EFFECTS OF WEB BASED, INTERACTIVE WHITEBOARD AND POWERPOINT ON ACADEMIC OUTCOME OF LIBRARY AND INFORMATION SCIENCE UNDERGRADUATE STUDENTS IN NIGERIAN UNIVERSITIES

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Abstract
This study explored on the Effect of Web Based, Interactive Whiteboard and PowerPoint on the Academic Achievements on Library and Information Science Undergraduate Students in Nigerian Universities. Research question was raised based on the objective of the study, is there any difference in the interactions between academic achievements, academic interest and retention of LIS students taught using the three pedagogies in Nigerian Universities? A null hypothesis tested at P< 0.05 level of significance. Quasi experiment research design was adopted. It was a pre-test, post-test, non-randomized experimental and control groups. Population of study constituted of 1018 undergraduate students of LIS in five (5) Universities in North-Western States Nigeria. Purposive sampling and intact classes were used. Four universities, consisting 900 undergraduate students were used in this study. Two Instruments were uses for data collection; Treatment WEBIP, IWB & PPP and Test Instrument LISAT & LISRT vs (LISAAT) consists of fifty multiple choice questions. Content validated was ensure by experts and specialists from the Universities. Instruments were trial tested at one of the Universities in the North-western Geo-Political Zone, (which was not part of study sample). Instrument were trial-tested. Reliability coefficient of 0.92 was obtained using Kuder-Richardson (KR - 21). While interest questionnaire obtained 0.89 using Cronbach Alpha. Data was analyzed viz descriptive and inferential statistics. Findings revealed that, the three experimental group of Web-based, Interactive Whiteboard and PowerPoint show the same level of academic outcomes. Conclusion and recommendations were made that, stakeholders in university educations should make tremendous efforts to ensure adoption of ICT and the integration of technology pedagogies in their lecture/classrooms.
Keywords: Technology Integrated pedagogies, Academic achievements, Interest and Retention and Industry

Introduction

Despite the long-standing interest in educational technology reforms, educators and researchers have found that it has been difficult to incorporate information and communication technology (ICT) in educational industries despite it benefits. Where most ICT projects, particularly in the university educational lecture/classrooms, are limited by the integration between pedagogy and technology. However, the integration of ICT in educational industry can take a different form for a different purpose ranging from technologizing education to transforming lecturer/classroom instructions. The transformative uses of ICT can support educational industry and its classroom instructional reform initiatives that are most challenging. Such uses of ICT in the lecturer/classroom instructions can also constitute the core concern in the Nigerian policies and practices to support the teaching and learning of library and information science for ICT integration in pedagogical strategies. Therefore, based on a worldwide study of ICT-supported pedagogical innovations, changes could be identified in curriculum goals, roles of lecturers/teachers and learners, assessing learning outcomes and the connectedness of lecture/classrooms instructions. However, universities in Nigeria are considered to have sufficient ICT resources for teaching and learning in 21st century lecture/classrooms instructions and are assumed to be leaders in technology integration in the Nigeria education industry pedagogy not minding other short comings. More so that, Information and Communication Technology (ICT) offers opportunities for governments in developing countries (Nigeria) to address key education challenges of quality, efficiency, equity and effectiveness. Where governments and educational industries in developed countries may have taken up these opportunities, other developing countries in Africa (Nigeria) have often missed them out. Although, this may be due to countries' socio-economic settings, approaches towards design and implementation of the ICT in education plan, and investment on education, research and development of ICT in education practically for lecture/classroom instruction. Regardless of its efficiency and effectiveness for lecture/classroom instructions(Janelle & Cox, 2016).

Technology can be described as a systematic process of portraying and analyzing problems; conceiving, controlling, implementing, accessing, managing and evaluating solutions to problems. Kaur, (2019) argues that, technology includes systems organizational patterns, procedures, various forms of analysis, research and development. Ghavifekr, Abd-Razak and Ghani, (2017) also describe technology in a teaching framework as a multifaceted, opines that, the integrated process involving devices, procedures and people in situations in that learning is purposive and controlled. Technology as used in facilitating human teaching and learning through the systematic identification, development, organization and utilization of a full range of learning recourses and through the management of these recourses. The operation of technology as students in university educational institution requires a new learning environment, also as the use of technology integration is at the core centre in the teaching and learning process. Therefore, the 21stcentury lecturers should be capable of integrating technology pedagogies to engage their students in technology-based (Web-based, PowerPoint Presentation & Interactive Whiteboard) learning activities in and outside the physical lecture/rooms (Garba, 2017). Pedagogy itself is a challenging concept, but involves activities that evoke changes in the students: Lin, M-C, Wang, P-Y, Lin, I-C (2019) define pedagogy as 'any conscious activity by one person intends to enhance learning in another'. Pedagogy and pedagogue come from the Greek paidos "boy child" and agogos "leader" in Greek "agogos" means" leader" a paidagogos was a slave who led boys to school and back, but also taught them manners and tutored them after school. While after, 'pedagogue" was formed to mean "teacher;" however the word "pedagogy", is still widely used and often means "teaching" Pedagogy is Chigona, (2018) the "how, what and why" the teaching and learning occurs. Pedagogy is a sustained process whereby somebody acquires new forms or develops existing forms of conduct, knowledge, practice and criteria from somebody(s) or something deemed to be an appropriate provider and evaluator'.

Also, technology integration has also been advocating to close the gap between students who are skirmishing with their achievement by providing more ways for teachers to differentiate more accurate support and build upon students' strengths and weaknesses. The role of technology is as a problem-solving tool, allowing teachers to oversee and more closely target students' areas of strengths and weaknesses. The integration of these technologies in socio-economic, political institutions and educational industries, is progressively making human interactions more and more reliant on these technological developments (Japhet & Lawrence, 2018). The rapid development in technology integrated pedagogies especially the Internet, traditional teaching and learning in university education worldwide are undergoing a rapid change in the structure and curriculum content of their study progrommes and instructional delivery methods of their courses. At the other hand Caldwell, (2016) and Danso, (2017) are of a view that, combining new technologies with effective pedagogy has become an overwhelming task for the department of Library and Information Science (LIS) in university education. As technology integrated pedagogies innovations involve a variety of tools such as LCD visual projection, preparation of lecture notes, web-based instruction, videoconferencing, PowerPoint presentation, interactive whiteboard, distance learning and so on. Therefore, integration of technology pedagogies into educational industries can change the way lecturers teach and it is valuable in supporting student-centered approaches to teaching (instruction) and learning, also in developing the higher order skills, promoting and accomplishing collaborative activities among others. However, most university argues of not having adequate knowledge and skills to use technology effectively for pedagogy approaches in the teaching and learning process. While there also seems to be numerous struggles around the world as which universities are effectively using technology to empower teacher librarians, to use technology as tools for enhancing teaching and learning processes in university campus Jung, (2019) and Lin, Wang & Lin, (2019) in order to boost their undergraduate student's academic achievement, interest, retention and so on.

Academic Interest is seen as a pre-determinant of one's perceptions about something or which aspect of the teaching and learning is mostly significant to that person. Academic interest also could be a temporary or permanent feeling of one's preference. In Lin, Wang & Lin, (2019) interest is viewed as a condition in which a person associate the essence of certain things or situations with his/her wants or needs. Although the drive to learning can to an extent be a function of the student's interest in the teaching and learning activity. Also, that depends on the student to decide why he wants to study an activity and engage in the learning activities. In most often a student's successful academic achievement in any teaching and learning activity is based upon the volume of requisite academic information that he has on the learning activity. Academic Interest is the best way to forget academic hardship and make students devote themselves to learning. They are ever willing to try their be stout of each interest. However, once a student becomes interested in a teaching and learning process, they will try to take part in all learning activities that are involved. This could be an interpretation of the students and most significantly, the application of their entire academic information on it which leads to academic retention. Academic Retention is viewed as the repeat

achievement by a student of the behavior than an acquired knowledge which is always intended to elicit in the student (without practice) after an interval of time. Retention is seen as how well an undergraduate student remembers after an interval of time without practice and that is the difference between what is initially learnt and what is later forgotten. Intensified retention and understanding of course concepts might be possible through the use of technology integrated pedagogies (Web-based Instruction, Interaction Whiteboard & PowerPoint Presentation) real-world contexts (Danso, 2017; Ghavifekr, Abd Razak and Ghani, 2017). It is believed that if undergraduate students are able to understand course concepts, their understanding will be more sustained than merely memorizing of data, a list of facts, information and formulas. More so, retaining the course concepts gives the students a strong foundation to build on and is necessary to be efficient in learning new course concepts and eventually to the work force. Significantly the use of technology integrated pedagogies should be encouraged as it gains the favorur of information and communication technology (ICT), as lecture room is for learning and what is learnt should be remembered. Therefore, what has been learned is needed for everyday life, carrier and for further education.

A problem is generally considered to be a task, a situation, or person which is difficult to deal with or control due to complexity and in transparency. A problem is considered to be a matter which is difficult to solve or settle, a doubtful case, or a complex task involving doubt and uncertainty. While Prospect is an outlook, anticipation, foretaste mean an advance realization of something to come. Prospects implies expectation of a particular event, condition, or development of definite interest or concern. Prospect is from the Latin word prospectus which means a "view or outlook." A prospect is still a way of looking ahead and expecting good things. Therefore, instructional delivery is expected to bring about a well-organized and gradual development or modification of knowledge, attitudes, and skills on the learners. While the traditional face-to-face classroom-based instruction with an instructor seem not to bring about the significant flexibility offered by the use of Educational Technology for the creative, innovative and professionally fulfilled workforce in the 21st century. Using Educational Technology with ICT to meet international best practices in instructional delivery cannot be void of challenges and issues in Nigeria as a developing Country (Chigona, 2018; Kundu & Dey, 2018). The major challenges faced while using ICT included unstable internet connection, lack of training, lack of support from the school. In general, several studies have identified a range of the following or similar factors as widespread barriers: lack of computers, lack of quality software, lack of time, technical problems, teachers' attitudes towards computers, poor funding, lack of teacher confidence, resistance to change, poor administrative (UNESCO, 2018). In order to ensure a more successful implementation of ICT in education, appropriate training on the usage of ICT in teaching should be provided. Although access to information and increased communications capacity bring major benefits to a society. New business opportunities emerge, as do opportunities for education (Frolova, Ryabova & Rogach, 2019). Also access to ICT can broaden opportunities for capacity building and increase workforce productivity. ICT helps teachers to interact with students. It helps in improve Teaching skill, helps in innovative Teaching. It helps in effectiveness of classroom. It also helps in improving professional Development and Educational management as well as enhances Active Learning of teacher Trainees. ICTs can enhance the quality of education in several ways: by increasing learner motivation and engagement, by facilitating the acquisition of basic skills, and by enhancing teacher training. ICTs are also transformational tools which, when used appropriately, can promote the shift to a learner-centered environment (Bindu, 2019).

ICT in education is the mode of education that use information and communications technology (ICT) to support, enhance, and optimise the delivery of information. Worldwide research has shown that ICT can lead to an improved student learning and better teaching strategies. However, Information and communications technology (ICT) is an extensional term for information technology (IT) that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals) and computers as per IFGICT, as well as necessary enterprise software, middleware. Information and communications technology (ICT) is an extensional term for information technology (IT) that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals) and computers, as well as necessary enterprise software, middleware, storage and audiovisual, that enable users to access, store, transmit, understand and manipulate information (Chalich, 2019). The term ICT is also used to refer to the convergence of audiovisual and telephone networks with computer networks through a single cabling or link system. There are large economic incentives to merge the telephone network with the computer network system using a single unified system of cabling, signal distribution, and management. ICT is an umbrella term that includes any communication device, encompassing radio, television, cell phones, computer and network hardware, satellite systems and so on, as well as the various services and appliances with them such as video conferencing and distance learning.ICT is technology that supports activities involving information; such activities include gathering, processing, storing and presenting data. Information and

communication technology (ICT) have become an important source of innovation and improvement of efficiency and effectiveness for many sectors across the globe. In the education sector, the application of ICT has become a critical part of the learning process for university students both outside and inside the classroom setting. The government and other stakeholders in the education industry have invested millions of dollars to adopt ICT in the education system during the last two decades. Most universities are said to have fully adopted ICT have recorded immense advancement in the application of ICT for the improvement of teaching and learning strategies, researching and development. It is, however, not clear what impact the ICT applications have on the academic outcome of students (Bauer&Kenton,2017). ICT adoption in the current study is understood as a gradual switching over to automation of the educational process not only in administrative activities like student's admission, registration, and evaluation but also developing a customized instructional package and transferring all the media resources and services in information work course outline, topics and the related data onto it.

Education Industry has been identified as a vital tool for any form of development be it economic, social or political. It is a factor that determines the state of prosperity sustenance of welfare and security of the people. The yearnings, needs, aspirations as well as the cultural heritage and environment of any society determine, to a large extent the kind of knowledge and skills to be acquired. Therefore, the kind of education operated should bring about skillful development as this will enable the undergraduate students of Library and Information Science to live and contribute meaningfully to educational system and the overall development of the society in which they live. Since government regards education as an instrument par excellence for facilitating and fostering national development as well as economic growth. It is imperative that, the kind of education to be provided should be holistic and wholesome so as to foster national development. Therefore, for any nation to boast of educational development, it should be able to boast of viable and function information and communication technology driven education especially in this fast-changing world where globalization is the order of the day.

Objective of the Study
The major purpose of the study is to determine the effects of Web Based, Interactive Whiteboard and PowerPoint on Academic Outcome of Library and Information Science Undergraduate Students in Nigerian Universities. Specifically, the study objective is to:
1. investigate the level of interactions between academic achievements, academic interest and retention of Library and Information Science undergraduate students taught using the three pedagogical tools in Nigerian Universities.

Research Questions
The following research question is raised and to be answered in this study.
1. Is there any difference in the interactions between academic achievements, academic interest and retention of LIS students taught using the three pedagogies in Nigerian Universities?

Null Hypothesis
The null hypothesisis postulated to be tested at $P < 0.05$ level of significance.
H$_o$1. There is no significant difference in the interactive effect of all the three experimental methods of Web Based, Interactive Whiteboard and PowerPoint on the academic achievements of undergraduate student in Nigerian Universities.

Methodology
The research design adopted for this study was quasi experiment design. It is a pre-test, post-test, non-randomized experimental and control groups. The experimental group was treated with web-based instructional package, Interactive Whiteboard and PowerPoint (WEBIP, IWB & PPP) while the control group was treated with Conventional Board using with same course outline. This consisted of six (6) topics and was also taught within six (6) weeks. The population of study constituted of 1018 undergraduate students of library and information science (LIS) offering LIS as a course in five (5) Universities in North-Western States Nigeria. The target population consist of 200 level undergraduate students and have operational technologies; Interactive whiteboards and computer facilities in 2019/2020 academic season. Purposive sampling and non-randomized techniques, where intact classes were used. Where four universities offering Library and Information Science at 200 level, consisting 900 students were used in this study because it had a required strength of students needed for study and facility to use WEBIP, IWB & PPP. Undergraduate students were placed basis on their scores in pre-test through random assignment. Group A treated as experimental and B as control group. Two Instruments were uses by the researcher for data

collection. These instruments include; Treatment and Test Instrument as the WEBIP, IWB & PPP were adapted vs a test (LISAAT) consists of fifty multiple choice questions based on the six (6) selected Topics of media resources services in information works a 200-level course outline (LISAIQ) which were designed by researcher. All the items were tested on the undergraduates' students in the four universities with eight (8) weeks. To ensure contents validated, computer scientist and programming experts, Instructional Technology specialists, measurement experts and Library and Information Science specialists from the Universities in order to suite LIS undergraduate students in the teaching and learning process, it was modified based on the recommendations. This instrument was trial tested at one of the Universities, (which was not part of study sample), for the purpose of this study. This was done in order to test reliability of the instrument. Thirty-five undergraduate students were used for the pilot study. The instrument was administered twice using a trial-tested method at two weeks' interval. However, a reliability coefficient of 0.92 was obtained using Kuder-Richardson (KR - 21) formula. While the reliability coefficient on interest questionnaire obtained 0.89 using Cronbach Alpha. This value indicated that, the test instrument LISAT and LISIQ were reliable to be used for this study. Data collected for this study was analyzed at two levels, viz descriptive and inferential levels. Using t-test and non-parametric test of Man Whitney statistic.

Results

The results of the analysis provided answers to the two null hypotheses posed as presented in tables ii, iii and iv below:

Question One: What is the difference in the interactive effect of all the three experimental methods of web based, interactive white board and power point on the academic achievement of undergraduate students?

Table ii: Descriptive statistics on web based, interactive white board and power point on the academic achievement of undergraduate students.

Table 1: Analysis of variance (ANOVA) statistics on web based, interactive whiteboard and PowerPoint on the academic achievement of undergraduate students.

ANOVA

		Sum of Squares	Df	Mean Square	F	Sig.
Academic Achievement	Between Groups	598.548	2	299.274	2.145	.118
	Within Groups	109643.599	786	139.496		
	Total	110242.147	788			
Retention	Between Groups	154.269	2	77.135	.992	.371
	Within Groups	61103.574	786	77.740		
	Total	61257.843	788			
Interest	Between Groups	330.631	2	165.315	.539	.584
	Within Groups	241275.197	786	306.966		
	Total	241605.828	788			

Academic achievement (p = 0.118 > 0.05, F computed =2.145 < F critical of 2.60, at df 2)
Retention ability (p = 0.371 > 0.05, F computed =0.992 < F critical of 2.60, at df 2)

Table 2: Descriptive		N	Mean	Std. Deviation	Std. Error
Academic Achievement	Exp1(web-based Instruction)	208	65.2885	12.09677	.83876
	Exp2 (interactive whiteboard)	385	65.9688	11.76657	.59968
	Exp3 (PowerPoint)	196	67.6378	11.58852	.82775
	Total	789	66.2041	11.82798	.42109
Retention	Exp1(web-based Instruction)	208	54.0721	8.87974	.61570
	Exp2 (interactive whiteboard)	385	53.7532	8.60740	.43867
	Exp3 (PowerPoint)	196	54.8418	9.15174	.65370
	Total	789	54.1077	8.81694	.31389
Interest	Exp1(web-based Instruction)	208	76.7356	16.90274	1.17199
	Exp2 (interactive whiteboard)	385	78.1169	18.10140	.92253
	Exp3 (PowerPoint)	196	76.9286	16.99366	1.21383
	Total	789	77.4575	17.51018	.62338

Results of the Analysis of Variance and the descriptive statistics above showed that there is no significant difference in the interactive effect of all the three experimental methods of web based, Interactive Whiteboard and PowerPoint

Presentation on the academic achievement of undergraduate students. Reason being that in each of the test, the calculated p values of 0.118, 0.371 and 0.584 in the Web Based, Interactive Whiteboard and PowerPoint Presentation are each greater than the 0.05 alpha level of significance. The mean Academic achievement scores of experimental 1 (Webb based), experimental 2 (interactive whiteboard) and experimental 3 (PowerPoint) were 65.2885, 65.9688 and 67.6378 respectively. The retention ability means scores of experimental 1 (Webb Based), experimental 2 (Interactive Whiteboard) and experimental 3 (PowerPoint) were 54.0721, 53.532 and 54.8418 respectively. The interest means Rank of experimental 1 (Webb Based), experimental 2 (Interactive Whiteboard) and experimental 3 (PowerPoint) are respectively 76.7356, 78.1189 and 78.9286 respectively. All those showed that each of the three experimental groups of Webb Based, Interactive Whiteboard and PowerPoint produces the same level of academic achievement, interest rank and the retention levels among the undergraduates implying that all the three experiments are effective. Consequently, the null hypothesis which states that there was no significant difference in the interactive effect of all the three experimental methods of web based, Interactive Whiteboard and PowerPoint on the academic achievement of undergraduate students, was hereby accepted and retained. However, the above findings revealed that the three experimental group of Web-based, interactive whiteboard and PowerPoint show the same level of academic achievement at 65.28885, 65.968 and 67.6378 respectively. Retention level are at 54.0721, 53.532 and 54.8418, while interest mean ranks are at 76.7356, 78.1189 and 78.9286 respectively. These results indicate that all the three technology integrated pedagogies are all effective in the teaching and learning of Library and Information Science undergraduate students. However, this was in agreement with the findings of Chigona (2018); Chalich (2019) and Ghavifekr, AbdRazak and Ghani (2017) whom stated that use of technological tools can be used to effectively enhance teaching and learning process on university campus and in order to boost their undergraduate student's academic achievement, retention and interest level as also supported by (Danso, 2017; Janelle & Cox, 2016).

Conclusion
In view of the findings of this study it is sufficient to conclude that the three technology integrated pedagogies (web based, Interactive Whiteboard and PowerPoint) are all effective in the teaching and learning of Library and Information Science undergraduate students. These also had significant effect on the academic achievement, interest and retention of LIS undergraduate students. Therefore, in order to bring a change in teaching and learning in a university, a paradigm shift is required that would be of student-centered approaches. Where it will aim at making the student an active element in the learning process, rather than passive through an adequate and effective guidance from the tutorial team.

Recommendations
However, in order to achieve the learning needs of Library and Information Science undergraduate students:
 i. Library and Information Science lecturers should take a careful look before integrating technology into pedagogical process. Where the content should be taught in differentiated ways, according to students' learning needs, where concepts are difficult to learn. And how technology integrated pedagogies can overcome conceptual challenges in order to boost their academic outcome.
 ii. Lecturers' and students should have knowledge of Problems and Prospects of ICT in Education Industry and try to comprehend how technology integrated pedagogies can be utilized to build on existing comprehensiveness and understanding in order to master new and more complex and advanced teaching and learning content.

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