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# Usage of Interactive Whiteboard among Postgraduate Student-teachers in the 21st Century Classroom

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***Abstract:*** *The survey study examined postgraduate student-teachers' use of Interactive Whiteboard (IWB) in the Department of Curriculum Studies and Educational Technology, University of Port-Harcourt. A sample of 111 postgraduate student-teachers was chosen for the study using purposive sampling technique. Two research questions were answered and one hypothesis tested at significance level of 0.05. A 19 items questionnaire titled 'Questionnaire on Postgraduate Student-teachers Use of IWB (QPSUIWB)' served as the instrument that was used in the study. Analysis of collected data was done using mean and standard deviation and the hypothesis was tested with Z-test. The results revealed that postgraduate student-teachers have used IWB during their lessons, however, in a limited number of ways compared to its actual ways of usage; and computer illiteracy, lack of training programs in the use of IWB in their school, inadequate knowledge and skills in using IWB, etc, did not serve as obstacles that hindered their use of IWB in the 21st century classroom. One of the recommendations made based on the findings was that student-teachers should be adequately trained to use IWB for different purposes (especially, to accommodate learners of diverse learning styles) during learning activities in their future classrooms.*

***Keywords:*** *Digital teaching/learning tools, 21st century classroom, and technological knowledge and skills.*

## I. Introduction

The education sector, just like other sectors of the economy, in this 21st century, is continuously witnessing the introduction of many new technologies, with many schools and classrooms (especially in the developed country) being equipped with modern Information and Communication Technology (ICT). With these digital tools in today's classroom, the teachers have no greater choice rather than acquainting themselves with the right knowledge required for their proper utilization in ways that will bring the expected learning experience in the 21st century learners. However, if these tools are not adequately utilized in the classroom practices, the purpose of having them installed will be jeopardized. Undoubtedly, ICT can effectively support teaching and learning, however, its mere introduction into the classrooms cannot do the job rather, there is need for pedagogical, content and technical expertise on the part of teachers in order to bring the required students' transformation in this technological rich generation.

According to SER (1997) cited in Victor (2013) ICT, generically, means all technologies used for collection, storage, edition and passage of information in diverse ways. ICT integration into teaching/learning can therefore be regarded as the incorporation of different technological resources (both hardware and software) such as interactive whiteboards, computers, Internet, CDs /DVDs, search engines, digital libraries, web 2.0 technologies, projectors, cameras, mobile and handheld devices; and techniques such as word processing, spread sheet programming, knowledge construction and sharing using the internet facilities, etc, into the pedagogical processes. The advantages of integrating ICT into teaching and learning processes cannot be overemphasized. Evidence has shown that ICT has unique features that can facilitate collaboration and communication, enhance creativity, help in the creation of mental picture of difficult concepts and duplication of documents, offers flexibility, diversity during learning and multimedia effect of concepts, (Victor, 2013).

Among the ICT tools, the interactive whiteboard has captured the interest of many educators, possibly due to its ability to bring different technologies together and interacting with them to transform students' learning experience right in the front of a classroom. IWB is an electronic board with touch-screen sensitivity and serves as a replacement for classroom's conventional black and white boards and simple computer screen projection. BBC Active (2010) pointed out that an interactive whiteboard serves as an instructional tool that could be used to display computer images onto a board when a digital projector is connected to the computer. IWB thus displays images of the computer screen only when in connection to a projector and computer, allowing users to interact with the computer and other technologies from the board.

With the help of numerous incorporated IWB components such as pen and highlighter, browsers, shape, page recorder, eraser, interactive authoring, drag and drop, text, screen-shade/blind/revealer, screen capture tools, etc; IWB has the potentials of revolutionizing the classrooms by improving teaching/learning quality; making learning interesting, interactive, engaging and motivating; and facilitating learning in learners of

different abilities, age and learning styles in the learning process. BBC Active (2010) remarked that using interactive whiteboards as one of the pedagogical tools enhances creativity in teaching and help learners in absorbing information easily …., and allow teachers to accommodate all different learning styles of students. All these however, depend largely on ways by which teachers are able to utilize the IWB in the classroom. Bupphachart (2009) posits that teachers can help students adapt to the 21st century context only when they are able understand, acquire, and utilize those skills by themselves.

Nevertheless, teachers can only use IWB technology in the classroom, when everything that may enhance adequate utilization is put in place. These involve provision of workstation equipped with technology gadgets (such as interactive whiteboards, computers, projectors, etc), training personnel, making IWB technology integration part of teachers training education curriculum, etc. Effective utilization of IWB demands adequate time allocation, pedagogical and technical training, teachers' self learning and self confidence in the use of IWB, good network connections, dependable infrastructure, etc, (Campbell, 2010 cited in Ishtaiwa & Shana, 2011). Thus, inability to address the fundamental requirements to IWB technology integration in the classroom may pose great challenges to teachers' integration of IWB technology into the classroom.

Related studies on classroom utilization of IWB have been conducted by some previous researchers. For instance, Bennett and Lockyer (2008) examined teachers' IWB integration into classrooms in Australian primary school and found among others that teachers used a variety of pedagogical approaches which were in line with those they often used in their teaching when using the IWBs. Al-Faki and Abdelmoneim (2014) investigated the challenges faced by teachers when using IWB during English language classes in Saudi contexts and unveiled that many difficulties which were grouped as school administrations', teachers'/students' and technical support's factors, were experienced by teachers when using IWB. In the same vein, Ishtaiwa and Shana (2011) investigated the effect of using IWB to promote the teaching and learning of Arabic language by pre-service teachers, looking among others, at the obstacles in using IWB as presumed by pre-service teachers; found out that insufficient time for the preparation and usage of IWB, inadequate training programs, inadequate knowledge and skills in integrating IWB, etc, are major the obstacles in using IWB perceived by Arabic pre-service teachers.

Based on the researchers' knowledge and the above cited studies, little or no empirical studies has been conducted to examine ways that teachers in Nigerian schools can use the IWB. Against this backdrop, the researchers conceived the idea of studying how postgraduate student-teachers use interactive whiteboard in the 21st century classroom.

**Statement of Problems**

IWB whiteboard has become a common teaching/learning tool in most of the classrooms in the developed countries. Some schools in developing countries like Nigeria have it installed in some strategic places likes the instructional laboratories or libraries while others are yet to see the need of having it installed. However, having this IWB installed just as a glorified structure either in the classroom or any other places within the school environment cannot help to transform students' learning experience; rather it has to be used in many creative ways so as to optimize its full potentials in transforming teaching/learning experiences. Thus, the various ways in which postgraduate students in the Department of Curriculum Studies and Educational Technology in University of Port-Harcourt, who have undergone training in the use of digital teaching/learning tools (especially, the IWB) in their Media Production course (EDU 514.2) during the postgraduate program, can use this IWB have not been well understood.

The problem of this study therefore is to discover the different ways that postgraduate students can use IWB and the possible obstacles that may hinder them from using it in the 21st century classroom.

**Aim and objectives of the study**

The main aim of this study was to ascertain the extent to which post-graduate student-teachers use interactive whiteboard in the 21st century classroom.

Specifically, the study sought to:

1. Discover the ways in which postgraduate student-teachers use IWB in the 21st century classroom.
2. Find out the obstacles that may hinder postgraduate student-teachers' use of IWB in the 21st century classroom.

**Research questions**

1. In what ways do post-graduate student-teachers use IWB in the 21st century classroom?
2. What are the obstacles that hinder post-graduate student-teachers' use of IWB in the 21st century classroom?

**Null Hypothesis**
There is no significant difference in the mean score of male and female post-graduate student-teachers in ways they use IWB and the obstacles that may hinder them from using it in the 21st century classroom at significance level of 0.5.

## II. Methodology

The study used a descriptive survey and discovered how Postgraduate student-teachers in Curriculum Studies and Educational Technology department, University of Port-Harcourt, in 2014/2015 academic session, are using IWB in the 21st century classroom. The sample size comprised of 111 postgraduate student-teachers who were selected using purposive sampling technique, (source of population figure: Departmental record of the Curriculum Studies and Educational Technology). A questionnaire with a title; Questionnaire on Postgraduate Student-teachers Use of IWB (QPSUIWB) and 19 items, created by the researchers formed the study's instrument. A modified Likert scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) formed the instrument's items response level, weighting 4, 3, 2 and 1 points respectively, with average of 2.50. Experts in Curriculum Studies and Educational Technology, and Measurement and Evaluation Departments validated the instrument using face and content validation, with the researchers effecting the corrections made on the final draft of the instrument. Test re-test method was used in conducting the reliability test while the Pearson's Product Moment Correlation Coefficient was used to get the reliability coefficient of 0.78. Descriptive statistics and Z-test (at $P < 0.05$) were used to analysis data based on the research questions and hypothesis respectively. The mean criteria level was 2.50 or above was used for the item statement's agreement while 2.49 or below stands for item statement's disagreement.

## III. Results

**Research Question 1:** In what ways do post-graduate student-teachers use IWB in the 21st century classroom?

**Table 1:** Mean Analysis of the ways post-graduate student-teachers use IWB in the 21st century classroom?

| Items | SA | A | D | SD | Mean | SD | Decision |
|---|---|---|---|---|---|---|---|
| 1. I have never used IWB during my lesson | 27 | 12 | 36 | 36 | 2.27 | 1.15 | Disagreed |
| 2. I use IWB to showcase my presentation to the whole class | 28 | 35 | 22 | 26 | 2.59 | 1.10 | Agreed |
| 3. I use IWB to record learning sessions | 8 | 35 | 36 | 32 | 2.17 | 0.93 | Disagreed |
| 4. I use IWB to access web-based materials | 15 | 39 | 28 | 29 | 2.36 | 1.01 | Disagreed |
| 5. I use IWB to share learning materials with my peers | 15 | 27 | 31 | 38 | 2.17 | 1.05 | Disagreed |
| 6. I use IWB to accommodate learners of differ learning styles | 15 | 23 | 35 | 38 | 2.14 | 1.04 | Disagreed |
| 7. I use IWB to collaborate with my course mates | 27 | 34 | 25 | 25 | 2.57 | 1.09 | Agreed |
| 8. I use IWB to make my lesson more visual | 35 | 38 | 16 | 22 | 2.77 | 1.09 | Agreed |
| 9. I use IWB to make my lesson interactive | 40 | 33 | 12 | 26 | 2.78 | 1.17 | Agreed |
| 10. I use IWB as a mere projector screen | 22 | 30 | 23 | 36 | 2.34 | 1.13 | Disagreed |

Table 1 revealed that post-graduate student-teachers disagreed with item 1, 3, 4, 5, 6 and 10 with mean value of 2.27, 2.17, 2.36, 2.17, 2.14 and 2.34 respectively and agreed with items 2, 7, 8 and 9 with mean value of 2.59, 2.57, 2.77 and 2.78 respectively, as the ways in which they use IWB in the 21st century classroom.

**Research Question 2:** What are the obstacles that may hinder post-graduate student-teachers' use of IWB in the 21st century classroom?

**Table 2:** Mean Analysis of the obstacles that may hinder post-graduate student-teachers' use of IWB in the 21st century classroom

| Items | SA | A | D | SD | Mean | SD | Decision |
|---|---|---|---|---|---|---|---|
| 1. I am not computer literate | 9 | 5 | 45 | 52 | 1.74 | 0.88 | Disagreed |
| 2. There is no training programs in the use of IWB in my school | 32 | 14 | 30 | 35 | 2.39 | 1.20 | Disagreed |
| 3. I don't have knowledge and skills in the use of IWB | 21 | 18 | 32 | 40 | 2.18 | 1.12 | Disagreed |
| 4. There is no manual on how to apply IWB in teaching in my school library | 13 | 22 | 33 | 43 | 2.05 | 1.03 | Disagreed |
| 5. There is no technical support in solving technology problems in my school | 13 | 18 | 51 | 29 | 2.14 | 0.93 | Disagreed |
| 6. I don't have time to learn how to use IWB | | 9 | 46 | 56 | 1.58 | 0.64 | Disagreed |
| 7. There is no provision to learn the use of IWB in my course curricula. | 11 | 18 | 50 | 32 | 2.07 | 0.92 | Disagreed |
| 8. I am afraid of using IWB | 1 | 5 | 42 | 63 | 1.49 | 0.63 | Disagreed |
| 9. I don't have interest in using technology to teach | 1 | 5 | 32 | 73 | 1.41 | 0.62 | Disagreed |

Table 2 showed that post-graduate student-teachers disagreed with all the items (items 1 2, 3, 4, 5, 6, 7, 8, and 9) with mean value of 1.74, 2.39, 2.18, 2.05, 2.14, 1.58, 2.07, 1.49 and 1.41 respectively, as obstacles that may hinder their use of IWB in the 21st century classroom.

**Null Hypothesis:** There is no significant difference in the mean score of male and female postgraduate student-teachers in the ways they use IWB and the obstacles that may hinder them from using it in the 21st century classroom.

**Table 3:** Z-test analysis of mean score of male and female postgraduate student-teachers

| | No of Respondents | $\bar{X}$ | SD | Df | $Z_{calculated}$ | $Z_{critical}$ | Result |
|---|---|---|---|---|---|---|---|
| **Male** | **36** | **2.20** | **0.99** | **109** | **0.37** | **1.98** | **Not Significant** |
| **Female** | **75** | **2.13** | **0.97** | | | | |

Table 3 revealed that there is no significant difference in the mean score of male and female postgraduate student-teachers in ways they use IWB and the obstacles that may hinder their use of IWB in the 21st century classroom; since the Zcalculated (0.37) is less than Zcritical (1.98) at df. of 109 and 0.05 level of significance. Therefore, the null hypothesis is accepted.

## IV. Discussion Of Findings

Table 1 finding showed that post-graduate student-teachers disagreed that they have never used IWB during their lesson, used IWB to record learning sessions, access web-based materials, share learning materials with their peers, accommodate learners of differ learning styles, and as a mere projector screen; rather agreed that the ways in which they use IWB in the 21st century classroom include; to showcase presentations to the whole class, collaborate with their course mates, make lesson more visual and interactive. This result implies that even though postgraduate students-teachers have used IWB during their lessons, they can only use it in a limited number of ways as compared to many different ways that IWB could be fully utilized in the classroom. It therefore indicates that these students have not really understood the affordances of IWB and techniques behind its utilization as teaching/learning tool. This finding is inconsistent with that of Bennett and Lockyer (2008) who found that teachers used a variety of pedagogical approaches which were in line with those they often used in their teaching when using the IWBs.

In table 2, the finding revealed that the post-graduate student-teachers disagreed that the following, which include; computer illiteracy, lack of training programs in the use of IWB in their school, inadequate knowledge and skills in using IWB, not having manual on how to apply IWB in teaching in the school library, inadequate technical support on how to solve technology problems, shortage of time to learn how to use IWB, no provision to learn the use of IWB in their course curricula, being afraid of using IWB and lack of interest in using technology to teach are obstacles that hindered their use of IWB in the 21st century classroom. This finding is so because these post-graduate student-teachers are in digital age and must have acquired some technological knowledge and skills. In addition, the Department of Curriculum Studies and Educational Technology, used as the study area has IWBs installed in her Information and Communication Technology Centre (ICTC) and Center for Innovation and Instructional Technology (CIIT), and every other things put in place to help postgraduate student-teachers learn the use of IWB and other digital tools during their study program; thus, these factors could not serve as hindrances to their use of IWB in 21$^{st}$ century classroom. This finding disagrees with that of Ishtaiwa and Shana (2011) whose study revealed among others that insufficient time for the preparation and usage of IWB; inadequate training programs; inadequate knowledge and skills in integrating IWB; are key challenges seen by Arabic pre-service teachers in using IWB.

As revealed in table 3, no significant difference existed in the mean score of male and female postgraduate student-teachers in the ways they use IWB and the obstacles that may hinder them from using it in the 21st century classroom. This result implies that postgraduate student-teachers can use the IWB in the same way irrespective of their genders.

## V. Conclusion

Post-graduate student-teachers have used IWB during their lesson for showcasing their presentations to the whole class, collaborating with their course mates and for making lesson more visual and interactive; however, they have never used it to record learning sessions, access web-based materials, share learning materials with their peers, accommodate learners of differ learning styles, and as a mere projector screen. Although, they were not hindered from using IWB by computer illiteracy, lack of training programs in the use of IWB in their school, inadequate knowledge and skills in using IWB, inadequate technical support on how to solve technology problems, shortage of time to learn the use IWB, etc.

## VI. Recommendations

- Schools that already have training programs in the use of IWB and other technologies in their curricula should ensure that such programs are made compulsory to all students-teachers.
- Student-teachers should be adequately trained to use IWB for different purposes (especially, to accommodate learners of diverse learning styles) during learning activities in their future classrooms.
- Student-teachers should not always depend on their educators before they can learn the use of new technologies like IWB since they have some basic technological knowledge and skills.

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