81	Agree
6	Adequate utilization of interactive whiteboard (IWB) in instructional delivery enhances the outcome of learning.	3.46	1.31	Agree
7	Effective utilization of interactive whiteboard (IWB) motivates lecturers in instructional delivery.	3.09	1.12	Agree
8	Effective utilization of IWB facilitates classroom management	2.43	1.00	Disagree
9	Effective utilization of IWB facilitates discussions on the content in classroom presentation.	2.79	1.21	Agree
10	Effective utilization of IWB encourages interaction and collaboration.	2.76	1.20	Agree
Cumulative Mean		2.93		Agree

Decision mean=2.5

Table 4 shows the response of lecturers on the perceived usefulness of interactive whiteboard (IWB) universities of Katsina state, Nigeria. It was observed that most of the respondents are in agreement that interactive whiteboard is useful in instructional delivery. Nine (9) out of the ten (10) items had a mean score above 2.50 indicating agreement in the perceived usefulness of IWB, with only one (1) item having a mean score of 2.43 which falls below the decision mean of 2.50. Meanwhile, the cumulative mean of lecturers' responses on the perceived usefulness of interactive whiteboard was 2.93 which is above the decision mean of 2.50.

Research Question 3: *What are the challenges faced by lecturers in using interactive whiteboard (IWB) for instructional purposes in universities of Katsina State, Nigeria?*

Table 5: Lecturers' responses on the challenges in utilizing Interactive Whiteboard (IWB)

S/N	Items	Mean	SD	Decision
1	Irregular electric power supply hinders the use of IWB	3.64	1.34	Agree
2	Inadequate skills on how to deliver lectures using an interactive whiteboards	3.06	1.21	Agree
3	Inadequacy of interactive whiteboards in your institution	2.56	1.19	Agree
4	Operational difficulties associated with the interactive whiteboard in our institution.	2.31	1.46	Disagree
5	Lack of confidence in using interactive whiteboard in your institution.	2.01	1.45	Disagree
6	Inadequate facilities to support full application of interactive whiteboard (IWB) in instructional delivery	2.24	1.45	Disagree
7	Inadequate training for lecturers on the use of interactive whiteboard	2.71	1.25	Agree
8	Overcrowded lecture rooms IWB for instructions	2.66	1.15	Agree
9	My course contents are not suitable for IWB presentation	2.93	1.18	Agree
10	Environmental factor such as heat, dust, humanity vibration and mechanical shock.	1.77	1.48	Disagree
Cumulative Mean		2.59		Agree

Decision mean=2.5

Table 5 shows the opinion of lecturers on the challenges in utilizing interactive whiteboard (IWB). It was observed that majority of the respondents are in agreement with the challenges faced by lecturers in the utilization of Interactive Whiteboard (IWB) by the lecturers in universities in Katsina state. Mean scores of respondents indicates that they agree with six (6) out of the ten (10) items (item 1,2,3,7,8 & 9) indicating agreement with the challenges faced in utilizing interactive whiteboard with four (4) items in disagreement (item 4,5,6 & 7). Furthermore, the cumulative mean of 2.59 is above the decision mean of 2.50.

HO₁: There is no significant difference in the availability of interactive whiteboard (IWB) among universities in Katsina State, Nigeria.

Table 6: Kruskal-Wallis' result on the availability of interactive whiteboard (IWB) for instructional purposes

Test Variable	Institution	N	Mean Rank	df	P-value
Availability of IWB	University A	261	117.15	2	.007
	University B	232	121.00		
	University C	171	103.94		
	Total	664			

According to table 6, the p-value of 0.07 > 0.05 threshold of significance indicating no significant difference in the responses of lecturers on the availability of interactive whiteboard for instructional purposes. This shows that irrespective of respondent's institution their mean ratings on availability of interactive whiteboard (IWB) is not significantly different. Therefore the null hypothesis which state that there no significant difference in the availability of interactive whiteboard (IWB) among universities in Katsina State, Nigeria is hereby retained.

HO₂: There is no significant difference on lecturer's perceived usefulness of interactive whiteboard (IWB) for instructional purposes among universities in Katsina State, Nigeria.

Table 7: Kruskal-Wallis' result on the perceived usefulness of interactive whiteboard (IWB) for instructional purposes

Test Variable	Institution	N	Mean Rank	df	P-value
Perceived usefulness of IWB	University A	261	122.00	2	.012
	University B	232	131.02		
	University C	171	118.13		
	Total	664			

From table 6, the p-value of 0.12 > 0.05 threshold of significance. This is indicating no significant difference in the responses of lecturers on the availability of interactive whiteboard for instructional purposes in their institutions. This shows that irrespective of respondent's institutions their mean ratings on perceived usefulness of interactive whiteboard (IWB) for instructional purposes is not significantly different. Therefore the null hypothesis which state that there no significant difference in lecturers' perceived usefulness of interactive whiteboard (IWB) for instructional purposes among universities in Katsina State, Nigeria is hereby retained.

DISCUSSION

From the data analysed it was established that interactive whiteboards are not adequately available for instructional purposes in universities of Katsina state, Nigeria. This is in support of the findings of Ibrahim, *et al.* (2023) who established that there is no availability of IWB in the classrooms of public tertiary institutions in Sokoto State, Nigeria and that Interactive whiteboards are not adequately available and not sufficiently utilized. Meanwhile, Gambari, *et al.* (2014) maintain that there are problems of availability, accessibility and usability of the Interactive Whiteboard (IWB) in Nigeria. Similarly, Interactive Whiteboards were also found not accessible and utilized by most instructors even in the developed world (Stephen, 2016; Benoit 2018).

Similarly, it found no significant difference in lecturers perceived usefulness of interactive whiteboard for instructional purposes in Katsina state universities. Lecturers perceived interactive whiteboard as useful

tool for instructional delivery which motivates them and enhance instructional delivery. This is in agreement with the findings of Chen and Tsai (2013) who found that using the interactive whiteboard in the lower grades increases the students' interest in reading at school and improves their level of literacy. Additionally, Genesi, (2009), posits that many teachers perceived IWB as a powerful, extra resource to support their teaching. The IWB allowed them to be more creative with their lesson presentations classroom organisation and time management. Moreover, Jang and Tsai, (2012) holds that using IWBs can easily get students' attention and help them to concentrate on learning, help teachers explain complex and abstract concepts and making teaching process smoother and effective. However, Ugwoke, *et al*, (2014), established that interactive whiteboard Technology (IWT) is poorly utilized by the lecturers, and many lecturers lack the skills for effective use of interactive whiteboard technology, in the South-Eastern Universities in Nigeria.

Furthermore, it was established that irregular power supply, inadequate supply of IWB and overcrowded lecture rooms were the major challenges of using interactive whiteboard for instructional purposes among universities in Katsina state. This is in line with the findings of Romina, (2014) who laments that incessant power failure in Nigeria is a serious impediment to the implementation of ICT integration in educational activities. Similarly, Onu, et al, (2014), established that interactive whiteboard Technology (IWT) is poorly utilized by the lecturers, and many lecturers in the universities lack the skills for effective use of interactive whiteboard technology, in the South-Eastern Universities in Nigeria. Gambari, Balogun, and Alfa, (2014) maintain that there are problems of availability, accessibility and usability of the Interactive Whiteboard (IWB) in Nigeria. Meanwhile, Onojetah, (2012), posits that inadequate ICT infrastructure, inadequate funding, acute shortage of manpower, lack of access to utilize ICT resources at will and non-availability of computer laboratories are constraints to teaching ICT in education systems.

CONCLUSION

Based on the outcome of the study, it was concluded that:

- i. Interactive whiteboard were not adequately available for instructional purposes among universities in Katsina state, Nigeria.
- ii. Lecturers perceived interactive whiteboard as a useful tool for instructional delivery which motivates them and enhance instructional delivery.
- iii. irregular power supply, inadequate supply of IWB and overcrowded lecture rooms were the major challenges in the utilization of interactive whiteboard for instructional purposes among universities in Katsina state.

RECOMMENDATIONS

In line with the findings of this study, the following recommendations are made:

- i. Government should increase the funding of education with emphasis on ICT infrastructure in Universities.
- ii. There should also be continuous and periodic training and retraining through workshops and seminars for lecturers on the use of interactive whiteboard (IWB) for instructional purposes in universities.
- iii. Adequate power supply with alternative sources should be put in place in universities to facilitate the use of interactive whiteboard (IWB) for instructional purposes.

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