

**AVAILABILITY AND UTILIZATION OF WEB-BASED TOOLS FOR
EFFECTIVE DELIVERY OF INSTRUCTION IN NIGERIAN
UNIVERSITIES IN SOUTH-SOUTH ZONE**

BY

HARRY, NIMITEINBO-OFORI JEREMIAH

PG/M.ED/12/62725

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FACULTY OF EDUCATION, UNIVERSITY OF NIGERIA, NSUKKA. IN
FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTERS OF
EDUCATION (M.ED) IN EDUCATIONAL TECHNOLOGY.**

SUPERVISOR: DR T. O. OFOEGBU

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APPROVAL PAGE

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CERTIFICATION

Harry, Nimiteinbo-Ofori Jeremiah, a postgraduate student of the Department of Arts Education, with registration number PG/M.ED/12/25725 has satisfactorily completed the requirement for research work for the degree of Masters in Arts Education (Educational Technology).

The work embodied in this project is original, and has not been submitted in part or full for any other Diploma or degree of this or any other University, and that this project as far as possible did cited have been acknowledged and referenced.

Dr. T. O. Ofoegbu
Supervisor

Dr. P.N. Uzoegwu
Head of Department

DEDICATION

This project is dedicated to God Almighty for His grace and provisions in my life and academy. Also to my precious mummy, Ibiwari Comson who gave me a focus in life to actualize my dream.

ACKNOWLEDGEMENTS

The researcher's profound gratitude goes to God Almighty for His grace and provision towards her and for the opportunity and strength He gave her to successfully complete this study.

Special thanks to her supervisor Dr. Mrs. T. O. Ofoegbu, whose expert advice, patience, meticulous academic guidance and immense contribution has brought this study to this level. The researcher also appreciates the efforts of the following professionals and academics: Prof. F.A. Okwo, Prof. O. Nwafor, Dr. U. Asogwa, Dr. I. Christopher, Dr. Mrs. N. Ibezem, Mr. E. Davis, and a host of others who contributed in one way or the other in making this study a success. The researcher is very grateful to family members and loved ones whose prayers, advice, and encouragement remain outstanding, especially her mum, Ibiwari Comson. Mrs D. Onia, Mr. B. Harry-Nye, Mrs. P. Benebo, Mr. Eze, C. Allwell, and Mr. Ogba, Kalu T.U.

Finally, the researcher is sincerely grateful to friends and colleagues too numerous to mention for all their love, support and prayers, may God richly bless you good.

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Abstract

The study examined the extent of availability and utilization of web-based tools in Nigerian Universities. A descriptive cross section survey research design was used for the study. Nine research questions were posed and six hypotheses formulated to guide the study. The population of the study consists of 35,680 lecturers and students in federal, state, and private universities in the study area. The sample is 395 lecturers and students, a proportionate stratified sampling technique was used to group the respondents into departments after which simple random sampling was used to draw the sample from the strata. The instruments for data collection were a checklist and questionnaires which were validated and internal consistency reliability coefficients determined using cronbach alpha technique; Data were analyzed using the IBM Statistical Package for Social Sciences version 2.0. Percentage, mean and standard deviation were used to answer the research questions, while ANOVA was used to test the hypotheses at 0.05 level of significance. It was found that Web-based tools are more available for effective delivery of instruction in State and Private Universities than Federal Universities in Nigerian; resources such as internet services, web-based learning software, personal laptops, scanners, smart boards, on-line library are available to a high extent. There was a significant difference in the mean ratings of lecturers and students in federal, state, and private universities on the extent of availability of resources that aid web-based tools for effective delivery of instruction. There is a high extent of utilization of web-based tools for effective delivery of instruction by lecturers and students in State and Private Universities in Nigerian. Female lecturers utilize web-based tools more than their counterparts in Nigerian Universities, both male and students utilize web-based tools to a less extent in content accessibility. Major implications of the findings are; there is a less extent in the use of web-based tools in e-assessment of students by lecturers in Nigerian Universities, that there is a less extent to which students utilize web-based tools in content accessibility. Based on these findings and implications, it was recommended that universities should include web-based learning in their teaching programmes and source grants to promote the use of web instruction at all levels, all university lecturers must as a matter of compulsion be made to acquire ICT skills, Courses on application of web-based tools for teaching and learning should be mounted in all faculties and departments to produce specialists that will man the units established for providing web-based support services in our universities.

CHAPTER ONE

INTRODUCTION

Background of the Study

Education is the enabler of social and economic change. It is a continuous process of shaping and modifying behaviours of an individual for adequate adjustments in the society. According to Akubue and Okolo (2008), education is a process of acculturation through which the individual is helped to sustain the development of his potentialities, and maximum activation when necessary thereby achieving self-fulfilment. The importance of education is undeniable for every single person because it is a self-enlightening process, which provides us with knowledge about the world, paves the way for a good career, helps build character, lays the foundation of a stronger nation and crucial to the overall development of an individual and the society at large (Itedjere, 1997; Whawo, 1997). To the researcher, education is an indispensable part of life personally and socially. However, the level of unequal standard and access to university education are still major problems that need to be solved. As a result of this, new strategies are being made to resolve the problem.

University education in Nigeria is faced by problems of access, population explosion and other problems associated with the learning process. According to Enaohwo (2008) access to University education implies the right, opportunity and means of making education available within the reach of every citizen of a nation. Access to education in its full and broad sense means free and unlimited, unhindered, unfettered opportunities to obtain knowledge, skills, and abilities available at each level of education needed to optimally participate and contribute to the development of the society (Okeke, 2008).

It has been observed that most of the candidates who sat for the Unified Tertiary Matriculation Examinations (UTME) conducted by the Joint Admission and Matriculation

Board (JAMB) are usually not admitted by various universities because of carrying capacity (Edukugbo, 2012). Edukugbo further maintained that this has led to denial of access to university education and leaves the candidates with no hope for the future. According to Edukugbo, in 2011/2012 academic session, a total of 1,493,604 candidates sat for the Unified Tertiary Matriculation Examinations (UTME) conducted by the Joint Admission and Matriculation Board (JAMB), the results announced showed that 842,851 candidates scored above 180 indicating that less than 45 percent passed the examination. JAMB later fixed 180 marks as minimum for university students, yet most of them were not admitted by the various universities (Edukugbo, 2012).

As at 2003 the capacity of tertiary institutions across the country is only about 500,000 (Afinsulu & Scannews, 2013). This shows that there is indeed a need for other alternatives to the conventional mode of education, that is, the teacher - student - chalkboard method of teaching. Alternative strategies such as distance learning, blended learning, electronic learning, web-based learning, will help in solving the problems of access, population explosion, other problems such as; problem of students not being able to complete their programs, inadequate learning, rote learning, problem of fund, problem of not completing the curriculum within the time frame, problem of large class size which greatly affect learning outcome, time constraints for students who are working, and mostly distance that stands as barrier for some students. But, the availability of resources and its utilization by lecturers and students to enhance these alternative methods poses a problem. In the quest for abating this trend, the researcher intends to find out the extent of availability and utilization of web-based tools for effective delivery of instruction by lecturers and students in Nigerian universities (NUs). In Nigeria, there are federal, state, and private universities which are being managed by the owners. Several factors help to establish who owns a university and what rights the university may, or may not, have. It is commonly agreed that to own

something, is to have certain rights and duties over it. In essence, ownership is a bundle of rights and duties.

Federal universities are universities that are operated and managed by the federal government, and for each state in the country there is a federal university. State owned universities are also called public or state government owned university. Every state also has a university which is been funded and managed by the state government. While Private universities are [universities](#) not operated by governments but by private individuals who fund and manage the affairs of the university, although many of these universities receive [tax breaks](#), public [student loans](#), and [grants](#). Depending on their location, private universities may be subject to government regulation. In [Nigeria](#) there are a number of private universities, one of which is [Igbinedion University](#), located in Okada, a town in Benin, Edo state. Hence, for the country to actualize its educational objectives of meeting the educational needs of her citizens, then, other modes of teaching and learning must be imbibed. Web-based instruction is seen as a means of meeting the educational needs of every single individual if it's being utilized by universities in the country.

Web-based instruction is a hypermedia-based instructional program which utilizes the attributes and resources of the World Wide Web to create a meaningful learning environment where learning is fostered and supported (Khan, 1997). It is delivered via the computer using the Internet, making it capable of instant updating, distribution, and sharing of information (Rosenberg, 2001). Activities like on-line forums, chats, mailing list, and web-quest are used to enhance teaching and learning on the web. The outcome may include effective interaction, feedback, knowledge and skills transfer to facilitate learning. Web-based instruction is one of the alternative strategies to education that uses web-based tools for effective delivery of learning. Web-based tools provide integrated environments of various technologies to support

diverse educators' and learners' needs via the Internet. The goal of these tools is to enhance face-to-face instruction and to deliver distance-learning courses. Web-based tools allow one to carry out tasks online that is, learning activities are done on a web browser and no separate download or installation of other software is required (Kilby, 2008). All the learning activities are accessible from anywhere where there is internet connection.

There are numerous web-based tools for educational purposes that can be effectively used to enhance communication. According to Almpanis, Miller, Ross, Price, and James (2011), these web-based tools include:

- Content management system: this is used to create, edit, update content or document on a website; it helps to manage work flow on the web.
- Picture management: this software makes it easy to import pictures and manage them. In addition, it gives one the ability to edit the images of documents, and allows for backups of files to prevent loss of original pictures.
- School management software is used for all administrative, management and learning activities; it is used to manage students, teachers, employees, courses and all the systems and processes related to running an institution efficiently.
- Document management: it's a computer system or program used to track and store electronic documents. It also keeps track of the different versions modified by different users.
- Web conferencing: refers to a service that allows conferencing events to be shared with remote locations. This service is made possible by internet technologies; the service allows real-time multicast communications from one sender to many receivers. It offers data streams of text-based messages, voice and video chat to be shared simultaneously across geographically dispersed locations.

Others are learning management system, simulation, Google document, content management system, wikis, weblogs, and podcast. The tools can be used to manage students' records, enhance participation and assignments, improve students' writing and research skills, motivate students to learn, design websites, send e-mails, write collaborative documents with colleagues or students, demonstrate concepts in an

interesting way, get other teachers's opinions about teaching issues, help students develop team work skills, and learn the use of internet responsibly. Therefore, the place of Web-based tools in the delivery of instruction as an alternative to conventional method to education cannot be over-emphasised. As the number of participants in education continues to increase, so does the importance of providing effective instruction that focuses on the needs of learners increases. Successful web-based learning is believed to revolve around a learner-centred system of instruction designed to meet the needs of individual learners. Web-based instruction is a rapidly growing instructional format that is challenging the traditional learning model in higher education and many institutions of higher learning in other countries are running furiously to join in this trend (Gordon, He, and Abdous, 2009). For an effective web-based instruction, there are software such as moodle, blackboard, among others that contains these web-based tools that can be used for academic purposes.

Moodle: This is an Open Source Course Management System (CMS), also known as learning and content management system (LCMS); an Open Source Course Management System is a free delivery means for students to learn subject matter electronically. CMS is a complete programme for managing educational content electronically, and this happens to be the engines of web-based learning that provide mechanisms for organising academic curriculum, delivering various modes of assessment which allows for communication between instructors and students (Dougiamas and Taylor, 2003). These programmes work on the internet or through educational institution's local networks connected to computers, it lets teachers, trainers and administrators manage online learning and online training. The LCMS can be used to conduct courses online or to support face-to-face teaching and learning, it can also be extended with modules for assignments, quizzes, grading, certification, social and collaborative learning in an engaging manner. Moodle can be integrated with online content resource repositories for managing course registration, payment and enrolment, course

schedules, allocation of training resources (Bauer and Kurtemeyer, 2005). This software is free and can also be an essential tool for effective delivery of web-based learning experience and can also be used effectively in the conventional method of teaching and learning process such that, teachers and students can communicate through e-mails, submit assignments, and news posting. Blackboard learn is of another importance in the utilization of web-based tools for effective delivery of instruction.

Blackboard: This is propriety of web-based learning management system (LMS), similar to moodle. It is designed to support fully online courses or provide a space for face-to-face course supplementation; Blackboard provides many types of tools and features for enriching the learning experience, allows instructors to put class materials on the internet, provides a variety of tools to facilitate teaching and learning using the web. The basic components used in a Blackboard Learn course include a syllabus, Learning Module, discussions, calendar, e-mail, announcements, grade book, exams, and assignments (Storey, Bavelas, Wang, and Phillips, 2009). The system consists of two parts i student and lecturer. To access the system, the user first registers either as a lecturer or a student, and also gets username and password for logging into the system. To access the main content of the application, the system performs authentication in which the user uses his/her personal username and password to log in, the administrator of the system can also login into the system using his/her password for any update. The student can log on to the application after registering, to check for any assignment posted by the lecturer on each course registered for, does the assignment, upload database, he/she can also log in again to check for marked assignments and the grades. The lecturers also log in to develop content, posts his/ her assignment to the students, and later log on to assess students's activities (Loch and Reushle, 2008). The lecturer's ability to develop and deliver course content utilizing the various tools found in Blackboard is vital for effective delivery of web-based instruction.

Web-based instruction can be achieved by utilizing any form of the available web tools. Any institution that must engage in any of these new strategies to improve access to education must provide adequate resources in terms of setting up computer laboratories in Information and Communication Technology centres (ICTC) and in each faculty; develop a comprehensive network design to cover academic and administrative units, student hostels and staff quarters with consideration for connectivity, train all staff of academic departments and programmes to possess the ability to use multimedia teaching workstations, equip lecture halls for multimedia instruction, develop and select virtual learning software, and other software that can be useful for educational purposes (Web-Based Education Commission, 2005).

Utilization, for the purpose of this study is making effective use of available web tools or resources. The lecturer, as well as the student's role is an important factor in the utilization of web-based tools for effective delivery of instruction, also, the lecturer and the student has to be competent in utilizing these available tools. According to Maor (2003) there are several facets of the role of the lecturer that can impact upon how web-based tools are developed and delivered. The lecturer will have to develop and deliver the course content depending upon the student's pedagogical needs which should include the learning outcomes, assignment requirements and relevant resources. Lecturers will have to check the online communication facilities for new postings and provide prompt and adequate replies to student's questions to ensure effectiveness of the delivery. Also, how the lecturers perceive the importance of web-based activities will influence how web-based tools are utilized and integrated into their teaching practices (Gordon, et al, 2009). Lecturers with a low perception of the importance of web-based activities may not fully consider how to apply web-based tools strategies to enhance their student's learning. Learning strategies can also be developed to encourage students to utilize online communication facilities such as conducting discussions about

specific topics and discussion based on issues relating to their assignments (Smith and Ragan, 2005; Bull, Kimball, and Stansberry, 1998). If the lecturers and students are able to utilize these web-based tools, effective delivery of instruction becomes easier for them which definitely will bring about learning outcome. The lecturer must have the basic skills to be able to develop an appropriate content that will meet the needs of the students. Content development is a core component of web-based instruction and in so doing; the lecturer will have in mind the pedagogical needs of the students.

In using [pedagogical](#) approaches for web-based learning, according to Bruning, Schraw, Norby, and Ronning (2004) the lecturer will have to consider the ability of the learner in terms of;

Cognitive perspective which focuses on the cognitive processes involved in learning as well as how the brain works. Emotional perspective which focuses on the emotional aspects of learning, like motivation, engagement, fun. Behavioural perspective focuses on the skills and behavioural outcomes of the learning process. Role-playing and application to the learning settings. Contextual perspective focuses on the environmental and social aspects which can stimulate learning. Interaction with other people, collaborative discovery and the importance of peer support as well as pressure.

When all these attributes are put in place it becomes easier, more interactive, interesting, and fun for both lecturers and students which will bring about effective utilization of web-based tools for effective delivery of instruction. Lecturers will also have to assess the ability of the learners to determine learning outcome, e-assessment by lecturers to assess the usability of student on web-tools is an essential aspect of effective delivery of web-based instruction.

E-assessment as it relates to education consists of all the procedures and strategies that are used to obtain information about students's learning. According to Pachler, Mellar,

Daly, Mor, Wiliam, and Laurillard (2009) e-assessments methods emanate from the specific learning objectives of a subject; hence e-assessment should be included in the planning of web-based instruction. E-assessments can be designed as an ongoing process (formative) or it can be designed to be used at the end of a prescribed period of learning (summative). Different e-assessment strategies such as e-testing, e-examination will also ensure accommodation of the different learning styles of the students. Classroom presentation naturally suits verbal or linguistic learners as it requires students to verbalise their knowledge but visual learners are likely to achieve higher in e-assessments which include pictures, videos, diagrams, maps because these will help them figure out their responses. Lecturers have access to a range of digital tools with which to organise their feedback and assessment in order to make learning more efficient, and to make room for formative, normative, or summative e-assessment processes. In addition, the lecturers have a range of different technologies that allow students either together or alone, to show their understanding of knowledge, phenomena and ideas by presenting tasks in various ways using different digital tools. Example of this is the possibility of making models, podcasts, videos and multimodal texts into which sound, image and video can be integrated for a collaborative learning outcome.

E-assessment, can therefore, be used by lecturers to assess the cognitive and practical abilities of students. Cognitive abilities can be assessed using e-testing software; practical abilities can also be assessed using e-portfolios or simulation software for them to have an effective delivery of instruction. The students should also have access to course content and not be restricted.

Web-based tools accessibility is another important factor in effective delivery of web-based instruction; this involves the ability of students to access course content developed on the web. First of all, both the learning content and the learning platform should be accessible

by students in order to effectively use these web-based tools. Web-based tools are often used with specific technology, or configuration, which can make them less available to people who have limited access capabilities or who are using non-standard computer equipment. As with most types of web applications, student should be conversant with LCMS environments which have become progressively more complex as instructors and students demand more features and more capability from their learning environments (Kwan and Fong, 2005). In terms of the interface elements, such as logging in, logging out, navigating to courses and content, communicating with instructors and other students, the LCMS core environment has its fixed interface elements, instructors have the ability to add further navigation issues in the form of multi-layered content folders, hyperlinks, html content(hyper text makeup language). All of these can typically be mixed together in any number of ways to enhance learning, this also creates flexibility for instructors and course designers, it can leave users of assistive technologies learning not just how to interact with the core LCMS features but with the individual courses as built by the instructors (UNESCO Bangkok, 2006). For instance, the websites for the Blackboard and Moodle LCMS tools both address the issue of accessibility of students; the Moodle site offers authors a basic accessibility overview and some do's and don'ts in terms of course design and content format, while Blackboard offers comprehensive instructions to students in terms of using the system with assistive technologies. The Blackboard website also address the accessibility from an instructors point of view, in terms of managing content which can include editing the names of items, deleting items or setting the sequence of items, and then adding content into the modules such as images, videos, links, documents, html element and perhaps sub-folders, these are among the most common. In the light of the above, the students' use of web-based tools for content accessibility developed on the web is important for effective delivery of web-based instruction (Porter, 2004). Another issue of research importance in the utilization of web-based tools is gender

influence. Many people behave differently and act differently to certain issues with respect to biological and psychological traits when it comes to web activities.

Gender influence is an important factor in the utilization of web-based tools for effective delivery of instruction; gender is a characteristic that distinguishes between male and female in the aspect of their behaviour, activities, and attitudes which must be considered in the investigation process of this work. Research has shown that gender issues affect all aspects of the society as regarding their profession, competencies in higher institution and so on, which actually reflects biasness in their performance level. Although most researchers have found male performing better than female especially on higher order knowledge, a few others saw female out-performing the male, while some others established no significant difference particularly during early education (Adeleke, 2008). A review of some gender based studies that were carried out showed that there is a considerable inconsistency in the literature as to the nature, extent and sources of bias in the differential performances between male and female in web-based learning. Loyd and Gressand (1991) cited in Onuzulike (2011) also found out that females have lower grade scores on computer technology competencies than male. Onuzulike further stated that, gender has been identified as a critical factor that affects lecturer's attitudes towards the use of computer. The study is therefore posed to investigate the influence of gender according to lecturers and students in the utilization of web-based tools in course content development, e-assessment, and course content accessibility in Nigerian Universities (NUs) for effective delivery of instruction.

Statement of the Problem

In Nigeria, millions of students pass the university entrance qualifying exam every year, but most of them never attend a university class. This is as a result of carrying capacity of the universities. Also, those that are already admitted into the system are faced with

challenges. This is because the conventional mode of education is associated with a lot of problems such as; students not being able to complete their programs, problem of fund, not being able to complete the curriculum, large class size which greatly affect learning outcome, time constraints for students who are working, and distance from school. Therefore, alternative mode to education have emerged providing opportunities for student to practice and to analyze what have been learnt, offering better access to education, and relevant articles for teaching and learning which is web-based instruction.

Despite the obvious and enormous advantages that come with using web-based tools in teaching and learning, lecturers and students in Nigerian universities have been finding education processes and research difficult because of the traditional educational delivery system still in practice. This calls for urgent attention by the government and the National University Commission (NUC) to ensure that web-based instructions are collaborated into the university system to improve access to education. Also, some of the lecturers in the universities in Nigeria lack adequate knowledge and skills required for effective web-based instructional delivery. The problem therefore, is to determine the extent of availability and utilization of web-based tools for effective delivery of instruction in Nigerian universities.

Purpose of the Study

The main purpose of the study was to find out the extent of availability and utilization of web-based tools for effective delivery of instruction in Nigerian Universities. Specifically, the study seeks to;

1. Determine the available web-tools for effective delivery of instruction in Nigerian universities.

2. Determine the extent of availability of resources for the utilization of web-based tools in Federal, State, and Private universities in Nigeria.
3. Determine the extent of utilization of available web-based tools in the delivery of course content by lecturers in Nigerian universities.
4. Determine lecturers' use of web-based tools in e-assessment of students in Nigerian universities.
5. Determine the influence of lecturers' gender on their use of web-based tools in content delivery in Nigerian universities.
6. Determine the extent to which students utilize web-based tools for academic purposes in Nigerian universities.
7. Determine the extent to which students utilize web-based tools in content accessibility in Nigerian universities.
8. Determine the influence of gender on students' use of web-based tools in content accessibility in Nigerian universities.
9. Identify factors that hinder the use of web-based tools for effective delivery of instruction in Nigerian universities.

Significance of the Study

Generally, the study was significant both in theoretical and practical dimensions to education. Theoretically, the study anchored on Activity-Based Learning Theory by (Vygotsky, 1978). The theory aims to enrich students' academic experience and learning outcomes by connecting theory with practice, and concepts with methods, using data and insight they obtain through engagement with the larger world. This theory is an ideal theory for web-based instruction, where the learner is actively engaged in the learning process, and learning experiences are connected with other human beings (lecturers, peers).

Practically, the study is useful to lecturers, students, educational Administrators/instructional designers, and the society at large. The lecturers will benefit by appreciating the importance of web-based instruction and thereby be motivated to acquire training for better application and production of knowledge for the real world. It will also facilitate teaching and learning, the findings also provide the lecturers with a feedback on assessment of the performance of students as a basis for improvement in their instructional practice in order to enhance performance of students. Also, lecturer - student contact can be maintained and strengthened, and this will foster a better educational experience for the student. It will also decrease work load for the lecturers as they can upload their lecture materials and ask students to access it themselves even before the lecture time, this will enable them to accommodate more students.

The students will have more benefit in access to university education through e-learning programs, students will also gain access to information that will increase their knowledge, inquiry and depth of investigation in course work as well as research works. They will also benefit accurate information, effective instructional delivery by lecturers which will enhance their academic achievements in their studies. Another benefit to students is the ability to do interactive teamwork among groups. Students have the opportunity to correspond with others from different backgrounds and to hear from a variety of experts from around the world. Using high-tech solutions, this process is easier and more enjoyable for learners. Students have access to experts and a tremendous volume of online databases; also, instead of searching for hours through card catalogs and library stacks, students can quickly utilize online search engines to find countless experts' articles and research databases that aid in their coursework. They can also access various libraries through their devices from wherever they are. The student worker can also conveniently access his/her course material whenever they are free, and distance will not be a barrier for some other students that live

away from school location. The study provides the student researcher with a workable literature for more areas of research not covered by the present study.

For educational administrators, the study will enable them to plan and integrate web-based instruction in the university curriculum. This will also help them to assess the importance of web-based instructional-techniques towards the performance of students, and also to assess the extent to which courses are effectively taught in Nigerian Universities and indeed, provide insight into the extent to which the objectives of teaching these courses in the universities are being realized. It is important, especially in instructional technology to create a bridge between the theoretical and the practical approach to create web-based instruction that will add value in terms of quality and effectiveness to teaching and learning. This will also enable Educational Administrators to rise to their responsibilities through supplying of resources in the universities.

Finally, the entire society will benefit an increased rate of literacy and opportunity for lifelong learning, communication and exchange which is essential to democratic living and the creation of a pool of globally competitive human resources, and also, it shall improve access to university education for the youth to an extent.

Scope of the Study

The study is concerned with the extent of availability and utilization of web-based tools for effective delivery of instruction by lecturers and students. The study was carried out in Nigerian universities, specifically, universities in South-South geo-political Zone. The study focused on the availability of web-based tools, usability of web-based tools by lecturers in terms of course content delivery, e-assessment, and student's accessibility of course content, gender as an independent variable, and also look at factors that hinder the use of web-based tools in the delivery of instruction.

Research Questions

The following research questions were posed to guide the study.

1. What are the available web-tools for effective delivery of instruction in Nigerian universities?
2. To what extent are resources available for the utilization of web-based tools for effective delivery of instruction in Federal, State, and Private universities in Nigeria?
3. To what extent do lecturers utilize available web-based tools in the delivery of course content by lecturers in Nigerian universities?
4. To what extent do lecturers use web-based tools in e-assessment of students in Nigerian universities?
5. Do lecturers differ based on gender in their utilization of web-based tools for course content delivery in Nigerian universities?
6. To what extent do students utilize web-based tools for academic purposes in Nigerian universities?
7. To what extent do students utilize web-based tools in content accessibility Nigerian universities?
8. What are the mean responses of male and female students on the use of web-based tools for content accessibility in Nigerian universities?
9. What are the factors that hinder the use of web-based tools for effective delivery of instruction in Nigerian universities?

Hypotheses

The following null hypotheses will be tested at 0.05 level of significance:

HO₁: There is no significant difference in the mean ratings of lecturers in Federal, State, and Private universities for the availability of resources for the utilization of web-based tools.

HO₂: There is no significant difference in the mean ratings of students in Federal, State, and Private universities for the availability of resources for the utilization of web-based tools.

HO₃: There is no significant difference in the mean ratings of male and female lecturers in their utilization of web-based tools for course content delivery of web-based instruction.

HO₄: There is no significant difference in the mean ratings of male and female lecturers in e-assessment of students in Nigerian universities.

HO₅: There is no significant difference in the mean ratings of students in Federal, State, and Private universities in the utilization of web-based tools for academic purposes.

HO₆: There is no significant difference in the mean rating of male and female students in their utilization of web-based tools in course content accessibility on the web.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

The review of literature of related studies was discussed under the following sub-headings:

Conceptual Framework

- Concept of Utilization of web-based tools
- Concept Of Web-Based tools
- Concept of Instruction
- Effective Delivery of Web-based Instruction
- Strategies Of Implementing Web-Based tools in instruction

- Gender Differences In Access And Use of web-based tools
- Benefits of web-based instruction
- Concept of University Ownership
- Factors That Hinder Web-Based instruction in Federal Universities.

Theoretical Framework

- ❖ Constructivist learning theory (Vygotsky, 1978) CLT
- ❖ Experiential learning theory (David A. Kolb, 1984) ELT
- ❖ Activity learning theory (Vygotsky, 1978) ALT

Empirical Studies

- Related Studies on Web-based instruction
- Related Studies on assessment for Effective Delivery of instruction
- Studies on Gender difference in the usage of web-based tools

Summary of Literature Review

Conceptual Framework

Concept of Utilization of Web-based Tools

Web-based learning tools provide integrated environments of various technologies to support diverse educators and learners needs through the internet. The goal of these tools is to enhance face-to-face instruction and to deliver distance-learning courses. Each of these tools offers similar components, such as course note posting, assignment submissions, quizzes and communication features. The primary motivation for developing these tools is to make it easier for instructors who have little knowledge of HTML and web navigation to put

course materials on the web (Evans, and Haase, 2001). However, the simplicity of use for novice users has significant drawbacks. For example, these systems force instructors and course administrators to use predetermined navigation models and course formats. These constraints may have a negative impact on their flexibility and usability for administrators, teachers and students.

There have been several studies and frameworks developed for analyzing these tools from pedagogical and institutional perspectives (Pantel, 2007). Pantel further noted that frameworks that provide guidance on what factors to consider and how they may be applied when educators and administrators are considering deploying web-based instructional tools have also been developed. However, they provide no information about how easy or difficult the tools are to use. Very few case studies have been conducted to identify potential usability issues with these tools. According to Morss and Fleming (1998) Web-based tools from a student's perspective using questionnaires will not place undue burdens on the students in terms of learning to use the tool. Software usability is not a new concept; it is usually referred to as the degree to which computer software assists a user in completing a task (Ferguson and Wijekumar, 2000). The concept of usability encompasses such attributes as learnability, efficiency, memorability, handling of user errors, and user satisfaction (Nielsen, 2010). Nielsen further maintained that usability centers on the user interface and the degree to which it meets various usability heuristics. Various methods can be employed to examine the usability of computer software, such as observation, interviews, questionnaires and expert reviews. According to Shneiderman (2011), a user interface designed on sound principles will exhibit natural dialogue between system and user that is clearly expressed in nontechnical terms, in addition, features of the interface will be consistent, and the memory load on the user will be minimized. User errors are prevented by good design, but when they occur, error messages follow the guidelines for dialogue. Finally, the system keeps users informed about

what is happening through appropriate feedback. When the software is designed for educational use, additional principles become important, such as the design of learning activities and the learner's ability to control sequence, pacing, presentation medium, and level of difficulty.

Concept of web-based tools

In today's world, technology is a part of nearly every aspect of almost everyone's daily life. Students of all ages are no exception to this rule. Because of this, teachers and schools are turning more and more to Web-based educational activities to give students another way to become engaged in learning. The Web has the potential to radically change what we assume about teaching and learning, and it presents us with important question to ponder: What needs to change about our curriculum when our students have the ability to reach audiences far beyond our classroom walls. According to Almpanis et al (2011) there are numerous web-based tools for educational purposes that can be effectively used to enhance communication. These web-based tools include; content management system, picture management, school management, document Management, web conferencing systems, simulation, online survey, weblog, wikis, learning management system, podcast.

Content Management System

A web content management system (CMS) is a sophisticated type of computer software that can be used to make the process of making and updating websites much easier and without the need of Hypertext Markup Language (HTML) skills using a CMS, the content creation process is separate from the design and presentation process. According to Berge (2007) Content on a website includes things like images, document (including reports, publications and fact sheets), sound clips and video clips. A CMS allows people without technical web authoring skills to update and maintain a website. Content can be added to the

database and displayed on a web page by typing or pasting normal text into a form within the CMS administration system. Information about the content (such as title, description, keywords, author, publish date, review date) can be added. This enables content that needs updating to be found and changed easily when it goes out of date. It can also be used to help manage work flow and maintain quality control by allowing an overall administrator of the system to set roles and permission for content (UNESCO Bangkok, 2006). For the purpose of teaching and learning; Students and lecturers can use a CMS to easily create web pages; by being involved in creating materials for a website, students become familiar with the subject matter, and work together in groups to create materials for a website, students can gain a sense of pride in their work and a sense of purpose motivating them to study the subject. Also, by utilizing web-based tools, class websites can be created to provide a means by which student can access useful information quickly and easily. Lecturers can regularly update the class website with new materials for classes, instead of providing new books or making copies. Websites makes it easy to share information, and so can make the administrative task more efficient. According to Light, and Pierson (2011) storing and sharing of information online (on website) saves papers, printing costs and mailing costs. If information is stored on a website, that information can be accessed when you are away in school or office simply by viewing the website using the internet services where ever you are.

Picture Management

Picture management tool is also called photo sharing software which enables one to manage and share on-line folders of photos. Using this software one can store, organize and catalogue images and set up on-line photo galleries and photo blogs.

School Management

School management software is designed to improve school administration, helping both school administrators and teachers, by centrally managing information on classes, students, teachers, and many other aspects of school operations. A secure central database provided as part of the software, enables information to be entered and maintained by authorized office staff. Information can be entered once but accessed through many screens. This avoids redundant data entry associated with managing information through many independent documents. Information can be efficiently managed by administrators and can then be made available to all staff on demand for shared use. Administration at a school has many levels and needs solid organization and structure to ensure effective provision of quality education (Kwan and Fong, 2005). School Management software is designed to make every day administrative tasks easier and faster. The software helps staff to take care of administration tasks simply and quickly, in ways that avoid overlap in tasks and improve efficiency. Using this software, administrative tasks can be completed on a web-based computerized system, instead of manually or on a desktop application that is not connected to a school wide system.

Document Management

Document management software is used to track and store electronic documents and images of paper documents. This software makes it easier to perform tasks such as searching for and retrieving documents, and thereby can be used as a tool to improve workflow and efficiency. According to Magouli and Chen (2006) document management software is necessary in order to address the issue of data proliferation; data proliferation is problematic for several reasons:

- Difficulty and time required to find and retrieve information.

- Data loss and legal liability when data is disorganized, not properly replicated, or cannot be found in a timely manner.
- As data proliferates, more manpower is required to manage data storage resources.
- Slower networks and application performance due to excess traffic as users search and search again for the material they need.
- High cost in terms of the energy resources required to operate storage hardware.

Web conferencing systems

Web conferencing systems also known as virtual classrooms, that is, the digital version of a classroom meeting; they allow a geographically dispersed group of people to meet synchronously online and communicate using a text chat, talk using a microphone or headset and display their face provided they have a camera connected or embedded to their computer (Almpanis, et al 2011). The use of web conferencing to provide a more interactive learning experience for web-based learning is becoming more widespread. The synchronous voice, text-chat, note-taking, whiteboard, and screen-sharing functionalities provided by systems such as Adobe Connect , Elluminate Live, and WebEx provide a powerful suite of tools with which to present information, model processes, and share concepts (Bower, 2011). The main advantage of using web conferencing software is that sessions can easily be recorded. Students can re-access to almost all content given in the virtual classroom and playback the recordings for later. Also, web conferencing software provides a suite of tools within one environment for disciplines such as mathematics and science generally; interactive visual and aural communication conducted from a personal computer is of significant advantage when discussing complex concepts (Loch and Reushle, 2008). This software provides tools which help to; create a conference web site, Manage on-line registration and payment, provide a mechanism for reviewing abstracts and other submissions, Index and share the conference proceedings.

Simulation

A computer simulation is a model of a real life or hypothetical situation on a computer. Using computer simulation technology, a user can change variables and thereby see how changes in variables can change the outcome. Computer simulations have become a useful part of core subject modelling of many natural system in physics (Computational physics), chemistry and biology, human systems in economics, psychology and in social science and in the process of engineering new technology to gain insight into the operation of those systems. Shneiderman (2011) found that more environments that support linking graphics, sound and video elements in addition to text elements that provide students with multiple opportunities are now available on the web. Traditionally, the formal modeling of systems has been via a mathematical model, which attempts to find analytical solutions to the problems which enable the prediction of the behaviour of the system from a set of parameters and initial conditions. Computer simulation builds on, and is a useful adjunct to purely mathematical models in science, technology and entertainment (Egura, 2010). Computer graphics are often used to display the results of a computer simulation. Animations can be used to experience a simulation in real-time. Furthermore, simulation results are often aggregated into static images using various ways of scientific visualisation. For Educational use; Computer simulations are fast and cost effective means of demonstrating real life activities or reactions. Instead of purchasing equipment and taking time to set it up, teachers can simply present a computer simulation and students can manipulate the variables to see how the outcome can be changed. Simulations also make it possible for teachers to explain and present reactions that could not be demonstrated in real life. It helps students actually experience a system or problem and not just read or hear about it (Egura, 2010). In essence, the ability of lecturers and students to effectively access and use the web environments encompasses many of the technology skills they need as they engage in web-based activity.

Online Survey

On-line survey software enables one to build, manage and analyze a survey. Using such software as google form you can create and publish on-line surveys within a minute. Some survey software run on the same server as the website. Others work on a third party's server. Some are limited by a number of surveys or questions, and answers. Most software offers a wide spectrum of features, allowing users not only to build and publish questionnaires, but also to monitor the survey process during all its stages and analyze the results. Software users can create all forms of questionnaires including complex web surveys, multipage questionnaires, registration forms and simple polls (O'Neil and Perez, 2003).

Weblog

A weblog or blog is like a journal that the whole world can read. It looks like a normal website but unlike a website, which typically lacks interactivity, a blog allows web authors get feedback on the comments and opinions they have published. Most blog such as work press consists of text, and often have links to related information and websites. Some blogs also have photographs, video and audio clips, while some blogs are used as a mainstream medium for creating and disseminating news and information (Honey, 2001). For Educational use; Blogging software is used to create special sites on which people can write blogs which can be used for teaching and learning. Writing blogs on topics relating to course work encourages students to express in writing, what they have learned, and this enhances the learning process. If students are required to communicate their ideas and opinions about what they are learning in blogs, it can help them to develop analytical skills. Blogs are published online, so students gain satisfaction from seeing their creative work in print in the public domain, in other words, students receive feedback through web-based activity (Ewing, Dowling, & Coutts, 2009).

Wikis

A wiki is a type of website that a group of users can contribute to. It enables documents to be written collaboratively. The most famous example of a wikis is "Wikipedia", the online encyclopaedia with articles that are written and edited by authorized site visitors, others are educational wikis, wikispaces is also a great kind of group website for families, classrooms, sports, and others. Using wiki technology, this type of web page can be created and updated very easily. According to Sendall, Ceccucci, and Peslak (2008), wikis skills are found to be significantly useful in the classroom. Contributors do not need technical skills and do not need to know HTML before using it. Generally, no prior review is required before modifications are accepted, and most wikis are open to the general public or at least to all persons who have been allowed to access the wiki. For Educational use; Wiki software enables users to create wikis, and a way to understand a wiki site is to think of a large black board with a paragraph written on it. Everyone is given an opportunity to erase, edit, or add content to what is already written. Unlike a blackboard, previous versions of the paragraph can be saved and everyone can write on the blackboard at the same time and from a long distance away. Wikis can be used to embrace education in several ways. For instance, since wikis are useful for creating collaborative documents, they can be used by teachers as a tool for fostering teamwork and online cooperation among groups of students. Using a wiki, students can collaboratively write articles on subjects ranging from what they learned in class (UNESCO Bangkok, 2006). Furthermore, several students can work on a given assignment concurrently; group work has always been a part of classroom learning. With wiki software it has become much easier to monitor group work in all its stages. Wiki search engines allows students and teachers to see and edit multiple drafts of a work, keeping it organized all the way through and making the most recent draft easily available. This leads to more organized collaboration in a web-based classroom.

Learning Management System

Learning Management System (LMS) is a software package that helps teachers and educators to manage learning content and resources which are often used to supplement the face-to face classroom. The focus of an LMS is to manage learners, keeping track of their progress and performance across all types of training activities. An LMS is also used to assist in administrative tasks, such as reporting instructors. Usually, an LMS is web-based which enable students to access learning content anywhere and anytime. All LMS offer the same basic tool set; a way to present content in a folder structure, assessment tools, survey tools, discussion group's announcement boards, and grade books. LMS differ in user interface, feature, services for course building and training, and integration with other on-campus systems such as e-mail and registration (Shneiderman, 2011). LMS is designed to help educators create effective online learning communities; LMS software such as Moodle can be used by teachers to create web-based courses. Such courses generally consist of several lessons, with each lesson including reading materials, activities (including tests and projects) and interactive elements to encourage students to engage in group work. Examples of other widely used LMS include Blackboard, WebCT, Deisre2Learn, ANGEL, and eCollege (UNESCO Bangkok, 2006). For Educational use; A Learning Management System (LMS) is a software tool that is used for managing learners, to keep track of their progress and performance in learning activities. An LMS can be used on any computer and can be used to assist just one teacher to manage one course, or can be used to manage the web-based learning content and delivery for several teachers and thousands of students (UNESCO Bangkok, 2006). An LMS is usually used to; Manage users, enrolment, courses, instructors, and facilities. Deliver courses on-line. Facilitate self-paced learning. Send messages and notifications to learners. Provide learning resources in a central on-line location. Encourage and track student's interaction with class material, teaching assistants. Generate reports.

Display scores and transcripts. Provide schedules (using the Course calendar). Facilitate (online) communication and discussion of subject matter among students.

Podcasts

Podcasting's essence is about creating content (audio or video i vodcasts) for an audience that wants to listen when they want, where they want, and how they want. Users can listen to podcasts and watch vodcasts on their computer (using Windows Media Player), or download to portable MP3/MP4 players and listen/watch on the move/anywhere, which is perfect for the busy student. Podcasts are already being used in school curricula and carry the potential of complementing, improving and adding new collaborative dimensions to the many Web-based instruction. Kwan and Fong (2005) describe many educational applications of podcasting and videocasting, including: Recordings of lectures for those students unable to attend the lecture in person; Audio recordings of textbook content by chapter allowing students to read or review texts while walking or driving to class (can be significant aid for auditory learners); Downloadable libraries.

Concept of Instruction

Instruction is vital for education, as it is the transfer of learning from one person to another. In general usage, the term **direct instruction** refers to instructional approaches that are structured, sequenced, and led by teachers for the presentation of academic content to students by teachers, such as in a lecture or demonstration class. In other words, teachers are directing the instructional process or instruction is being directed at students. Instruction encompasses a wide variety of fundamental teaching techniques and potential that can be implored in education. For example, teachers may use direct instruction to prepare students for an activity in which the students work collaboratively on a group project with guidance and coaching from the teacher as needed (the group activity would not be considered a form of direct instruction) which can be conventional or web-based.

Effective Delivery of Web-based Instruction

For some time now, educational researchers, classroom teachers and curriculum developers have been exploring ways to increase the effectiveness of teaching programs and in particular, learning in flexible environments. The learning theories have always suggested that what is needed is more active involvement of the learners in the learning process. Theories of learning have been developed which explain the way in which learning is achieved through knowledge construction (O'Neil and Perez, 2003). The integral role of communication between learners has been explored and the value of collaboration and construction of knowledge developed (Ewing, Dowling, and Coutts, 2009). At the same time, curriculum developments have moved from descriptions of the content to be learned to environments where outcomes of learning have been made discrete. Student-centred learning environments have been proposed, such as authentic learning settings, and others with problem-based learning tasks (Alu, 2011). The role of assessment has been recognised and given a more fundamental place in the learning process. The sum of these developments suggests a changed direction for educational planning and technology, in particular Web-based technologies which appear to offer many opportunities for teachers and learners. The new educational technologies emerging from multimedia and on-line developments support highly interactive student-centred learning for effective delivery and provide many new opportunities for both learners and teachers.

Strategies of Implementing Web-based Tools

According to Ferguson and Wijekumar (2000), a variety of web-based tools and course design strategies including the following;

- ❖ Syllabus course outline posting - syllabus posting is available for web-based instruction. The absence of an instructor to review the syllabus with the learner requires an easily understandable and comprehensive syllabus.
- ❖ Video classroom Streaming - video has replaced video tapes as the tool of choice for lecture delivery in web-based courses; video must be interesting, engaging, and worthwhile. Videos should not simply restate what is available in written materials. A primary consideration for streaming video is the bandwidth available to the learner. While high speed connections are usually available on campus, Students who rely on dial-up connections will be at a significant disadvantage when using streaming video. Provisions for downloadable or CD-Rom video files should be made to prevent this problem.
- ❖ Course Notes - Course notes can be posted to the web to supplement video lectures and required readings.
- ❖ Course Reference Materials, Readings, Cases Supplemental reading materials can be posted to the web for students to download. Links to other websites are frequently provided in references.
- ❖ Chat Rooms - Structured chat rooms conducted by the instructor provide group discussion on course activities and assignments. Using real-time chat, the instructor can ask questions during in a similar manner to the traditional classroom. Audio chat, a web-based tool that functions similar to teleconferencing, using a tool like Microsoft's NetMeeting has an advantage in that it is more spontaneous than text-based chat and not dependent on the learners keyboard speed. Chat also allows the instructor to provide immediate feedback to learner questions, evaluate learner participation, and take attendance.

- ❖ E-mail ĩ E-mail allows students to asynchronously communicate with their instructor. Learners can ask questions and send assignments to the instructor. The instructor can use email to send evaluated assignments back to the learner
- ❖ Bulletin Boards, Group Discussion Boards, and Digital Drop Boxes ĩ These tools allow the learners to collaborate on projects, exchange ideas and participate in group activities.
- ❖ Online Testing ĩ Online testing procedures allow the instructor to design evaluation instruments comparable to any form of paper based instrument. Multiple choices, true or false, matching, and fill-in-the-blank questions can be automatically graded and posted. Long or short answer essay questions can also be used. However, essay questions must be graded by the instructor.
- ❖ Interactive Activities ĩ Interactive activities provide a method of having the students practice desired behaviours. Click and drag techniques can be used to assemble components online.
- ❖ Feedback ĩ Specific provisions must be provided to insure students receive sufficient feedback. Instructors must be trained to promptly respond to emails, virtual office hours can be held using chat. Computer graded exams should have provisions for giving the student correct answers to the questions answered incorrectly. Provisions for both asynchronous and synchronous feedback should be provided in course design. For the purpose of the study, Asynchronous feedback occurs when the individual requesting the feedback (that is the student) experiences a time delay before feedback is received. Synchronous feedback occurs when the feedback response immediately follows the question or request with no time delay.
- ❖ Virtual Classroom- this is an online interactive class session between students and instructor which simulates much of the interaction found in traditional face-to-face

classrooms that incorporates other web-based tools including audio chat, video classroom, white boarding, among others.

- ❖ White boarding i This is the ability to write and draw on an electronic board during a virtual classroom session.

Gender Differences in Access and Use of Web-Based Tools

Most of the literature on gender and ICT considers access by female to ICT, this includes concerns about infrastructure, training, local content and female in rural or underserved areas. Although existing information is scattered and fragmented. The study is concerned to assess gender differences in access and use of web-based tools. Understanding gender and web use is still a challenge because of several perspectives and approaches. Three perspectives and two approaches have been identified. The first perspective as discussed by Harding (1991), takes gender as a variable. In this female are seen as a homogenous category. Studies that take on this perspective simply compare and contrast female and male in terms of important yet crude indicators such as the number and percentages of male and female who access the web; this provides very useful information which is often missing from national statistical data as indicated by Hafkin and Taggart (2006). The second perspective, on the other hand, is the post- structuralist /post- modern feminist perspective which stresses that ñfemaleò are not universal. This perspective emphasizes that variations are created with context. Thus female are understood as individuals not as groups. The strength with this perspective therefore is that it gives individual women a voice, and its focus is context and target specific. The third perspective known as feminist standpoint theory stresses the importance of women situation and shared experiences regarding the widespread oppression and devaluation of women as central features of society and its institutions. This perspective embraces a qualitative research methodology basing on personal experiences to provide critical insights (Haraway, 1991; Harding, 1991; Sandra 2004).

Differences in web use offers an opportunity to critically explain gender differences within the context specific experiences of web users. In turning to the approaches to understanding gender and the web, there is need to consider both the women and technology approach, and the gender and technology approach as discussed by Henwood, (1993) in Morahan-Martin (2004) takes technology as having a gender-neutral effect on the users. This implies that regardless of one's gender, the outcomes deriving from the application of the web are identical. Thus the required strategy is to simply increase the number of women using technology. This proposed solution unfortunately disregards other factors which obstruct the participation of women in technology. As some scholars have put it, technology is social; therefore, differences between male and female do exist, and can be seen in their respective experiences in society (Morahan-Martin 2004). Looking at male and female as if they are identical does not bring us to an accurate and useful analysis of the web in the society. On the other hand the gender and technology approach shifts focus to the technology and gender relations in society (Cockburn and Ormrod, 1993).

In the society, today, web usage is experienced differently by male and females. These experiences have a bearing on the outcomes of the different technological relationships. Thus the efforts to analyse and explain gender differences in web uptake will fail unless there comes to terms the different experiences of male and female and the specific contexts underlying these experiences. The gender and technology approach leads directly to the issue of meanings and values as they are created, defined and eventually attached to the use of the web.

Benefits of Using Web-based Tools for Instruction.

According to Ekabua (2007) the benefits of Effective utilisation of Web-based tools for instructional delivery portends great benefits for the Nation; these include:

- ❖ The problem of access to university education will be abated in the sense that many candidates will elect to go for part time programmes, if they are not able to access the regular programmes.
- ❖ Access to university education is broadened because persons from poor economic background can enrol in a degree programme and at the same time engage in income generating activities.
- ❖ The problem of inadequate facilities will reduce in the universities, in as much as there is alternative means of running degree programmes, number of intake into the regular programmes will be subject to the capacity of the existing infrastructure and facilities.
- ❖ Our system of education suffers dearth of text-books, but with web-tools, there is the likelihood of availability of modules and on-line text materials. Candidates have the ample opportunity to go for courses of their choice and not courses availabilities. Performance will be enhanced and quality of education will improve because an individual is likely to perform better when he/she takes a course of his/her interest than an individual who takes a course as last resort.
- ❖ The 21st century is a century of Information Communication Technology (ICT). Web-based instruction programme makes computer literacy a must, as such candidate as a matter of compulsion must be computer literate.
- ❖ Web-based instruction programmes take care of the interests of marginalised group; women, nursing mother(s), handicapped, migrant fishermen and pastoralists whose peculiar situations constitute impediment to university education will benefit greatly.
- ❖ Distance will no longer be a barrier for choice of university, hence, learners can remain wherever they are to access any programme of interest in any university.

Web-based tools can be a very effective tool in enhancing students experience and raising the quality of learning. The quest for active contextual learning to promote

understanding should be supplemented by multi-media applications that require learners to create realistic contexts for problem-solving, data analysis and the creation of knowledge in the learning process; this is seen as a collaborative learning style for an effective web-based delivery of instruction. In these light, web-based tools for instruction is not just about creating interesting tasks for learners, but to deepen their understanding, and taking learners beyond recall, recognition and reproduction of information to evaluation, analysis, synthesis and production of arguments, ideas and performance. The framework below is a framework for planning learning activity which is engaging when the learner is seen as an active member of the learning processing.

A framework for planning web-based activity

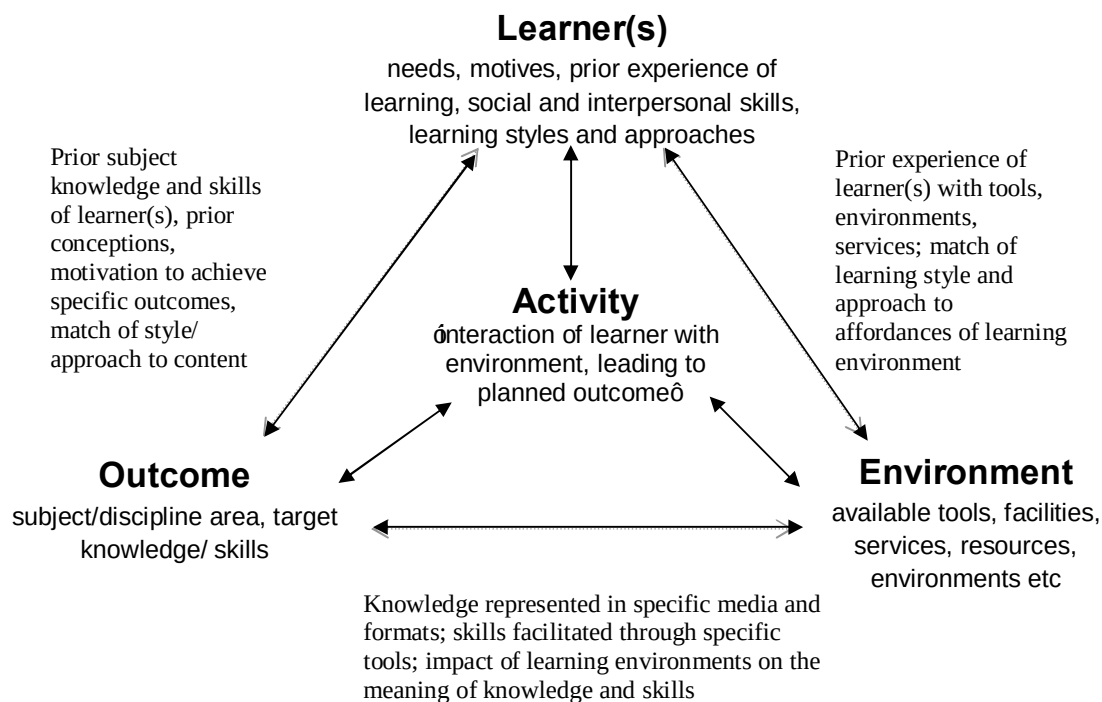


Fig 1- framework for planning web –based learning (Pantel, 2007)

This framework is based on web-based learning activity as one or more learner(s) carry out a task in an environment to meet a planned objective. The role of the learner does not appear

explicitly, as the learner is the subject of the planning process, though the specific role(s) played by learner(s), including the personal attributes, skills and knowledge they bring, naturally make up part of the environment for the learner, this makes learning an active process. In the above light, when the learner is engaged in a web-based activity, there will be an interaction with available tools, social interaction, as well as learner ÷ instructor interaction. This in turn will lead to motivation to achieve specific learning outcome.

Concept of University Ownership

Education in Nigeria is the shared responsibility of the federal, state and private individuals. Ownership is seen as a person who owns something. Hornby (2001:836) sees ownership as the fact of owning something that belongs to one. In this context, ownership is viewed in terms of management of universities. There are three universities under study; the federal, state, and private universities. The federal universities are owned, funded and managed by the federal government of Nigeria, the state universities are owned, funded and managed by the state government, while the private universities are owned, funded and managed by private individuals in the country. Abonyi (2006) noted that ownership has great influence in the management and administration of universities. There are currently (2014) 123 federal, state and private universities accredited in Nigeria as degree-granting institutions, [National University Commission](#) (NUC, 2013).

Factors that Hinder the Use of Web-Based Tools in Nigerian Universities

In many web-based learning projects, according to Ndume (2008), students face some challenges of bad perception during their studies: Lack of Pedagogy in the content developed, lack of resources, lack of user's touch and feeling in their learning platform. At home, more web-based learners may not manage to study as they are responsible for domestic activities (like caring for children and solving some household chores). Furthermore, some instructors

may not be knowledgeable enough in coaching or use of multimedia tools if they lack telecoaching skill. Contributing to this, Gunge (2010) added that while the urge to embark on web-based learning is high in Nigeria, it is still a dream because of weak ICT infrastructure, unsensitized populace and technophobia workforce. Gunge further identified high cost of personal computer, laptop, software, internet and the technical support, and power instability, blackout in towns and un-connectedness in rural areas, as problems that militate against utilization of web-based tools for effective delivery of instruction in Nigerian Universities.

The wide gap between the experience of ICT experts who develop web-based learning system and the slow, and sometimes, unwilling designers of education instructional system planner is also a challenge (Ilechukwu, 2011). Davis (2011) identified limited access to computer and modems as factors that is detrimental to the success of web-based learning environment. High cost that must be met by the learners which arises from connecting to internet as a challenge. Connecting to internet might be unreliable, slow or limited and might cause frustration and failure of learning outcome, and learning materials cannot be accessed and downloaded in time to support efficient learning. McClelland (2001) maintained that "electronic" content cannot currently sustain the qualities and multi dimensionality of the kind of tutor-student relationship that learning with web-based seems to require. Alu (2011) posited that the issue of computer literacy among students and teachers and availability of personal computer (PC) among teachers and students is lacking. There is no rigorous computer training in the process of teacher preparation to help teacher usage. Thus many teachers and learners are not computer literate. Alu also identified reliability of technology as a problem. Unless technology becomes reliable, the universe use of web-based learning will be difficult. Alu pointed out that many web-based learning do not provide enough content for good understanding of subject matter. Some of them for instance, only provide power point slides of lectures and online discussion forum which are not enough for users to obtain a good

understanding of the subject content. These problem and others, slow down the pace of utilizing web-based tools for effective delivery of instruction in Nigerian Universities. To overcome most of these problems, lecturers should be constantly updating their skills in computer operation, networking, media, communication; these may help them to cope with the new innovations in ICT technologies.

Theoretical Framework.

Constructivist learning theory

Constructivist learning theory by Vygotsky (1978) states that every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relationships between individuals. The theory focuses on the learner, and providing opportunities to build his knowledge through active interaction and through mental processes. In constructivist theory emphasis is placed on social interactions, the relationship among activity, skill, thought, cultural and historical activities in an individual community which have an effect on what learners acquire Lebow (1993). The theory sees learners as active rather than passive, the emphasis is on knowledge construction and learner autonomy, and web-based learning therefore, allows learners to displace the trainer at the centre of the learning experience, and take more responsibility for their own learning. The learning results depend on students and teacher's activeness and interest in the subject. Student's activeness in the learning process can be activated with alternative learning methods such as group works, discussions and questionnaires (Ewing, Dowling and Coutts, 2009).

There is no right way to learn in a specific situation. Everyone has his/her own style on learning which can also vary from one situation to another. Because of the variety of learning theories and styles, one can choose flexibly different strategies and styles in situations so as to use the most efficient one. The better, one is aware of his own learning style, the better he can use them to his advantage in learning (Verkkotutor, 2005). People learn differently and there is said to be dissimilar learners. This dissimilarity is due to the fact that learners prefer different learning styles, have different learning motivation and differ from each other in self-confidence (Vainionpää, 2006). Motives and motivation originate from targets that are set by the learner. Motivation activates the learner to target-oriented actions which lead to achieving some learning objective (Salovaara, 2005). Self-confidence has an important role in studying and learning. Without a realistic view of oneself and sufficient self-confidence learning is very hard or impossible. According to Aho and Laine (2002) the learners can also be dissimilar in their studying pace. Some are comfortable with the existing pace in the university studies but others find it difficult to keep up.

Constructivist Learning Designs

The emergence of the new learning technologies appears to have coincided with a growing awareness and recognition of alternative theories for learning, theories that suggest many problems and inefficiencies with conventional forms of teaching. The theories of learning that hold the greatest sway today are those based on constructivist principles such as Duffy and Cunningham (1996). These principles posit that learning is achieved by the active construction of knowledge supported by various perspectives within meaningful contexts. In constructivist theories, social interactions are seen to play a critical role in the processes of learning and cognition (Vygotsky, 1978). The strengths of constructivism lie in its emphasis on learning as a process of personal understanding and meaning making which is active and interpretative. In this domain learning is viewed as the construction of meaning rather than as

the memorisation of facts (Lebow, 1993; Jonassen and Reeves, 1996). Technology-based approaches to learning provide many opportunities for constructivist learning through their provision and support for resource-based, student centred settings and by enabling learning to be related to context and to practice (Barron, 1998; Berge, 2007).

However, there are a number of discrete learning designs that support constructivist learning and whose forms can provide designers with guidance and structure in the design of actual constructivist learning settings. When these ideas are put into practice, the forms of learning setting that result are similar in many respects and quite different to conventional settings. The designs tend to be based on forms of learning that are based on learners undertaking various forms of activity that are open-ended and student-centred. The forms of environment tend to be those that require learners to work with others and to share the results of their work as well as to reflect on the outcomes. There are numbers of discrete learning designs that accommodate these needs and that are also applicable in web-based learning; some of these are discussed below:-

- ❖ Problem-based learning (PBL) is a learning design that found popularity in the mid 1980s in medical schools as an alternative to traditional forms of learning in this domain. Barrows (2000) describes a problem based setting where students work in small groups under the guidance of a facilitator in a problem-based setting. PBL involves presenting students with a real-life problem immersed in a context which is relevant to professional practice. Problem-based learning designs involve complex problems which provide a stimulus for learning. They provide students with the opportunity to immerse them into a context which requires more than memorisation and understanding of concepts and challenge them to apply their knowledge to determine the best outcome. In PBL settings students apply their conceptual knowledge as well as processes and effective action learnt in solving the problem. Problem-based learning usually incorporates cooperative learning

groups. Students work cooperatively in small groups identifying their prior knowledge and what they need to know to effectively solve the problem. Problems do not encourage simple, lower level solutions but demand that students pursue new knowledge through the process of solving the problem. The lecturer's role is to facilitate a positive, encouraging cooperative learning environment and provide scaffolding at crucial times for students while using web-based tools for instruction.

- ❖ Case-based learning is a form of problem-based learning but with unique characteristics. In case-based learning, students typically work through a problem setting which is usually a realistic case relevant to their course (medicine, business, education, among others). Students work through the case, either collaboratively or individually, and make decisions. A case is an abstract of an event and interpretations of experiences. It can either be a previously encountered and solved problem, or a typical way of solving a problem. The characteristic feature of this type of learning activity is case-based reasoning. Case-based reasoning is a problem solving paradigm which utilizes the specific knowledge of previous experiences within concrete problem situations such as cases (Korhonen, 2004). In web-based learning, students are exposed to solving new problem by finding a similar past case, and applying its solution to the new problem situation.
- ❖ Project-based learning engages students in the process of designing and creating products that meet authentic needs. It can focus on the central concepts and principles of a discipline through involving students in problem-solving investigations. Project-based learning lends itself to cooperative learning environments which enable students to discuss, explore, test ideas and concepts supported by a team environment. Project-based learning environments are considered authentic in nature and provide a learning environment which stimulates and encourages students to construct their own knowledge

and pursue their own interests resulting in the creation of realistic products (Manochehr, 2006).

- ❖ Inquiry-based learning describes a learning design where students are faced with an open-ended task for which they must formulate investigative questions, obtain factual information, and then build the knowledge that enables them to answer the original question. The form of learning is a hybrid of problem-based learning with its own idiosyncratic features. Students are often required to observe and question, present explanations, devise and conduct tests to test their theories; analyse data; draw conclusions, or design and build models. Inquiry-based learning emphasises research, critical thinking and multi-disciplined study to achieve course outcomes. Inquiry-based learning is sometimes discussed in conjunction with problem-based learning. Cerny, Amundson, Mueller, & Waldron (2001) describe inquiry-based learning as a process where students formulate questions or the teacher provides questions to stimulate investigative processes to obtain information to help build knowledge to effectively determine a solution. Inquiry-based learning can involve other forms of learning design including discussions, group exercises and role plays. The strategy makes strong use of student interactions, their previous knowledge and life experiences (Cerny et al., 2001).
- ❖ Role playing is a learning activity where students assume characters within a chosen context and carry out roles in the conduct of a predetermined scenario. Role playing is often used in educational contexts as a means to develop the affective components of a curriculum, for example students' beliefs and attitudes. In many business courses, role playing is used in such areas as counselling, negotiation training and learning about ethics (Glass, 2000). Some instances of role playing take the form of games and are often referred to as simulations. In the context of this paper, we are principally concerned with the less structured forms of role playing. Role playing is an open-ended learning

environment and can involve the same high levels of learner activity and inquiry as other settings described earlier. Role plays are usually based around problem settings and in themselves tend to be problem-solving activities. Role plays are set within specific contexts and tend to follow a phased approach with learning occurring across a number of phases (Chesler and Fox, 1966). Constructivist learning theory can be applied in the teaching and learning of courses via web-based learning since it involves discovery, readiness, intuition and analytical language. Hence, this theory encourages the learner to be inquisitive, explorative, initiative, innovative, and to engage in self discovery in the process of learning.

This theory is related to the present study because the theory focuses on the learner, and provides opportunities for the student to build his knowledge through active interaction and through mental processes. The theory placed emphasis on social interactions, the relationship among activity, skill, thought, cultural and historical activities in an individual community which have an effect on what learners acquire. Likewise, web-based learning allows learners to be at the centre of the learning experience, and take more responsibility for their own learning. The learning results depend on students and teacher's activeness and interest in the subject. Student's activeness in the learning process can be activated with alternative learning methods such as group works, discussions and forums. This give room for Students to work cooperatively in small groups identifying their prior knowledge and what they need to know to effectively solve problem, whereby the teacher's role is to facilitate a positive, encouraging cooperative learning environment and provide scaffolding at crucial times, as determined by the dynamic process of solving problem. Hence, the theory provides a base for the study.

Experiential Learning Theory (David A. Kolb, 1984)

Experiential Learning Theory (ELT) by Kolb states that, learning is the process whereby knowledge is created through the transformation of experience. The theory talks about a person learning through discovery and experience. It involves four stages i Concrete Experience, Reflective Observation, Abstract Conceptualization, and Active Experimentation.

Kolb's Experiential Learning Theory

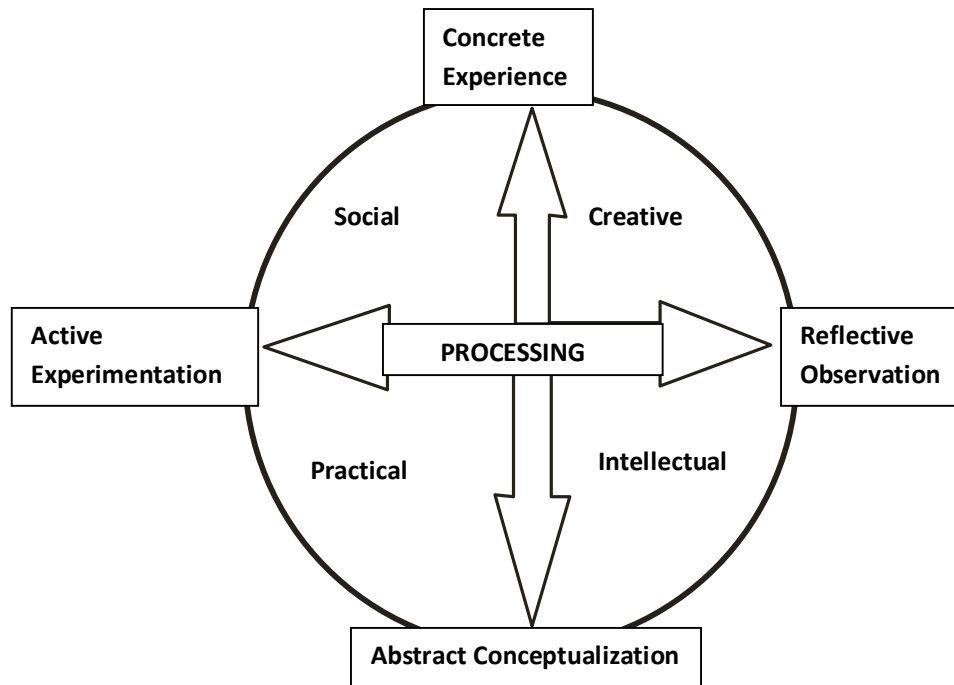


Fig 2 – Experiential learning theory by kolb

Concrete Experience (CE) i Kolb's cycle starts with a concrete experience, in other words it begins with doing something in which the individual or groups are assigned a task. This implies an active involvement, that is to say that one cannot learn simply by watching or reading, for effective learning to take place he/she must actually do something. By so doing the learning experience becomes an ice breaker and energiser to the learner, hence, he/ she become a problem solver.

Reflective Observation (RO) is the second stage in the cycle is that of reflective observation. This means taking time out from 'doing' and stepping back from the task and also reviewing what has been done and experienced.

Abstract Conceptualization (AC) is this is the process of making sense out of what has happened in the course of learning. This involves interpretation of the events and understanding the relationship between them. At this stage the learner makes comparisons between what he/she have done, and reflects on the learning outcome.

Active Experimentation (AE) is this is the final stage where the learner considers how he/she is going to put what has been learnt into practice. Kolb also applied four separate learning styles to the four stage cycle of learning which is concerned with the learner's internal cognitive processes. These include;

Diverging (feeling and watching) here, learners are able to look at things from different perspectives, they are sensitive, and they prefer to watch rather than do, tending to gather information and using imagination to solve problems. They are best at viewing concrete situations in several different viewpoints. Kolb called this style 'diverging' because these learners perform better in situations that require ideas-generation, for example, brainstorming. Learners with a diverging learning style have broad cultural interests and like to gather information. They are interested in people, tend to be imaginative and emotional, and tend to be strong in the arts. Learners with the diverging style prefer to work in groups, to listen with an open mind and to receive personal feedback.

Assimilating (watching and thinking) The Assimilating learning preference is for a concise, logical approach. These learners require good clear explanation rather than practical opportunity. They excel at understanding wide-ranging information and organizing it in a clear logical format. Learners with an assimilating learning style are less focused on people

and more interested in ideas and abstract concepts. Learners with this style are more attracted to logically sound theories than approaches based on practical value.

Converging (doing and thinking) learners with a converging learning style can solve problems and will use their learning to find solutions to practical issues. They prefer technical tasks, and are less concerned with people and interpersonal aspects. People with a converging learning style are best at finding practical uses for ideas and theories. They can solve problems and make decisions by finding solutions to questions and problems. Learners with a converging learning style are more attracted to technical tasks and problems than social or interpersonal issues. A converging learning style enables specialist and technology abilities. Learners with a converging style like to experiment with new ideas, to simulate, and to work with practical applications.

Accommodating (doing and feeling). The Accommodating learning style is 'hands-on', and relies on intuition rather than logic. These learners use other people's analysis, and prefer to take a practical, experiential approach. They are attracted to new challenges and experiences, and to carrying out plans. Learners with an accommodating learning style will tend to rely on others for information than carry out their own analysis. This learning style is prevalent within the general population.

The relevance of this theory to the present study lies in the fact that the theory talks about learning through discovery and experience, where the learner has a concrete experience. This implies an active involvement, for effective learning to take place he/she must actually do something and have the opportunity of reflecting and reviewing what has been done and experienced. In web-based learning, students with converging learning style may become specialist and have some technology abilities that may enhance learning

outcome. Learners with a converging style like to experiment with new ideas, to simulate, and to work with practical applications.

Activity-Based Learning ABL (Vygotsky, 1978)

Activity based learning according to Vygotsky (1978) states that knowledge is co-constructed and that individuals learn from one another. It is more of a descriptive meta-theory or framework than a predictive theory. In Activity-Based Learning, students do public service, fieldwork, community-based research and internships in conjunction with in-class work. ABL pedagogy aims to enrich students' academic experience and learning outcomes by connecting theory with practice, and concepts with methods, using data and insight they obtain through engagement with the larger world. Activity-based learning (ABL) theory is a cognitive-learning theory which is considered a "constructivist" learning theory (Hein, 1991). Essentially, a learner "constructs" his own microcosms of knowledge from past knowledge and/or current experiences and interacting with data. He or she actively seeks new information, and is actively engaged in the process in the ways (he) gains, assimilates, and utilizes knowledge. The facilitator engages learners in outlining real-world problems in the first place instead of starting with a classification of problem-solving methods. (Therefore, the theory is also referred to as problem-based learning theory). Integrating ABL elements is thus a promising way to enhance students' learning experiences. Vital learning principles include

Learning is an active process: A student needs an input of "doing", and is engaged with the world, from which the learner constructs a meaning, as well as systems of meaning.

Learning is engaging: Teachers need to provide activities that engage the mind as well as the hands.

Learning is a social activity: Learning experiences are connected with other human beings (example, teachers, and peers).

Learning occurs contextually: Learning experiences are interwoven with life experiences.

Learning builds on previous knowledge: Teachers' efforts must be connected to the state of the learner and provide a path into the subject based on his/her previous knowledge or experience.

Learning takes time: Students need to revisit ideas, ponder them, try them out, play with them, and use them (Hein, 1991).

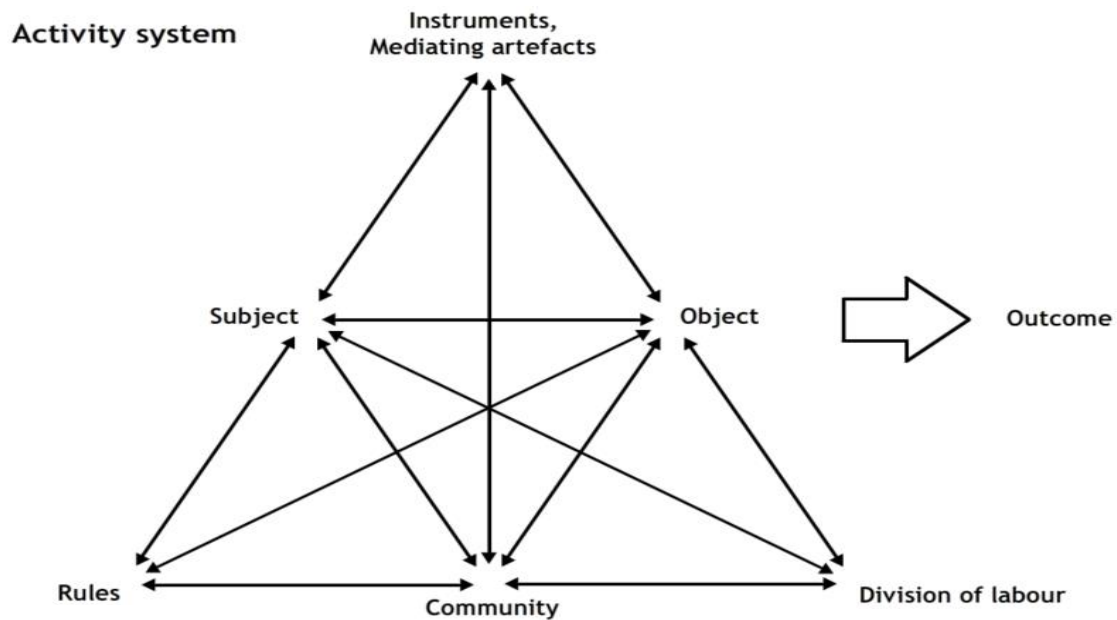


Fig 3- Activity based learning (theory)

The figure above is useful for understanding how a wide range of factors work together to impact an activity. In order to reach an outcome, it is necessary to produce certain objects (such as experiences, knowledge, and physical products). Human activity is mediated by artefacts (such as tools used, documents, and recipes, among others). Activity is also mediated by an organization or community (lecturers and students). Also, the community may impose rules that affect activity. The subject works as part of the community to achieve the object. An activity normally also features a division of labour, this has to do with collaborative learning.

This theory is related to the present study because the theory sees learning as an active process. The learner actively seeks new information, and is actively engaged in the process in the ways he/she gains, assimilates, and utilizes knowledge. Learning occurs contextually and

experiences are connected with other human beings. The theory emphasizes the teachers providing activities that engage the mind as well as the hands of the learner, hence, it has to do with collaborative learning such as web-based learning.

Empirical Studies

Related empirical studies on web-based instruction in general have been carried out by different researchers and Educational bodies at all levels in different disciplines.

Related Studies on web-based Instruction

Storey, Phillips, Maczewski, and Wang (2009) carried out a study, on Evaluating the Usability of Web-based Learning Tools in the Departments of Computer Science and Psychology University of Victoria, British Columbia, Canada. The design of the study was experimental design, comparing two commercially available learning tools in a university course. Fifty-four (54) students enrolled in the spring 2009 section of Human-Computer Interaction at the University of Victoria volunteered to participate in the study and were randomly assigned to two groups of 27. All of the questionnaires were administered as online forms. The researchers discussed the findings from the study in relation to basic usability issues that must be attended to when designing user interfaces for web-based learning tools. Findings revealed that navigation, customization, student management and content creation are all important aspects of web-based learning and were discussed in detail. The study closes with recommendations for universities, educators and tools-developers for the development and use of web-based learning tools that take into account the importance of usability issues in the choice of web-based learning tools and recognition of the situations of students and educators within real life contexts. The study is related to the on-going study because both are discussing the utilization of web-based learning tools and both studies use the same

instrument (questionnaire) for data collection. The studies differ in their designs; the former study used an experimental design while the present study used a survey design.

Minna (2007) carried out a study on Emotions in a Web-based Learning Environment, at the Department of Teacher Education University of Turku, Finland. The aim of the study was to examine emotions in a web-based learning environment (WBLE). Four empirical studies guided the study. All the courses discussed were organized through a web-based learning environment called WorkMates. A total of 266 students volunteered to participate in the four independent studies. The study demonstrates that emotions are important determinants of student behaviour in a web-based learning, and justify the conclusion that interactions on the web can and do have an emotional content. Based on the results of these empirical studies, it was concluded that the emotions students experience during the web-based learning result mostly from the social interactions rather than from the technological context. The studies indicate that the technology itself is not the only antecedent of students' emotional reactions in the collaborative web-based learning situations. However, the technology itself also exerted an influence on students' behaviour. The Findings of the study revealed that comparing emotional reactions in web-based and face to face collaborative learning indicated that the learning by means of web-based communication resulted in more affective reactivity when compared to learning in a face to face situation. The results imply that the students in the web-based learning group experienced more intense emotions than the students in the face to face learning group. The interpretations of this result are that the lack of means for expressing emotional reactions and perceiving others' emotions increased the affectivity in the web-based learning groups. Such increased affective reactivity could, for example, debilitate individual's learning performance, especially in complex learning tasks. The study is related to the on-going study in the sense that both studies are interested in web-based Learning and the studies were carried out in universities, but differ in their design.

Ofoegbu, Agboeze, and Anyanwu, (2013) investigated on the web browsing competencies of pre-service adult facilitators in the South-East geopolitical zone of Nigeria. The study is a survey of the web browsing competencies of final year adult education pre-service facilitators in the Federal universities in the south-east geopolitical zone of Nigeria. The population consists of all final year pre-service adult facilitators in all the Federal universities in the south-east geopolitical zone of Nigeria. Accidental random sampling technique was used to sample 234 final year pre-service adult facilitators. The sample consists of 39 males and 195 females. The instrument for the study named Web Browsing Competency Questionnaire (WBCQ) is a 43-item questionnaire developed by the researchers based on literature reviewed. The items were weighted on a four point rating scale of Excellently Well (EW-4points), Very Well (VW-3points), Moderately Well (MW-2points) and Not Applied (NA-1point). WBCQ was face validated by three experts in educational technology, adult education and measurement and evaluation. The reliability index of the instrument was determined using Crombach Alpha which was 0.78. Mean scores were used to answer the research questions and were calculated item by item. The interpretations of the means were based on the limit of real numbers: 3.50-4.00 (Excellently Well), 2.50-3.49 (Very Well), 1.50-2.49 (Moderately Well), 0.50-1.49 (Not Applied). t -test statistic was used to analyze the null hypothesis at 0.05 level of significance. The findings of the study showed that the pre-service adult facilitators have web browsing competencies to an average level and that male adult facilitators have significantly higher competencies than their female counterparts. Based on the findings, some recommendations were made which include that the country just like most developed nations should embrace the innovative distance learning in the form of on-line learning, e-learning, virtual classroom and on-line counseling knowing that most of the current pre-service facilitators have average web browsing competence. This study is related to the present study in the sense that both studies are interested on web-based,

but the studies differ in their approach. While the former investigated on the web browsing competencies of pre-service adult facilitators in the South-East geopolitical zone of Nigeria, the present study seek to find out the extent of availability and utilization of web-based tools for effective delivery of instruction in Nigerian universities. Both studies also use the same design.

Serpil (2012) carried out an investigation on the effects of web-based distance mathematics instruction on vocational school students' mathematics attitudes and achievements. The study was carried out in Erzurum Vocational School of Atatürk University during spring term of 2011-2012 academic years. The pretest-posttest control group design was used in the study. The participants were 60 freshmen students enrolled in on-campus and distance education programs at the Department of Computer Programming. Data collection tools consisted of mathematics attitude scale (MAS), and achievement test (MAT); the items and test statistics of the MAT were computed for reliability and validity. The results of the finding showed that implementation of web based mathematics instruction significantly enhanced students' attitude and achievement. The findings further suggested that web-based mathematics instruction compared to traditional one produced significant effect on achievement and attitude. In other words, web-based mathematics instruction has a positive effect on students' attitudes and achievements. Though the study investigated on the effects of web-based distance mathematics instruction as a subject, it applies to all other subjects. Both studies are related because both are interested on web-based instruction but differ in their design, while the former used an experimental design the present used a survey design.

Atsumbe, Raymond, Enoch & Patrick (2012) investigated a study on the availability and utilization of e-learning infrastructures in Federal University of Technology, Minna in Nigeria to determine the level of ICT implementation. Four research questions guided the study. The population of the study was made up of 382 students and 182 lecturers randomly

selected from the four schools of the institution. A 64-item structured questionnaire known as Availability and Utilization of E-learning Infrastructures Questionnaire (AU-ELIQ) was used to obtain data from respondents for the study. The reliability of the instrument was established using Cronbach Alpha the instrument yielded a reliability coefficient of 0.89. Data obtained was analysed using mean and t-test. The hypotheses were tested at 0.05 level of significance using t-test statistic. Some of the findings revealed that e- learning infrastructures are not adequate in the university for teaching and learning, and management's efforts towards the development of Information and Communication Technology (ICT) is mainly for administrative purposes. In addition, lecturers and students both have computers and laptops and can access the internet but, they do not use them for teaching and learning. Based on the findings of the study, recommendations were made to encourage the use of e-learning infrastructures to foster teaching and learning in the university. The university should as matter of urgency organise in house training for lecturers on the use of ICT for teaching and learning. Government should release the necessary funds to enable universities put in place necessary ICT infrastructures that will facilitate teaching learning. The findings of this study are related to the present study because both studies are interested in the availability and utilization of resources for teaching and learning. The result of the study showed that Lecturers have electronic devices and laptops that could facilitate e-learning but cannot effectively use these devices to teach, also students have electronic devices and laptops that could facilitate e-learning but are ineffective in using them for learning purposes. Both studies used the same research design.

Ugwoke (2012) conducted an investigation on secondary school principals's perception of problems associated with web-based learning in Nsukka Education zone. Two research questions and one null hypothesis guided the study. A descriptive survey design was adopted. The population of the study was all the fifty-six (56) secondary school principals in

Nsukka education zone. Questionnaire containing 20 items was the instrument for data collection. Descriptive statistics and t-test were used in answering the research questions and testing the hypothesis respectively. Findings of the study revealed that the perceived problems associated with web-based learning according to the principals in Nsukka education zone included: web-based learning has the potential to render many teachers jobless, students can get frustrated with the technical problems arising from web-based learning, it also create room for social isolation of the learners, among others. On the extent of availability of equipment and facilities the findings revealed that majority of the secondary schools in the zone lacked computer laboratory, superior and original web-based equipment/facilities were not easily accessible, irregular power supply encouraged inefficiency in web-based learning. The recommendations include that there should be opportunity for professional development of teachers to enable them become familiar with the new technology. The instruction on the website should be clear and simple. The instructors should give immediate feedback to the students regarding their performances. The government should fund the web-based learning programme in secondary schools. The study is related to the present study because both studies are interested in web-based learning, they both examined the extent of availability of web-based learning facilities and problems associated with web-based learning. Both studies also used the same research design.

Mahwish , and Farooq (2009) conducted a study on the empirical study of learner contentment towards E-Learning in International Islamic University. A Survey design was used to find out the impact of ñStudentò, ñInstructorò, ñCourseò, ñDesignò and ñTechnicalò factors on student satisfaction. The population of the study were the students, but specifically the students who were enrolled in the online learning courses. As this study was measuring the graduate and master level studentôs satisfaction that was enrolled in online learning environment, so only the specific online students were contacted to fill the questionnaires.

Quantitative research technique was used in the study. Survey was conducted to collect primary data and to prove the hypotheses. Questionnaire was used as an instrument for data collection. The female respondents of the survey sample was 30 % (N=83) from the total sample, while the male respondents from the total sample was 70 % (N= 193). For each variable there was different number of items, and all were measured on 5 point Likert scale. The results of this study are highly significant and all hypotheses are supportive. The result of the survey showed the learner's and instructor's attitude towards EL, their computer efficacy, interface of learning portal, quality of course content and administrative support were the main aspects which affected student EL satisfaction. The results of this study can be useful for the educational institutions before implementing web-based environment. Administration should consider the factors that have been pointed out in this study, for successful implementation. The studies are related because both studies used the same research design and the studies were carried out in the universities.

Evarest and Laura (2011) examined a study on the use of electronic learning facilities in learning in Nigeria Universities with a case study of the Federal University of Technology Minna, Nigeria. A survey design was adopted for this study; the population of the study comprised all the students in the university. A total of 120 students from across the levels were involved as sample for this study. The sample was composed through a multi-stage sampling technique, using proportionate random Sampling. First the university was grouped into strata based on schools/faculties. This gave a total of six schools/faculties; secondly random sampling was used to select one department across from each of the strata. This gave a total of six departments used for this study. Questionnaire was used as instrument for data collection. Data collected were analysed with the use of descriptive statistics (frequency count, mean score and percentage. Result revealed showed that the facilities available in the university are not adequate. Majority of the students do not have access to the available e-

learning facilities, and revealed some inhibitors to the use of e-learning facilities. The findings of this study are relevant to the present study because it examined the use of electronic learning in Nigerian Universities which is also web-based, the interest of the present study; also both studies adopt the same research design.

Related Studies on Assessment for Effective Delivery of Instruction

Ilechukwu (2013) conducted a study on the assessment of utilization of e-learning opportunities for effective teaching and learning of religion in Nigerian tertiary institutions. Survey research design was used, the study aims at determining the teacher's usage of e-learning packages in their education delivery services; the teachers' competences in the computer and web-based applications and to the optimization of e-learning packages in effective teaching and learning of Religion in Tertiary Institutions in Nigeria. A questionnaire was used to elicit answers to the three research questions that guided the study. The study revealed among other things that Religion Teachers in Tertiary Institution in Nigeria are utilizing e-learning applications in their educational delivery services of preparing and delivering lessons, e-assessment of the students, conducting research, among others, and that many Religion teachers have computer and web-based competences. The study also disclosed that Religion teachers in the utilization of e-learning packages face the problem of lack of adequate ICT infrastructures, paucity of fund, irregular supply of electricity, lack of technical support from ICT professionals. It was recommended that government should liaise with other stakeholders in education sector to make internet connectivity and other e-learning resources such as computer, projectors, scanners, among others, available to the Tertiary Institutions and Teacher preparation institutions should incorporate Computer Mediate Communication strategy in the relevant areas of the curriculum units and expose teachers to this strategic learning.

The study is related to the present study because both studies are interested in utilization, and they both use the same research design.

Studies on Gender Difference in the Use of Web-Based Tools

Wong, Sidek, Aida, Zakaria, Kamariah, Hamidah, ... (2005) conducted a study on Gender Differences in ICT Competencies among Academicians at Universiti Putra Malaysia. The study was a descriptive study that was conducted to assess existing levels of information and communication technology (ICT) competencies among the academic staff of Universiti Putra Malaysia (UPM) according to gender. Specifically, it seeks to investigate if differences exist between females and males in terms of eight components (word processing, spreadsheets, databases, presentations, electronic mail, World Wide Web, multimedia and virtual class applications) related to ICT. A total of 109 academic staff participated in this study. The results of the study shows that there exists a gap between female and male academicians; in certain cases, the competencies of female academicians have even surpassed those possessed by males. The various possible reasons attributed to these results will be highlighted and discussed. To conclude, this study has shown that the gap between female and male academicians at UPM has narrowed in terms of their ICT skills and in certain applications, the competencies of female staff have even surpassed those possessed by males. Both studies are related because both use the same research design and are investigating the use of the web according to gender.

Adeleke (2008) carried out a study that examined the performance of male and female students' mathematical problem-solving performances using Conceptual Learning Strategy (CLS) and Procedural Learning Strategy (PLS). A sample of 124 science students assigned into Conceptual Learning Strategy (CLS), Procedural Learning Strategy (PLS) and Conventional method (CM) groups were involved in the study making use of pretest post test control group design. Findings of the study showed a non significant difference in the

performance of boys and girls in the two learning strategies. But a significant difference was recorded in the performance of boys when comparing the two groups and in the performance of girls when comparing the two groups. The study therefore concluded that when training on problem solving is carried out in mathematics using Conceptual Learning Strategy (CLS) and Procedural Learning Strategy (PLS) boys and girls will perform equally well without significant difference. The study is relevant to the present study because both studies are interested in the issue of gender difference in performance, but differ in their research design.

Shintari, Luiz, Renda, and Santos, (2012) examined factors influencing e-learning adoption and the moderating role of gender. The study extends the Technology Acceptance Model (TAM) by adding attitude and social interaction. A gender effect on e-learning adoption from educators's perspectives was explored. The data collection took place in three major Brazilian universities in which the e-learning penetration has been on the rise. The structural equation modeling reveals that ease of use and perceived usefulness are significant antecedents of attitude, which in turn affects intention. The proposed model was tested and validated by an empirical survey. A total of 600 faculty members were used, both part-time as well as full-time members, were approached by e-mail and invited to participate in the web-based survey. In total, 468 respondents completed the questionnaire. Twenty-two responses were incomplete and 446 responses were thus usable. Therefore, the effective response rate was 74%. The findings of the study will help academics, educators, and policy makers to better understand the mechanism of e-learning adoption in universities. The findings of this study is relevant to the present study in the sense that it examines factors influencing e-learning adoption (which is also an aspect of web-based learning) and the moderating role of gender in web-based learning, both studies used the same research design and instrument.

Some researchers on gender issues have proposed that gender differences on academic achievement are related to how well define a problem is. Results from such studies indicated that female students do better on problems that are well defined and for which the method is straight forward while male students tend to do better on problems that are not well defined and which requires less standard type of solution. It is on this gender performance disparity that this study anchors on to give a clear picture on gender difference in the use of web-based tools for Learning.

Summary of Literature Review

The literature reviewed has been presented from the conceptual, theoretical and empirical perspective. From the conceptual perspective, literature reviewed showed that web-based learning is all about connecting learners to other learners, it plays significant role in teachers to professional support services and providing platforms for learning. The use of web-based tools will connect learners and lecturers to better information, ideas, through effective combinations of pedagogy and technology. It also established that the use of web-based tools is more than developing computer literacy and the skills necessary to operate various types of information and communication technology. It is the ability to apply ICT skills to access, analyse, evaluate, integrate, present and communicate information. Creating knowledge and new information by adapting, applying, designing, inventing and authoring information; enhance teaching and learning through communication and collaboration by using web-based tools. The review also shows that although, internet access is becoming more common, but the use of the internet for teaching and learning purposes is very limited, due to high connectivity and telecommunication costs, lack of well developed content, and inadequate technical and pedagogical support. Beyond access, there is a gap in the ability of students and lecturers to use these technologies effectively, to access high-quality and diverse

content, to create content of their own, to communicate, collaborate and to integrate web-based tools into teaching and learning.

The literature further showed that the accomplishment of web-based tools for an effective delivery depends solely on activity based learning, experiential learning and the constructivist theory of learning. The propounders of these theories believes that learners will be in charge of the learning process when they are exposed to web-based tools as they come across new ideas and discovers new experiences themselves.

The review of literature also included some empirical studies on web-based instruction, assessment of web-based instruction and gender difference in web-based learning. The review established among others that basic usability issues must be attended to when designing user interfaces for web-based learning tools in Computer Science and Psychology University of Victoria, Canada; and that emotions are important determinants of student behaviour in a web-based learning and the emotions students experience during the web-based learning result mostly from the social interactions rather than from the technological context in Teacher Education University of Turku in Finland, also, that pre-service adult facilitators have web browsing competencies to an average level and that male adult facilitators have significantly higher competencies than their female counterparts in South-East geopolitical zone of Nigeria; that teachers do not practice continuous assessment system properly due to students's population and lack of time on the part of the teacher in Nigerian schools. Students who took all or part of their class online performed better, on average, than those taking the same course through traditional face-to-face instruction in Washington. The study also showed that there exists a gap between female and male academicians; in certain cases, the competencies of female academicians have even surpassed those possessed by males in university of Putra Malaysia.

To the best knowledge of the researcher, no known work has been carried out on the availability and utilization of web-based tools for effective delivery of instructions in Nigerian Universities and particularly in South-South geopolitical zone of Nigeria. Hence, the gap the study intends to fill.

CHAPTER THREE

RESEARCH METHODS

This chapter presents the procedures the researcher used in the study. The chapter is discussed under the following subheadings: design of the study, area of the study, population of the study, sample and sampling technique, instrument for data collection and method of data analysis.

Design of the Study

The study used a descriptive survey research design. This is because information was sort from group of people (lecturers and students). A descriptive survey research design according to Nworgu (2006) is one in which a group of people or items are studied by collecting and analyzing data in a systematic manner from only a few people or items considered to be the representative of the entire group. The researcher adopted this design because the study involves studying and describing certain variables in relation to the population to ascertain the extent of availability and utilization of web-based tools for effective delivery of instruction in Nigerian universities.

Area of the Study

The study was carried out in South-South Geopolitical zone of Nigeria. The zone comprised of six states namely; Akwa Ibom State, Bayelsa State, Cross-Rivers State, Delta State, Edo State, and Rivers State. Each state in this zone has Federal, State, and Private universities. The researcher's choice of this zone was predicated on the fact that the zone is a

resource control geographical zone of the Republic of Nigeria that has a lot of money to finance her universities with adequate facilities. Also, from reviewed literature it was observed that even though some studies have been conducted in other parts of the country, none of them have paid attention on both the availability and usability of web-based tool for effective delivery of instruction in this zone. Therefore, the researcher carried out the study to find out the extent of availability and utilization of web-based tools by the universities in the zone. (See appendix B, page 107)

Population of the Study

The population of the study was made up of 35,680 lecturers and students in Federal, State, and Private Universities in South-South Geopolitical zone of Nigeria. A total of 13,405 for the University of Calabar, 19,089 for Rivers State University of Science and Technology, and 3,185 for Igbinedion University (see appendix C 108).

Sample and Sampling Techniques

Sample is the subset of the population or the entire population. There are Federal, states, and Private universities in Nigeria (see appendix A, page 104). Specifically, three Universities (one Federal, one State, and one Private) in South-South geo-political zone were randomly selected for the study, namely; the University of Calabar, Rivers State University of Science and Technology Port Harcourt, and Igbinedion University Okada. These were randomly selected to avoid biasness. (See appendix C, page 108). Using the Taro Yemenô's formula to obtain the sample size (see appendix D, Page 109), therefore, the sample consist of 395 respondents which was drawn from the three (3) universities, 60% of students from the sample (395) which is 237 and 40% of lecturers which is 158 was used. A total 237 for students and 158 for lecturers was evenly distributed to the universities; a total of 131 respondents from each University (79 students and 52 lecturers) constitute the sample of the study, the number is chosen to avoid biasness. A proportionate stratified sampling technique

was used to group the respondents into department after which the simple random sampling was used to draw the sample from the strata (departments). This help for an even representation of the grouping.

Instrument for Data Collection

Two instruments were used to collect data for the study. The instruments were developed by the researcher, a checklist and a questionnaire named i Web-Based Tools for Effective Delivery Questionnaire (WBTEDQ). The checklist contained 18 items on the availability of web-based tools with response pattern of 3 point rating scale of In use, Available (AV), and Not Available (NAV) which was checked by the researcher in the different universities, this instrument addresses research question one. While the questionnaire contained 60 items which were divided into two sections. Section A dealt with the general information about the respondents with options and blank spaces that required the respondents to tick (ã) or fill as appropriate, this include; name of university, status of respondents, and gender.

Section B had six clusters which dealt with research questions. Each cluster contained 10 items that were used to elicit information from the respondents on the extent of availability and utilization of web-based tools. It was structured on a four-point rating scale. the response categories of Very High Extent (VHE); High Extent (HE); Low Extent (LE); Very Low Extent (VLE); others are rated under Strongly Agree (SA); Agree (A); Disagree (D); Strongly Disagree (SD) was adopted. The rating scale was used for clusters A through F. Cluster A addressed research question two which contained 10 items on the availability of resources that aid the utilization of web-based tools. Cluster B addresses research question three, it contained 10 items on the utilization of web tools by lecturers. Cluster C addresses research question four, it contained 10 items on the e-assessment of students by lecturers. Cluster D addresses research question six, it contained 10 items on the utilization of web

tools by students for academic purposes. Cluster E addresses research question seven, it contained 10 items on students' use of web tools in content accessibility. Cluster F addresses research question nine which contained 10 items on factors that hinder the use of web tools in the universities.

In responding to the items lecturers responded to section A and section B; clusters A, B, C, and F. while students responded to section A and section B; clusters A, D, E, and F. Different questionnaire were given to both lecturers and students at same time. The researcher and research assistants distribute the questionnaire in the three universities.

Validation of Instrument

Validity refers to whether a tool measurement/survey may achieve its intended function or purpose. The two instruments were face validated by three experts in the field of Education. The experts were from the Department of Arts Education (Educational Technology), Science Education (Measurement and Evaluation) and Vocational Teachers Education (Computer Science) all in the Faculty of Education University of Nigeria, Nsukka. The experts were requested to check the appropriateness of the items, in line with the purpose of the study, research questions, and hypotheses. Based on their comments and recommendations necessary modifications were made to give the instruments their present structure and content. The suggestions made on the validated instruments are attached as appendix G page 115.

Reliability of the Instrument

Reliability refers to being consistent and steady in terms of measurement/survey method. The reliability coefficients of the instrument (WBTEDQ) was determined and computed using the data obtained after trial testing with thirty respondents, (10 lecturers and 20 students) from the University of Nigeria, Nsukka. This university was used because it has

the same characteristics with the population of the study. The Cronbach Alpha coefficient (α) was used to estimate the internal consistency (reliability), according to Ezech (2005) the best method for determining the reliability coefficient of an instrument having non-dichotomous items is through Cronbach Alpha method. The reliability coefficient was used to check the instrument if it is reliable and could be used for the study. There were four section and they yielded the following: 0.76 for section A, 0.64 for section B, 0.53 for section C, and 0.79 for section D respectively. The instrument has an overall reliability estimate of 0.76 which indicates that the instrument is reliable to be used for the study (See appendix J, page 118).

Method of Data Collection

The questionnaire was administered by the researcher and research assistants. The instrument was administered to the respondents, waited for the respondents to fill in their opinions and questionnaire was collected immediately after completion. This is to ensure that the instruments are filled appropriately and also to ensure a high rate of return of the instrument. The researcher also went to the faculties of Education in each university with the checklist to check out the available resources that can be used for web-based instruction; this is to ensure accuracy of results. A total of 378 copies out of the 395 questionnaires administered were retrieved representing about 96 per cent retrieval.

Method of Data Analysis

Data generated from the research questions were analyzed using the Statistical Package for Social Sciences 2013 version. Research question one which is the checklist was analyzed using percentage, forty percent (40%) was considered as a pass score for each university. The checklist has a 3 point rating scale of In use = 3, Available (AV) = 2, Not Available (NAV) = 1.

Also, mean and standard deviation was used to answer research question two to nine, mean and standard deviation was used because mean it is the most reliable measure of central tendency and standard deviation is the most reliable estimate of variability (Nworgu, 2006). Based on the 4-point rating scale, in answering the research questions, any item that has mean value of 2.50 and above was accepted and those that fall below 2.49 was rejected using real limits of numbers.

Response Categories	Value	Real Limits of numbers
VHE/SA	4	3.50 ÷ 4.00
HE/A	3	2.50 ÷ 3.49
LE/D	2	1.50 ÷ 2.49
VLE/SD	1	0.50 ÷ 1.49

The personal information was coded as follows:

Name of university; University of Calabar = 1, Rivers State University of Science and Technology = 2, Igbinedion University = 3

Status of respondents: lecturers = 1, students = 2

Gender: male =1, female = 2

The null hypotheses formulated for the study was tested using analysis of variance (ANOVA) at 0.05 level of significance to determine the acceptance or rejection of the null hypotheses. The one way ANOVA was used to test hypotheses one and two while a two way ANOVA was used to test hypotheses three to six. The null hypotheses was rejected if the F

value is greater than the level of significance at 0.05, otherwise, the null hypotheses was accepted.

CHAPTER FOUR

RESULTS

This chapter deals with data presentation, analysis and interpretation. The results are presented and analyzed in line with the research questions and hypotheses formulated for the study. Data analysis was done using the Statistical Package for Social Science (SPSS).

Research Question 1: What are the available web-tools for effective delivery of instruction in Nigerian universities?

To answer the above research question, percentage was used for the checklist (see appendix F 114) and the data presented in table below:

Table 1: Percentage of available web tools for effective delivery of instruction

Available	Not Available
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Name of University	NO	%	NO	%
University of Calabar	8	44.4	10	55.5
Rivers State University of Science & Technology	14	77.7	4	22.2
Igbinedion University	16	88.8	2	11.1

Table 1 above is based on the available web-tools for effective delivery of instruction in Nigerian universities. It revealed that Ict centre, effective internet service on campus, smart board in the departments, e-library for students and lecturers use, content management system, picture management, school management, document management, web conferencing systems, simulation, personal laptops, Bluetooth, wikis, webcam among others are all available in federal, State, and Private universities. The table also revealed that University of Calabar had a percentage of (44.4%), Rivers State University of Science and Technology had a percentage of (77.7%), while Igbinedion University had a cumulative percentage of

(88.8%). The University of Calabar having less than 50% indicates that web-based tools for effective delivery of instruction are available to a less extent in the university, while Rivers State University of Science and Technology having 77.7% indicates that there is a high extent to which web-tools are available for effective delivery of instruction in the university, and Igbiniedion University having a 88.8% , also indicates that there is a high extent to which web-tools are available for effective delivery of instruction in the university.

Research Question 2: To what extent are resources available for the utilization of web-based tools for effective delivery of instruction in Federal, State, and Private Universities in Nigeria?

Table 2a: Mean responses of lecturers on the extent of availability of resources for the utilization of web-based tools in Nigerian Universities. N=148

S/N	Items	$\bar{X}$	SD	Decision
1	Internet services in the university.	3.20	.646	High Extent
2	Web-based learning software such as Moodle and blackboard for instruction in my university.	2.50	.958	High Extent
3	Personal laptops.	3.39	.635	High Extent
4	Scanners to aid instruction.	2.50	.733	High Extent
5	Smart board in the departments for instruction.	2.55	.811	High Extent
6	Document Management system to enhance instruction.	2.46	1.019	Less Extent
7	On-line library in your university for use by students and lecturers.	2.55	1.012	High Extent
8	Weblog for academic purpose,	2.31	1.016	Less Extent
9	Wikis for academic purpose	2.43	.983	Less Extent
10	Podcast for academic purpose.	2.09	.989	Less Extent
Grand Cluster Mean		2.59	6.154	High Extent

$\bar{X}$ = mean, SD = standard deviation

The data presented in Table 2a, is an analysis of the extent to which resources are available for the utilization of web-based tools for effective delivery of instruction. The table showed the mean responses for lecturers in federal, state, and private universities in Nigeria addressing research question two. The table also illustrated that internet services, web-based learning software, personal laptops, scanners, smart boards, on-line library are available to a high extent while document management system, weblog, wikis, and podcast are less available for academic purposes. The table had a grand cluster mean of 2.59 with a standard deviation of 6.154. This indicated that resources for the utilization of web-based tools are available to a high extent in Nigerian universities. (see appendix k)

Table 2b: Mean responses of students on the extent of availability of resources for the utilization

of web-based tools in Nigerian universities.

N=230				
S/N	Items	$\bar{X}$	SD	Decision
1	Internet services in the university.	3.20	.763	High Extent
2	Web-based learning software such as Moodle and blackboard for instruction in my university.	2.73	.753	High Extent
3	Personal laptops.	3.28	.852	High Extent
4	Scanners to aid instruction.	2.67	.894	High Extent
5	Smart board in the departments for instruction.	2.85	.904	High Extent
6	Document Management system to enhance instruction.	2.72	.772	High Extent
7	On-line library in your university for use by students and lecturers.	2.86	.972	High Extent
8	Weblog for academic purpose,	2.27	.696	Less Extent
9	Wikis for academic purpose	2.32	.777	Less Extent
10	Podcast for academic purpose.	2.21	.748	Less Extent

Grand Cluster Mean

2.71

6.069 High Extent

$\bar{X}$ = mean, SD = standard deviation

The data presented in Table 2b is a descriptive analysis of the extent to which resources are available for the utilization of web-based tools for effective delivery of instruction. The table showed the mean responses for students in federal, state, and private universities in Nigeria addressing research question two. Table 2b also showed that internet services, web-based learning software, personal laptops, scanners, smart boards, on-line library, document management system are available to a high extent while the rest items are available to a less extent for academic purposes. The overall mean responses of student for the availability of resources for utilization of web tools had a grand cluster mean of 2.71 with a standard deviation of 6.069. This indicated that resources for the utilization of web-based tools are available to a high extent in Nigerian universities. (see appendix k)

Research Question 3

To what extent do lecturers utilize available web-based tools in the delivery of course content in Nigerian universities?

Table 3: Mean responses of lecturers on the extent of utilization of web-based tools in course

content delivery in Nigerian universities.

N=148

S/N	Items	$\bar{X}$	SD	Decision
11	I download and upload files on the web.	2.61	.821	High Extent
12	I design and change homepage on the web.	2.94	1.191	High Extent
13	I develop course content on the web using content management system.	2.19	.868	Less Extent
14	I add images, sound clips, and video clips to course content on the web.	2.69	1.245	High Extent
15	I create and update website for my class with new	2.01	.774	Less Extent

	materials.			
16	I make Backups of my lecture notes and important documents online.	2.95	.855	High Extent
17	I use the News forum link to give general announcements and reminders to students	1.90	.771	Very Less
	Extent			
	about upcoming events.			
18	I use flash drives/external hard drives to store documents for future references	2.68	.721	High Extent
19	I scan and edit articles and upload online for academic purpose.	2.50	.993	High Extent
20	I add and attach document in blogs entry for academic purpose.	2.67	.965	High Extent
	Grand Cluster Mean	2.51	5.820	High
	Extent			

$\bar{X}$ = mean, SD = standard deviation

The data presented in Table 3 is an analysis of the extent to which lecturers utilize available web-based tools in the delivery of course content in Nigerian universities. The table showed the mean responses for lecturers in federal, state, and private universities in Nigeria addressing research question three. The table, also showed that lecturers download and upload files, design homepages, add images and sound clips, make backups, use storage devices, scan and upload files online, and attach document in blog to a high extent, while development of course content, creating and updating of websites, use of news forum, are utilized to a less extent. The table had a grand cluster mean of 2.51 with a standard deviation of 5.820. This indicated that utilization of web-based tools for effective delivery of instruction is to a high extent in Nigerian universities. (see appendix k)

Research Question 4

To what extent do lecturers use web-based tools in e-assessment of students in Nigerian universities?

Table 4: Mean responses of lecturers on the extent use of web-based tools in e-assessment of

students in Nigerian universities.		N=148		
S/N	Items	$\bar{X}$	SD	Decision
21	I log into the system with my personal username and password.	2.99	.884	High Extent
22	I engage and track students's interaction online.	2.32	.859	Less Extent
23	I conduct discussion class with my students online.	2.34	1.292	Less Extent
24	Students post their assignments to my e-mail box.	2.41	.925	Less Extent
25	I conduct quizzes for my students online.	2.45	1.157	Less Extent
26	I conduct e-testing for my students.	2.23	.984	Less Extent
27	I use the calendar feature, (giving date) to post assignments and announcements to students online.	2.49	1.134	Less Extent
28	I refer students to educational sites.	2.76	.862	High Extent
29	I assess students's ability to use web tools in learning process online.	2.16	1.001	Less Extent
30	I grade assignments submitted by students online using the grade book.	2.73	1.265	High Extent
Grand Cluster Mean		2.48	6.871	Less Extent

$\bar{X}$ = mean, SD = standard deviation

The data presented in Table 4 is an analysis of the extent to which lecturers use web-based tools in e-assessment of students in Nigerian Universities. The table showed the mean responses for lecturers in federal, state, and private universities in Nigeria addressing research question three. The table, also showed that lecturers log in to the web with their personal laptops, refer students to educational sites and grade assignments to a high extent while they respond to a less extent to every other item. The table had a grand cluster mean of 2.48 with a standard deviation of 6.871. The implication of this grand mean is that lecturers use web-based tools in e-assessment of students to a less extent in Nigerian universities. (see appendix k)

Research Question 5

What are the mean responses of lecturers according to gender in the utilization of web-based tools in course content delivery in Nigerian universities?

Table 5: Mean responses of male and female lecturers in the utilization of web-based tools in

course content delivery in Nigerian universities. N=148

Name Of University	Lecturers	$\bar{X}$	SD	N	Decision
University of Calabar	Male	1.91	6.543	24	Less Extent
	Female	2.20	5.535	26	Less Extent
	Total	2.06	6.160	50	Less Extent
Rivers State University of Sci. & Tech.	Male	2.43	3.734	22	Less Extent
	Female	2.62	3.901	30	High Extent
	Total	2.54	3.913	52	High Extent
Igbinedion University	Male	2.88	3.330	18	High Extent
	Female	3.02	2.558	28	High Extent
	Total	2.96	2.929	46	High Extent
Total	Male	2.36	6.237	64	Less Extent
	Female	2.62	5.237	84	High Extent
	Total	2.51	5.820	148	High Extent

$\bar{X}$ = mean, SD = standard deviation

The data presented in Table 5 above showed the mean responses of male and female lecturers in federal, state, and private universities in Nigeria on the extent of utilization of web-based tools in the delivery of course content. The table addressed research question five which had a mean of 1.91, 2.43, and 2.88 with a standard deviation of 6.543, 3.734, and 3.330 for male lecturers in federal, state, and private universities respectively. While female lecturers had a mean of 2.20, 2.62, 3.02 with a standard deviation of 5.535, 3.901, and 2.558 for federal, state, and private universities respectively. The table had a total mean of 2.36 with a standard deviation of 6.237 for male, and a mean of 2.62 with a standard deviation of

5.237 for female. The implication of this is that female lecturers utilize web-based tools more than their male counterparts in Nigerian Universities. (See appendix k)

Research Question 6

To what extent do students utilize web-based tools for academic purposes in Nigerian universities?

Table 6: Mean responses of students on the extent of utilization of web-based tools for academic

purposes in Nigerian universities.		N=230		
S/N	Items	$\bar{X}$	SD	Decision
31	I boot and shut down the computer system.	3.02	.937	High Extent
32	I log on to the internet using different search engines.	2.68	1 .015	High Extent
33	I use weblog for academic purpose.	2.47	.952	Less Extent
34	I send messages through e-mails.	2.73	1.002	High Extent
35	I use smartboard for educational purposes.	2.33	.928	Less Extent
36	I use the web for my research work	3.03	.896	High Extent
37	I use wikis for academic purpose.	2.51	.924	High Extent
38	I use video navigations to support my learning	2.40	1.022	Less Extent
39	I save my lecture notes from online using storage devices, for future reference.	2.66	1.102	High Extent
40	I use the News forum link to get announcements and reminders about upcoming events.	2.82	.984	High Extent
Grand Cluster Mean		2.66	7.335	High
Extent				

$\bar{X}$ = mean, SD = standard deviation

The data presented in Table 6 is an analysis of the extent to which students utilize web-based tools for academic purposes in Nigerian Universities. The table showed the mean responses of students in federal, state, and private universities in Nigeria addressing research question six. It also showed that students boot and shutdown computer, use different search engines, send messages via e-mail, use the web for research works, use wikis, save lecture notes online, use the news forum to get announcement to a high extent while they respond at less extent to other items. The table had a grand cluster mean of 2.66 with a standard

deviation of 7.335. The implication of this is that utilization of web-based tools for academic purposes by students is to a high extent in Nigerian universities. (See appendix k)

Research Question 7

To what extent do students utilize web-based tools in content accessibility in Nigerian universities?

Table 7: Mean responses of students on the extent of utilization of web-based tools in content

accessibility in Nigerian universities.		N=230		
S/N	Items	$\bar{X}$	SD	Decision
41	I access course content on the internet.	2.87	.983	High Extent
42	I engage in online forum discussion with classmates .	2.49	1.031	Less Extent
43	I submit assignment to lecturers online.	2.32	.971	High Extent
44	I use podcast for recording my lectures.	2.43	1.110	Less Extent
45	I access lecture material through moodle, blackboard, Google document, etc.	2.41	.975	Less Extent
46	I take some exams online.	2.30	.993	Less Extent
47	I access any of the web pages included in the search results, and navigate through the results for desired information.	2.27	.813	Less Extent
48	I use web quest for my academic purposes.	2.78	.971	High Extent
49	I access online library for academic information.	2.18	.845	Less Extent
50	I use mobile phones that can access, store, send, and read audio and visual information for my academic purposes wherever I am.	2.39	.708	Less Extent
Grand Cluster Mean		2.44	6.706	Less Extent

$\bar{X}$ = mean, SD = standard deviation

The data presented in Table 7 is an analysis of the extent to which students utilize web-based tools in content accessibility in Nigerian universities. The table showed the mean responses of students in federal, state, and private universities in Nigeria addressing research question seven. The table showed that students access course content on the internet, submit assignment to lecturers online, use web quest for their academic purposes to a high extent while they responded to a less extent for other items. The table had a grand cluster mean of 2.44 with a standard deviation of 6.706. This indicated that students utilize web-based tools in content accessibility to a less extent in Nigerian Universities. (see appendix k)

Research Question 8

What are the mean responses of students according to gender on their use of web-based tools in content accessibility in Nigerian universities?

Table 8: Mean responses of male and female students on the extent of their use of web-based

tools in content accessibility in Nigerian universities. N=230

Name of					
University	Students	$\bar{X}$	SD	N	Decision
University of Calabar	Male	2.08	6.725	37	Less Extent
	Female	2.36	6.600	39	Less Extent
	Total	2.22	6.760	76	Less Extent
Rivers State University of Sci. & Tech.	Male	2.73	7.649	36	High Extent
	Female	2.36	6.222	40	Less Extent
	Total	2.53	7.134	76	High Extent
Igbinedion University	Male	3.27	3.638	39	High Extent
	Female	3.16	3.835	39	High Extent
	Total	3.22	3.757	78	High Extent
Total	Male	2.70	7.868	112	High Extent
	Female	2.62	6.799	118	High Extent
	Total	2.66	7.335	230	High Extent

$\bar{X}$ = mean, SD = standard deviation

The data presented in Table 8 above showed the mean responses of male and female students in federal, state, and private universities in Nigeria on the extent of their use of web-based tools in content accessibility in Nigerian Universities, addressing research question eight which had a mean score of 2.08, 2.73, 3.27 with a standard deviation of 6.725, 7.649, 3.638 for male students in federal, state, and private universities respectively. While female students had a mean score of 2.36, 2.36 and 3.16 with a standard deviation of 6.600, 6.222, and 3.835 for federal, state, and private universities respectively. The table had a total mean of 2.70 with a standard deviation of 7.868 for male students, and a total mean of 2.72 with a standard 6.799 for female students respectively. The implication of this is that both male and students in federal universities utilize web-based tools in content accessibility to a less extent, while those in state, and private universities utilize web-based tools in content accessibility to a high extent in Nigerian Universities. (see appendix k).

Research Question 9

What are the factors that hinder the use of web-based tools for effective delivery of instruction in

Nigerian universities?

Table 9a: Mean responses of lecturers on factors that hinder the use of web-based tools for

effective delivery of instruction in Nigerian Universities. N=148

S/N	Items	$\bar{X}$	SD	Decision
51	Unreliable power supply for the use of electronic devices in teaching and learning.	3.32	.749	High Extent
52	Poor internet service providers for browsing.	3.22	.821	High Extent
53	High cost of áair timeô for browsing.	3.01	.911	High Extent
54	Unavailability of ICT compliant staff for teaching using web based tools.	2.67	.759	High Extent
55	Inadequate funds for the development of web-based instruction.	2.95	.668	High Extent
56	Refusal of Lecturers to adopt new methods of	2.56	.851	High Extent

	teaching.			
57	Time constrains for developing educational computer applications for instruction.	3.16	.814	High Extent
58	High cost of maintaining electronic gadgets discourages their use for learning.	3.26	.792	High Extent
59	Restrictions in accessing online educational materials.	3.01	.918	High Extent
60	Lack of ICT technicians to fix up problems when the need arises.	2.99	.854	High Extent
	Grand Cluster Mean	3.01	4.810	High Extent

$\bar{X}$ = mean, SD = standard deviation

The data presented in Table 9a above showed the mean responses for lecturers in federal, state, and private universities in Nigeria addressing research question nine which had a grand cluster mean of 3.01 with a standard deviation of 4.810. The implication of this is that lecturers agree that unreliable power supply, poor internet service providers for browsing, high cost of áair timeô for browsing, unavailability of ICT compliant staff, inadequate fund, among others are some of the factors that hinder to a high extent the use of web-based tools for effective delivery of instruction in Nigerian Universities. (see appendix k)

Table 9b: Mean responses of students on factors that hinder the use of web-based tools for effective delivery of instruction in Nigerian Universities. N=230

S/N	Items	$\bar{X}$	SD	Decision
51	Unreliable power supply for the use of electronic devices in teaching and learning.	3.11	.815	High Extent
52	Poor internet service providers for browsing.	2.79	.878	High Extent
53	High cost of áair timeô for browsing.	2.81	.900	High Extent
54	Unavailability of ICT compliant staff for teaching using web based tools.	2.56	.879	High Extent
55	Inadequate fund for the development of web-based instruction.	2.63	.818	High Extent
56	Refusal of Lecturers to adopt new	2.64	.898	High Extent

	methods of teaching.			
57	Time constrains for developing educational computer applications for instruction.	3.03	.787	High Extent
58	High cost of maintaining electronic gadgets discourages their use for learning.	3.13	.746	High Extent
59	Restrictions in accessing online educational materials.	2.93	.869	High Extent
60	Lack of ICT technicians to fix up problems when the need arises.	2.75	.850	High Extent
	Grand Cluster Mean	2.83	5.097	High Extent

$\bar{X}$ = mean, SD = standard deviation

The data presented in Table 9b above showed the mean responses for students in federal, state, and private universities in Nigeria addressing research question nine which had a grand cluster mean of 2.83 with a standard deviation of 5.097. The implication of this is that students agree that unreliable power supply, poor internet service providers for browsing, high cost of fair time for browsing, unavailability of ICT compliant staff, inadequate fund, amongst others are some of the factors that hinder to a high extent the use of web-based tools for effective delivery of instruction in Nigerian Universities. (see appendix k)

Hypothesis one: There is no significant difference in the mean ratings of lecturers in Federal, State, and Private universities on the availability of resources for the utilization of web-based tools for effective delivery of instruction.

Table 10: Analysis of Variance (ANOVA) of the mean ratings of lecturers in Federal, State, and Private universities on the extent of availability of resources for the utilization of web-based tools for effective delivery of instruction.

Sources of Variance	Sum of Squares	DF	Mean Square	F	Level of Sig.	Remark
Between Groups	219.390	1	219.390	5.989	.016	Rejected
Within Groups	5348.502	146	36.634			

Total	5567.892	147
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The study showed that Federal Universities had statistically significant lower score (2.0 ± 6.1), State Universities had statistically significant high score (2.5 ± 3.9), and Private Universities had statistically significant high score (2.9 ± 2.9). There was significant difference between the groups by one-way ANOVA, $F(1,146) = 5.989$, $P < 0.05$ or $P = 0.016$. This showed that there was a significant difference in the mean ratings of lecturers in federal, state, and private universities on the extent of availability of resources for the utilization of web-based tools for effective delivery in Nigeria universities. Therefore, the null hypothesis of no significant difference was rejected. (see appendix k)

Hypothesis Two: There is no significant difference in the mean ratings of students in Federal, State, and Private Universities on the availability of resources for the utilization of web-based tools for effective delivery of instruction.

Table 11: Analysis of Variance (ANOVA) of the mean ratings of students in Federal, State, and Private universities on the extent availability of resources for the utilization of web-based tools for effective delivery of instruction.

Sources of Variance	Sum of Squares	DF	Mean Square	F	Level of Sig.	Remark
Between Groups	262.065	1	262.065	7.310	.007	Rejected
Within Groups	8173.831	228	35.850			
Total	8435	229				

The study showed that Federal Universities had statistically significant lower score (2.2 ± 6.7), State Universities had statistically significant high score (2.5 ± 7.1), and Private Universities had statistically significant high score (3.2 ± 3.7). There was significant difference between the groups by one-way ANOVA, $F(1,228) = 7.310$, $P < 0.05$ or $P = 0.007$. This showed that there was a significant difference in the mean ratings of students in federal, state, and private universities on the extent of availability of resources for the utilization of web-based tools for effective delivery of instruction in Nigeria. Therefore, the null hypothesis of no significant difference was rejected. (see appendix k)

Hypothesis Three: There is no significant difference in the mean ratings of male and female lecturers in Federal, State, and Private universities in their utilization of web-based tools in course content delivery of web-based instruction.

Table 12: Analysis of Variance (ANOVA) of the Mean ratings of male and lecturers in Federal, State, and Private universities in the utilization of web-based tools for effective delivery of instruction.

Source	Type III Sum of				
	Squares	Df	Mean Square	F	Sig.
Corrected Model	2129.472 ^a	5	425.894	21.221	.000
Intercept	90896.236	1	90896.236	4529.143	.000
Nameofuniversity	1866.411	2	933.206	46.499	.000
Gender	156.035	1	156.035	7.775	.006

Name of university *					
Gender	15.152	2	7.576	.377	.686
Error	2849.825	142	20.069		
Total	98482.000	148			
Corrected Total	4979.297	147			

a. R Squared = .428 (Adjusted R Squared = .408)

The analysis of variance (ANOVA) presented in table 12 above revealed the mean ratings of male and female lecturers in federal, state, and private universities. The table showed an interaction between university ownership and gender. The study revealed that there was a statistically significant difference in the mean and standard deviation of male and female lecturers in Federal Universities having a lower score (1.9 ± 6.5), (2.2 ± 5.5); State Universities had (2.4 ± 3.7), (2.6 ± 3.9); and Private Universities having a statistically significant score of (2.8 ± 3.3), (3.0 ± 2.5) respectively. There was significant difference between the groups by two-way ANOVA, $F(2, 147) = 7.576$, $P < 0.05$ or $P = 0.686$. This indicates that F value is greater than the significant level; therefore, there was a significant difference in the mean ratings of male and female lecturers in federal, state, and private universities in their utilization of web-based tools for course content delivery of web-based instruction in Nigeria. Therefore, the null hypothesis of no significant difference was rejected. (see appendix k)

The table also have a graph showing distinctly the differences in male and female lecturers in their utilization of web-based tools in course content delivery in federal, state, and private universities. The graph identified male with blue line and female with green line. It showed that male lecturers in federal universities performed very low with estimated marginal means a little above 18 points, and males in state universities with estimated marginal means of 24 points, while male lecturers in private universities had estimated

marginal means above 28 points. On the other hand, female lecturers in federal universities had an estimated marginal means of 22 points, females in state had above 26 points, and females in private universities had estimated marginal means above 30 points. From all indication, male and female lecturers in private universities utilize web tools more than their counterparts in federal and state universities.

Hypothesis four: There is no significant difference in the mean ratings of male and female lecturers in e-assessment of students in Nigerian universities.

Table 13: Analysis of Variance (ANOVA) of the Mean ratings of male and female lecturers in Federal, State, and Private Universities in e-assessment of students in Nigerian universities.

Type III Sum of					
Source	Squares	Df	Mean Square	F	Sig.

Corrected Model	3622.778 ^a	5	724.556	31.018	.000
Intercept	89020.857	1	89020.857	3810.925	.000
Name of university	3256.380	2	1628.190	69.702	.000
Gender	150.256	1	150.256	6.432	.012
Name of university *					
Gender	83.519	2	41.759	1.788	.171
Error	3317.033	142	23.359		
Total	98482.000	148			
Corrected Total	6939.811	147			

a. R Squared = .522 (Adjusted R Squared = .505)

The analysis of variance (ANOVA) presented in table 13 above revealed the mean ratings of male and female lecturers in federal, state, and private universities. The table showed an interaction between university ownership and gender. $F(2, 147) = 1.788$, $P = 0.05$ or $P = 0.171$. This indicates that F value is greater than the significant level; this revealed that there was a significant difference in the mean ratings of male and female lecturers in federal, state, and private universities in their utilization of web-based tools in e-assessment of students in Nigerian universities. Therefore, the null hypothesis of no significant difference was rejected. (see appendix k)

The table also have a graph showing distinctly the differences in male and female lecturers in their utilization of web-based tools in e-assessment of students in federal, state, and private universities. The graph identified male with blue line and female with green line. It showed that male lecturers in federal universities performed very low with estimated marginal means of 18 points, and males in state universities with estimated marginal means above 22 points, while male lecturers in private universities had estimated marginal means of 30 points. On the other hand, female lecturers in federal universities had an estimated

marginal means above 18 points, females in state had above 28 points, and females in private universities had estimated marginal means above 30 points. The graph showed that both male and female lecturers in federal universities performed poorly in the utilization of web tools in e-assessment of students. While male and female lecturers in private universities utilize web tools more than their counterparts in federal and state universities.

Hypothesis Five: There is no significant difference in the mean ratings of students in Federal, State, and Private Universities in their utilization of web-based tools for academic purposes.

Table 14: Analysis of Variance (ANOVA) of the Mean ratings of students in Federal, State, and Private universities in the utilization of web-based tools for academic purposes.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	4416.856 ^a	5	883.371	25.039	.000
Intercept	162924.305	1	162924.305	4618.053	.000
Name of university	3992.363	2	1996.182	56.581	.000
GENDER	27.691	1	27.691	.785	.377
Name of university *					
Gender	400.792	2	200.396	5.680	.004
Error	7902.691	224	35.280		
Total	175804.000	230			
Corrected Total	12319.548	229			

a. R Squared = .359 (Adjusted R Squared = .344)

The analysis of variance (ANOVA) presented in table 14 above revealed the mean ratings of male and female students in federal, state, and private universities. The table showed an interaction between university ownership and gender. The study revealed that

there was a statistically significant difference in the mean and standard deviation of male and female students in Federal Universities having a lower score (2.0 ± 6.7), (2.3 ± 6.6); State Universities had (2.7 ± 7.6), (2.3 ± 6.2); and Private Universities having a statistically significant higher score of (3.2 ± 3.6), (3.1 ± 3.8) respectively. There was significant difference between the groups by two-way ANOVA, $F(2, 229) = 5.680$, $P < 0.05$ or $P = 0.004$. This indicates that F value is greater than the significant level; this showed that there was a significant difference in the mean ratings of students in federal, state, and private universities on the utilization of web-based tools for academic purposes in Nigeria universities. Therefore, the null hypothesis of no significant difference was rejected. (see appendix k)

The table also have a graph showing distinctly the differences in male and female students in their utilization of web-based tools in federal, state, and private universities. The graph identified male with blue line and female with green line. It showed that male students in federal universities performed very low with estimated marginal means a little above 20 points, and males in state universities with estimated marginal means of 27.5 points, while male students in private universities had estimated marginal means of 32.5 points. There was an intercept between females in federal and state universities with estimated marginal means of 23 points, and females in private universities with 32 points. From all indication, male and female students in private universities utilize web tools more than their counterparts in federal and state universities. (see appendix k).

Hypothesis Six: There is no significant difference in the mean rating of male and female students in their utilization of web-based tools in course content accessibility on the web.

Table 15: Analysis of Variance (ANOVA) of the Mean ratings of male and female students in Federal, State, and Private universities in their utilization of web-based tools in course content accessibility on the web.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3761.300 ^a	5	752.260	25.778	.000
Intercept	136609.282	1	136609.282	4681.160	.000
Name of university	3347.675	2	1673.837	57.357	.000
Gender	9.151	1	9.151	.314	.576
Name of university *					
Gender	418.337	2	209.168	7.168	.001
Error	6536.944	224	29.183		
Total	147524.000	230			
Corrected Total	10298.243	229			

a. R Squared = .365 (Adjusted R Squared = .351)

The analysis of variance (ANOVA) presented in table 15 above revealed the mean ratings of male and female students in federal, state, and private universities. The table showed an interaction between university ownership and gender. $F(2, 229) = 7.168$, $P < 0.05$ or $P = 0.001$. This shows that F value is greater than the significant level; therefore, the null hypothesis is rejected. There was a significant different difference in the mean ratings of students in federal, state, and private universities in their utilization of web-based tools in course content accessibility. (see appendix k)

The table also have a graph showing distinctly the differences in male and female students in their utilization of web-based tools in course content accessibility in federal, state, and private universities. The graph identified male with blue line and female with green line.

It showed that male students in federal universities performed very low with estimated marginal means a little above 18 points, and males in state universities with estimated marginal means a little above 24 points, while male students in private universities had estimated marginal means a little above 30 points. There was an intercept between females in federal and state universities with estimated marginal means a little above 22 points, and females in private universities with estimated marginal means above 28 points. From all indication, male and female students in private universities utilize web tools more than their counterparts in federal and state universities.

Summary of Findings for Research Questions

Based on the analysis, the major findings were summarized below:

1. Web-based tools are available for effective delivery of instruction in Nigerian Universities. It was revealed that Private and States Universities had a higher percentage of 100% and 66.7% respectively, while Federal Universities had a lower percentage of 33.3%.
2. Resources such as internet services, web-based learning software, personal laptops, scanners, smart boards, on-line library are available to a high extent, while others are available at a less extent.
3. There is a high extent of utilization of web-based tools for effective delivery of instruction by lecturers and students in Private and State Universities than Federal Universities in Nigerian.
4. Lecturers in Nigerian Universities use web tools in e-assessment of students to a less extent.
5. Female lecturers utilize web-based tools more than their counterparts in Nigerian Universities.

6. Male and female students in Federal universities utilize web-based tools in content accessibility to a less extent.
7. Male students in State universities utilized web tools more than their female counterparts.
8. Both male and female students in Private universities utilize web-based tools to a high extent in content accessibility in Nigerian.
9. Lecturers and students agree to a high extent that factors such as unreliable power supply, poor internet service providers for browsing, high cost of áair timeô for browsing, high cost of maintaining electronic gadgets, restrictions in accessing online educational materials, amongst others hinder the use of web-based tools for effective delivery of instruction in Nigerian Universities.

Summary of Findings for Hypotheses

1. There was a significant difference in the mean ratings of lecturers in federal, state, and private universities on the extent of availability of resources for the utilization of web-based tools for effective delivery of instruction in Nigeria.
2. There was a significant difference in the mean ratings of students in federal, state, and private universities on the extent of availability of resources for the utilization of web-based tools for effective delivery of instruction in Nigeria.
3. There was a significant different difference in the mean ratings of lecturers in federal, state, and private universities in the utilization of web-based tools.
4. There was a significant different difference in the mean ratings of lecturers in federal, state, and private universities in e-assessment of students. There was also a graph showing distinctly the difference between male and female lecturers in their utilization of web-based tool in e-assessment of students.

5. There was a significant different difference in the mean ratings of students in federal, state, and private universities in the utilization of web-based tools for academic purposes.
6. There was a significant different difference in the mean ratings of students in federal, state, and private universities in their utilization of web-based tools in course content accessibility.

CHAPTER FIVE

DISCUSSION, CONCLUSION, IMPLICATIONS, RECOMMENDATION AND SUMMARY

This chapter presents the discussion of the findings, conclusion arising from the findings, educational implications, recommendations, summary, limitations, and suggestions for further research.

Discussion of the Findings

The discussion of the findings was done according to the research questions and hypotheses:

1. Available web-tools for effective delivery of instruction in Nigerian universities.
2. Extent of availability of resources for the utilization of web-based tools for effective delivery of instruction in Federal, State, and Private Universities in Nigeria.

3. Extent of lecturers' and students' utilization of available web-based tools in the delivery of instruction in Nigeria universities.
4. Extent of lecturers' utilization of web-based tools in the delivery of course content in Nigerian universities.
5. Extent of lecturers' use of web-based tools in e-assessment of students in Nigeria universities.
6. Mean responses of lecturers according to gender in the utilization of web-based tools in course content delivery in Nigerian universities.
7. Extent of students' utilization of web-based tools in content accessibility Nigerian universities.
8. Mean responses of students according to gender in the use of web-based tools in content accessibility in Nigerian universities.
9. Factors that hinder the use of web-based tools for effective delivery of instruction in Nigerian universities.

Available web-tools for effective delivery of instruction in Nigerian universities.

The researcher observed in the course of the study that Ict centre, effective internet service on campus, smart board in the departments, e-library for students and lecturers use, content management system, picture management, school management, document management, web conferencing systems, simulation, personal laptops, Bluetooth, wikis, webcam among others are all available in Private and State universities but are not satisfactory in the Federal owned universities. This is consistent with the findings of

Atsumbe, Raymond, Enoch and Patrick (2012), which showed that e- learning infrastructures are not adequate in the university for teaching and learning.

Extent of availability of resources for the utilization of web-based tools for effective delivery of instruction in Federal, State, and Private Universities in Nigeria.

It was deduced from the analysis of responses from lecturers and students relating to research question two that resources such as internet services, web-based learning software, personal laptops, scanners, smart boards, and on-line library are available to a high extent, while others are available to a less extent. However, it was observed that private universities have more resources than their counterparts in other universities. This is in line with Ugwoke (2012) which revealed that majority of the secondary schools in Nsukka zone of Enugu State lacked computer laboratory, superior and original web-based equipment/facilities were not easily accessible. Nevertheless, this is also applicable to the universities in Nigeria.

From the analysis of variance (ANOVA), the findings revealed, that there was a statistically significant difference in the mean ratings of lecturers and students in federal, state, and private universities on the extent of availability of resources for the utilization of web-based tools for effective delivery of instruction in Nigeria. As a result, the null hypothesis of no significant difference was rejected.

Extent of lecturers' utilization of web-based tools in the delivery of course content in Nigerian universities.

The lecturers' role is an important factor in the utilization of web-based tools for effective delivery of instruction. Lecturers with a low perception of the importance of web-based activities may not fully consider how to apply web-based tools strategies to enhance their students' learning. Interestingly, table four and six revealed that there is a high extent of

utilization of web-based tools for effective delivery of instruction in Nigerian Universities by lecturers and students. This is in corroboration with Storey, Phillips, Maczewski, Wang (2009) which indicated that basic usability issues such as navigation, customization, student management and content creation are all important aspects of web-based learning. The concept of usability encompasses such attributes as learnability, efficiency, memorability, handling of user errors, and user satisfaction. Usability centers on the user interface and the degree to which it meets various usability heuristics. Various methods can be employed to examine the usability of web-based tools such as observation, interviews, questionnaires and expert reviews. When the software for web instruction is designed for educational use, additional principles become important, such as the design of learning activities and the learner's ability to control sequence, pacing, presentation medium, and level of difficulty, and this must be put into consideration by the designers of educational software. When lecturers utilize these web-based tools, effective delivery of instruction becomes easier for them which definitely will bring about learning outcome, and will also bridge the gap of access and population explosion in education.

From the analysis of variance (ANOVA), the findings revealed that there was a significant difference in the mean ratings of lecturers in federal, state, and private universities in their utilization of web-based tools for course content delivery of web-based instruction in Nigeria. Therefore, the null hypothesis of no significant difference was rejected.

Extent of lecturers' use of web-based tools in e-assessment of students in Nigerian universities.

The results of the study showed that lecturers in Nigerian universities use web-based tools in e-assessment of students to a less extent. The result however, is contrary to the findings of Ilechukwu (2013) which revealed that religion teachers in tertiary institution in Nigeria are utilizing e-learning applications in their educational delivery services such as preparing and delivering lessons, e-assessment of the students, conducting research. This might be as a result of the package used. As observed by Lu, Finley and McCormack (2009), within the key capacity building of education, it is lecturers who make information alive and empower students, the leaders of tomorrow. With web-based instructional delivery, lecturers are able to teach, communicate, maintain good records and evaluate students' activity. Indeed, web-based tools help to enhance effective teaching, learning and research. It help to reduce distances, virtually, if not physically thus providing greater access to education and input into the world's economy. Hence e-assessment should be included in the planning of web-based instruction, and different e-assessment strategies should be used by lecturers to ensure accommodation of the different learning styles of the students.

From the analysis of variance (ANOVA), the findings showed that there was a significant difference in the mean ratings of male and female lecturers in federal, state, and private universities in their utilization of web-based tools in e-assessment of students in Nigerian universities. Therefore, the null hypothesis of no significant difference was rejected. The table also had a graph showing distinctly the difference between male and female lecturers in their utilization of web-based tool in e-assessment of students.

Mean responses of lecturers according to gender in the utilization of web-based tools in course content delivery in Nigerian universities.

In the society today, web usage is experienced differently by male and female. These experiences have a bearing on the outcomes of the different technological relationships. Thus

the efforts to analyse and explain gender differences in web uptake will fail unless there comes to terms the different experiences of male and female and the specific contexts underlying these experiences. The findings of this study indicated that female lecturers utilize web-based tools more than their male counterparts in Nigerian Universities. This is consistent with the findings of Wong et al (2005) which revealed that there exists a gap between female and male academicians in their ICT skills and in certain applications. It is true that gender issues affect all aspects of the society as regarding their profession, competencies in higher institution and so on, which actually reflects biasness in their performance level. Although most researchers have found male performing better than female especially on higher order knowledge, a few others saw female out-performing the male, while some others established no significant difference particularly during early education.

From the analysis of variance (ANOVA), the findings revealed that there was a significant difference in the mean ratings of male and female lecturers in federal, state, and private universities in their utilization of web-based tools for course content delivery of web-based instruction in Nigeria. Therefore, the null hypothesis of no significant difference was rejected. The table also had a graph showing distinctly the difference between male and female lecturers in their utilization of web-based tool.

Extent of students' utilization of web-based tools for academic purposes in Nigerian universities.

Web-based instruction can be achieved by utilizing any form of the available technological tools; any institution that must engage in any of these new strategies must provide adequate resources in terms of setting up computer laboratories in Information and Communication Technology centres (ICTC) and in each faculty. In today's world, technology is a part of nearly every aspect of almost everyone's daily life. Students of all ages are no

exception to this rule. Because of this, teachers and schools are turning more and more to Web-based educational activities to give students another way to become engaged in learning. The Web has the potential to radically change what we assume about teaching and learning. The constructivist school of learning suggests that learners should be given opportunity to construct personal knowledge from the learning experience. In essence, learners should be given the opportunity to complete assignments and projects that use real life applications and information. Transferring knowledge to real-life situations could assist the learners to develop personal meaning and contextualize the information. From the findings of the results it was revealed that students boot and shutdown computer, use different search engines, send messages via e-mail, and use the web for research works use wikis, save lecture notes online, use the news forum to get announcement to a high extent while they respond to less extent for other items. It was also revealed that there is a high extent of utilization of web-based tools for academic purposes by students in Nigerian Universities. In essence, the university system can accommodate more students by incorporating web-based instruction into the face to face (conventional) method of teaching and learning to increase access to education, and reduce population explosion since students are able to utilize web-based tools.

From the analysis of variance (ANOVA), the findings showed that there was a significant difference in the mean ratings of students in federal, state, and private universities on the utilization of web-based tools for academic purposes in Nigeria universities. Therefore, the null hypothesis of no significant difference was rejected. The table also had a graph showing distinctly the difference between male and female students in their utilization of web-based tool.

Extent of students' utilization of web-based tools in content accessibility Nigerian universities

Web-based tools accessibility is an important factor in effective delivery of web-based instruction; this involves the ability of students to access course content developed on the web. First of all, both the learning content and the learning platform should be accessible by students in order to effectively use these web-based tools. Web tools can be accessed from a range of computer based and internet enabled devices of various sizes, including desktop computers, laptops PDAs and cell phones. However, some students find it difficult to access and use these tools. From the findings of the study, it was revealed that students utilize web-based tools in content accessibility in Nigerian universities to a less extent. This could be as a result of the conventional method of teaching and learning in which is teacher centered. This study is consistent with findings of Evarest and Laura (2011) which revealed that majority of the students do not have access to the available e-learning facilities. Web-based tools are often used with specific technology, or configuration, which can make them less available to students who have limited access capabilities or who are using non-standard computer equipment. Hence, there are some theorist who have supported learners acquiring information either from peers or their environment, the study is also anchored on some of these theories.

The study also upholds Experiential Learning Theory by Kolb which states that, learning is the process whereby knowledge is created through the transformation of experience. Kolb explained his theory in four stages i Concrete Experience, Reflective Observation, Abstract Conceptualization, and Active Experimentation. In web-based instructional delivery, learning takes place through discovery and experience, where the learner has a concrete experience. This implies an active involvement, for effective learning to take place he/she must actually do something and have the opportunity of reflecting and reviewing what has been done and experienced.

Mean responses of students according to gender in the use of web-based tools in content accessibility in Nigerian universities.

Differences in web use offer an opportunity to critically explain gender differences within the context specific experiences of web users. As some scholars have put it, technology is social; therefore, differences between male and female do exist, and can be seen in their respective experiences in society (Morahan-Martin 2004). The findings showed that both male and female students utilize web-based tools such as online forum discussion, access to lecture material, taking of exams online, access to online library, use webquest, among others to a less extent in course content accessibility in Nigerian Universities. Therefore, there is a need to encourage students to facilitate constructivist learning approach; students should construct their own knowledge rather than accepting all that is given by the lecturer. Knowledge construction is facilitated by good interactive web-based instruction, since the students have to take the initiative to learn and to interact with other students and the lecturer, and because the learning agenda is controlled by the student. In web-based instruction, students experience the information at first-hand, rather than receiving filtered information from an instructor whose style or background may differ from theirs. Unlike the conventional classroom, where the teacher contextualizes and personalizes the information to meet their own needs, which may not be appropriate for all learners. In web-based instruction, learners experience the information first-hand, which gives them the opportunity to contextualize and personalize the information themselves.

From the findings, there was no statistical significant difference in the mean ratings of male and female students in federal, state, and private universities in their utilization of web-based tools in course content accessibility on the web. Therefore, the null hypothesis of no significant difference was accepted. The table also had a graph identifying distinctly the

similarities between male and female students in their utilization of web-based tool in course content accessibility.

Factors that hinder the use of web-based tools for effective delivery of instruction in Nigerian universities

In many web-based learning projects, students face some challenges of bad perception during their studies; lecturers may not be knowledgeable enough in coaching or in the use of multimedia tools if they lack telecoaching skill. Gunge (2010) also noted that while the urge to embark on web-based learning is high in Nigeria, it is still a dream because of weak ICT infrastructure, unsensitized populace and technophobia workforce. Gunge further identified high cost of personal computer, laptop, software, internet and the technical support, and power instability, blackout in towns and un-connectedness in rural areas, as problems that militate against utilization of web-based tools for effective delivery of instruction in Nigerian Universities. The results of the study showed that lecturers and students agree to a high extent that factors such as unreliable power supply, poor internet service providers for browsing, high cost of áir timeô for browsing, high cost of maintaining electronic gadgets, restrictions in accessing online educational materials, amongst others hinder the use of web-based tools for effective delivery of instruction in Nigerian Universities. This is consistent with Alu (2011) who identified reliability of technology as a problem. Unless technology becomes reliable, the universe use of web-based learning will be difficult. Alu also pointed out that many web-based learning do not provide enough content for good understanding of subject matter. Some of them for instance, only provide power point slides of lectures and online discussion forum which are not enough for users to obtain a good understanding of the subject content. It was also observed by Davis (2011) that limited access to computer and modems are factors that are detrimental to the success of web-based learning environment.

High cost that must be met by the learners which arises from connecting to internet as a challenge. Connecting to internet might be unreliable, slow or limited and might cause frustration and failure of learning outcome, and learning materials cannot be accessed and downloaded in time to support efficient learning. Therefore, it can be concluded that these problem and others, slow down the pace of utilizing web-based tools for effective delivery of instruction in Nigerian Universities.

Conclusion

The rapid expansion of the Internet and increasing software capabilities are influencing dynamics of teaching and learning at many different levels. Web-based learning tools are constantly being re-designed by the developers to improve their effectiveness. Both moodle and Blackboard have newer versions of their course tools that can be utilized for academic purposes. The usefulness and effectiveness of these tools are contextual, depending on many different factors including the design of the tool itself. Feedback from real users, such as students, is important to provide input into further tool improvement.

Nonetheless, from the researchers observation, in course of the study it can be deduced that web-based course supplements are widely accepted by students, and at times even expected, as being part of students' experiences in education but do not have full access to experiencing it because of factors mention earlier. If the tools are not available, it cannot be used or implemented in the university system, hence, the positive support for learning can be reversed. The tools themselves can impact students' perceived learning in positive or negative ways. Therefore, training programmes, questioning of implementation processes as well as reflection and usability studies on how, when and why web-based tools are used is essential to ensure that chosen tools achieve what they are designed to accomplish. Hence, the study has revealed that web-based tools for academic purposes are available in Private and State universities but are not satisfactory in the Federal owned universities.

Also, it was revealed that lecturers and students utilize web-based tools for effective delivery of instruction to a high extent in Nigerian Universities. However, on the contrary, it also revealed that lecturers use web-based tools in e-assessment of students to a less extent. Students also utilize web-based tools in content accessibility to a less extent in Nigerian Universities.

There was a statistically significant difference in the mean ratings of lecturers and students in federal, state, and private universities on the extent of availability of resources for the utilization of web-based tools for effective delivery of instruction in Nigerian universities.

The study also shows that lectures in private universities utilizes web-based tools for course content more than their counterparts in federal, and state universities, while lecturers in federal universities are the least in the utilization of web-based tools for course content delivery in Nigerian universities.

The study showed that there was a statistically significant difference in the mean ratings of male and female lecturers in federal, state, and private universities in their utilization of web-based tools in e-assessment of students in Nigerian universities. Also, that female lecturers in federal, state, and private universities utilizes web-based tools for e-assessment of students more than their male counterparts.

There was a significant difference in the mean ratings of students in federal, state, and private universities on the utilization of web-based tools for academic purposes in Nigeria universities. Female students in federal universities utilizes web-based tools for academic purposes more than their male counterparts, on the other hand, male students in state and private universities utilizes web-based tools for academic purposes more than their female counterparts.

Educational Implications for Web-Based Instruction

The findings of this study have educational implications for lecturers, students, educational Administrators/instructional designers. The study revealed that lecturers use web-based tools in e-assessment of students to a less extent in Nigerian Universities. This has an effect on the educational system, because the international world has moved to a state of globalization, utilizing the web for almost every activity both for academic purpose and all aspect of life. The web is being used for online applications such as employment, registration of all kind, writing of articles, interview, admission, among others. A major factor to achieving the mission and vision of any university system is the lecturer. According to UNESCO (2007), cited in Onuzulike, (2011) there is a plethora of evidence suggesting that lecturers quantity, quality and motivation exert noteworthy effects on a host of university. Hence, lecturers's ability to utilize web-based tools will help to enhance effective web-based instruction in Nigerian universities.

The study also found out that students utilize web-based tools in content accessibility to a less extent in Nigerian Universities. For web-based instruction to effectively achieve its purpose, students must be tested to determine whether or not they have achieved the learning outcome. Online testing or other forms of testing and assessment should be integrated into the learning sequence to check the learner's achievement level and to provide appropriate feedback. Learning materials must be sequenced appropriately to promote learning. The sequencing could take the form of simple to complex, known to unknown, and knowledge to application. Online learning materials should include activities for the different learning styles, so that learners can select appropriate activities based on their preferred style. Concrete-experience learners prefer specific examples in which they can be involved, and they relate to peers and not to people in authority. They like group work and peer feedback, and they see the instructor as coach or helper. These learners prefer support methods that allow them to interact with peers and obtain coaching from the instructor. Reflective-

observation learners like to observe carefully before taking any action. They prefer that all the information be available for learning, and see the instructor as the expert. They tend to avoid interaction with others. Abstract conceptualization learners like to work more with things and symbols and less with people. They like to work with theory and to conduct systematic analyses. Active-experimentation learners prefer to learn by doing practical projects and through group discussions. They prefer active learning methods and interacting with peers for feedback and information. They tend to establish their own criteria for evaluating situations.

From the findings of the study, educational administrators/ instructional designers are to ensure universality in access and usability of web-based instruction across campus and universities for every student. They should also carefully consider design quality and usability of web tools before selecting a technology. The study will enable them to plan and integrate web-based instruction in the university curriculum. This will also help them to assess the importance of web-based instructional-techniques towards the performance of students, and also to assess the extent to which courses are effectively taught in Nigerian Universities and indeed, provide insight into the extent to which the objectives of teaching these courses in the universities are being realized. It is important, especially in instructional technology; this will enable them to create a bridge between the theoretical and the practical approach to create web-based instruction that will add value in terms of quality and effectiveness to teaching and learning.

Recommendations

Based on the findings of the study, the following are recommended:

- Federal Ministry of Education should through the NUC direct all universities in Nigeria to provide opportunities for greater access to university education through web-based instruction. Lecturers must be trained to be highly computer literate and

facilitate web-based learning. This will provide a large number of students access to university education, and reduce population in the conventional classroom.

- Faculties of Education in universities should improve in their web-based learning/teaching programmes and source grants to promote the use of web instruction.
- Workshops, trainings and refresher courses on the use of web-based tools for education should be made available to all lecturers and students in the universities.
- Computers, laptops, ipads and other mobile devices should be made accessible to all lecturers and students in education through subsidies and loan facilities.
- Broadband facilities should be readily available in the university campuses to enhance the use of web-based tools for teaching and learning.

Summary

Beautiful as the application of Web-based tools may look, it may not work well because of the attitude of Nigerian academics to Information Communication Technology (ICT) compliance generally. The skills of using these tools may not be easily acquired and thus may militate against their adoption. Many of our Universities may not be able to use Web-based tools despite the fact that some are even free on the web. Consequently the study suggests that due to the complexity surrounding the use of some of the Web-based tools, it is better to adopt the principle of learning from simple to complex. Lecturers can start by giving assignments through the web, mark them and send them back to student through the same web channel. Students can be made to submit their questions on lecture topics through the web and explanations on such topics can also be sent back to the students through the web. Lectures can be delivered using multimedia projector and laptops connected to the internet, in which case internet materials can be utilized on the spot if the need arises. Subsequently, the more complex Web-based materials can then be gradually introduced.

Limitations of the Study

1. Universities were not ready to give out vital information such as data (number of lecturers and students) which posed a great challenge to the study.
2. The study covered only three universities; one federal, one state, and one private in South-South Nigeria, after which generalizations of the findings were made to include all the universities in Nigeria.
3. Some universities were already rounding off their second semester examinations as at the time of data collection which delayed the study and as a result decreased the sample size of the study.

Suggestions for Further Studies

1. Although some research has been done on web-based instruction, further research should be employed to examine the value of allowing students to share their learning experiences in synchronous-asynchronous environments at all levels. Additionally, another delivery method, blended, a combination of the face-to-face and web-based format, can be used to help enhance learning experience in Nigerian universities.
2. Another research study may investigate the attitudes and perceptions of lecturers on web-based learning. The lecturers perceptions and attitudes may affect the performance in the online environment. Since the time and efforts spent on more than one environment is not negligibly small, the lecturers's point of view is important in the evaluation of web-based learning environments.
3. Further study can also be carried out to assess competencies of lecturers and students in the utilization of web-based tool in Nigerian universities.

REFERENCES

- Abonyi, N.N. (2006). New dimensions of cult activities in tertiary institutions in Nigeria: The case of university undergraduates. *International Journal of Social and Policy Issues*, 4 (1&2), 1-23.
- Adeleke M. A. (2008). Strategic improvement of mathematical problem- solving performance of secondary school students using procedural and conceptual learning strategies: The African Symposium. *An online Journal of African Educational Research Network*, 8(1), 143-149.
- Afinsulu, F (2013). *UTME: Over one million candidates will be denied admission*. Retrieved from <http://dailypost.co/utme-over-one-million-candidates>.
- Aho, S., & Laine, K. (2002). *Minä ja muut. Kasvaminen sosiaaliseen vuorovaikutukseen*: Helsinki Otava.
- Akubue, F.N., & Okolo, A.N. (2008). *Sociology of education*. Nsukka: Great AP Express Publishers LTD.
- Almpanis, T., Miller, E., Ross, M., Price, D., & James, R. (2011). Evaluating the use of web conferencing software to enhance flexible curriculum delivery. In: *Ireland International Conference on Education - IICE, Dublin Ireland*.
- Alu, N. C. (2011). Utilizing e-learning in science and technology education.problems and prospects: In O.Onyegegbu, & U.Eze, (Eds), *Optimizing e-learning opportunities for effective education service delivery. A Publication of the Institute of Education: University of Nigeria, Nsukka*.
- Ashby, J., Sadera, W. A., & McNary, S. W. (2011). Comparing students'success between developmental math courses offered online, blended, and face-to-face. *Journal of Interactive Online Learning*, 10(3), 128-140.
- Atsumbe, B. N., Raymond, E., Enoch, E. B., & Patrick, D. (2012). Availability and utilization of e-learning infrastructures in Federal University of Technology, Minna. *Journal of Education and Practice*, 3(13)
- Barron, A. (1998). Designing Web-based training. *British Journal of Educational Technology*, 29(4), 355-371.
- Barrows, H .S. (2000). *Problem-Based learning applied to medical education*. Southern Illinois University School of Medicine, Springfield, Ill.
- Bauer, W., & Kurtemeyer, G. (2005). Resource sharing in an open source course management environment. Retrieved from <http://www.ict.org.italy>.

- Berge, Z. (2007). Guiding principles in web-based instructional design. *Education Media International*, 35(2), 72-76.
- Bower, M. (2011). Synchronous collaboration competencies in web-conferencing environments their impact on the learning process. *Distance Education*, 32(1), 63–83.
- Bruning, H., Schraw, G. J., Norby, M.M., & Ronning, R.R. (2004). *Cognitive psychology and instruction*. Upper Saddle River, NJ: Pearson Education, Inc.
- Bull, K. S., Kimball, S. L., & Stansberry, S. (1998). Instructional design in computer mediated learning. paper presented at the coming together: Preparing for rural special education in the 21st century. Conference Proceedings of the American Council on Rural Special Education, U.S., Oklahoma.
- Cerny, J., Amundson, M., Mueller, C., & Waldron, J. (2001). Inquiry-based learning, nursing student attitudes and the HIV patient. *Journal of Nursing Education*, 35, 219-222.
- Chesler, M. & Fox, R. (1966). *Role playing methods in the classroom*. Chicago, Science Research Associates.
- Cockburn, C. & Ormrod, S. (1993). *Gender and technology in the making*. London, SAGE.
- Davis, M. R. (2011). Online credit recovery emphasizes personalized learning: Education Week. Retrieved from <http://www.edweek.org/ew/articles/15edtech.credit>.
- Dougiamas, M. & Taylor, P. C. (2003) *Moodle: Using learning communities to create an open source course management system*. National Key Centre for Science and Mathematics Education, Curtin University of Technology. Australia.
- Duffy, T., & Cunningham, D. (1996). *Constructivism: Implications for the design and delivery of instruction, Handbook of research for educational telecommunications and technology*. New York: MacMillan, 170-198.
- Edukugbo, E. (2012). *Admission scramble: It's survival of the brightest*. Retrieval date 20th September, 2013.
- Egura Oromena F. (2010). *Effect of computer simulation on achievement and interest of students in algebra at junior secondary school level (Master's thesis)*. University of Nigeria: Nsukka.
- Ekabua, (2007). Nigerian graduating students access to e-learning technology: Implication for higher education management. *Proceedings of the 6th International internet Education conference*, 59-76.
- Enaohwo, J.K. (2008). Access, cost and quality in Nigerian education. In B.G. Nworgu & E.I. Eke (Eds.), *Access, quality and cost in Nigerian education (pp.3-19)*. Published Proceeding of the 23rd Annual Congress of the Nigerian Academy of Education.

- Evans, J.R., & Haase, I.M. (2001). *Online business education in the twenty-first century: An analysis of potential target markets, internet research: Networking Applications and Policy*, 11(3), 246-260.
- Evarest, C. M., & Laura A. P. (2011). Learning electronically in Nigeria universities : The example of federal university of technology Minna, Nigeria. *Journal of Emerging Trends in Computing and Information Sciences*, 2 (12), 696-700.
- Ewing, J., Dowling, J., & Coutts, N. (2009). Learning using the World Wide Web: A collaborative learning event. *Journal of Educational Multimedia and Hypermedia*, 8(1), 3-22.
- Ezeh, D.N. (2005). *What to write and how to write, a step-by-step guide to educational research proposal and report*. Enugu: Pearl and Gold Publishers.
- Ferguson, K. & Wijekumar (2000). Effective design & use of web-based distance learning environments. *American Society of Safety Engineers* 28-32.
- Glass, R. (2000). Integrating ethics into information systems course: A multi-method approach based on role playing. *Journal of IS education*, 6(4), 15.
- Gordon, S., He, W., & Abdous, M. (2009). Using a web-based system to estimate the cost of online course production. *Online Journal of Distance Learning Administration* 12(3). Retrived from <http://www.westga.edu/~distance/ojdla/fall123/gordon123.html>.
- Gunga, S. O. (2010). Challenges of implementation of E-learning in Mathematics, Science and Technology Education (MSTE) in African schools: A Critical Review: *Journal of Contemporary Issues in Education*, 5 (1), 45-51. Retrieved from <http://ojs.edu.valbertafundex.pjp/jcied>.
- Hafkin and Taggart (2006). *Gender, Information Technology, and developing countries: An analytical*.
- Haraway, D. (1991). Situated knowledges: The science question in feminism and the privilege of partial perspective. Simians, cyborgs , and women. *Feminist Studies*, 14(3), 575-599.
- Harbor-Harbor . (2009). Alternative assessment techniques. *Journal for Research in Mathematics Education* , 30 (5) 37-52.
- Harding. (1991). *Whose science? Whose knowledge?: Thinking from women's lives*. Buckingham: Open University Press.
- Hein, G. E. (1991). *Constructivist Learning Theory*. Hershey, PA: Information Science Publishing. Retrieved from <http://www.exploratorium.edu/IFI/resources/constructivistlearning.html>.
- Honey, P., (2001). E-learning: A performance appraisal and some suggestions for improvement. *The Learning Organization* , 8 (5), 200-202. Retrieved from <http://www.ed.gov/offices/AC/WBEC/FinalReport/WBECReport.pdf>

- Hornby, A.S. (2010). *Oxford Advanced Learner's Dictionary*. International Student's Edition, (8th ed) Oxford University Press.
- Ilechukwu, L. C. (2011). Challenges of implementation of e-learning technology in Religious studies in primary schools in Enugu State. In Onyegegbu, N. & Eze, U. (eds) *Optimizing E-learning Opportunities for Effective Education Service Delivery. Publication of Institute of Education University of Nigeria, Nsukka*.
- Ilechukwu, L. C. (2013). The assessment of utilization of e-learning opportunities for effective teaching and learning of religion in Nigerian Tertiary Institutions. *European Journal of Educational Studies* 5(3), Ozean Publication.
- Itedjere, P.O. (1997). *History of education*. Benin City, Nigeria: Osasu Publication.
- Jonassen, D., & Reeves, T. (1996). Learning with computers: Computers as cognitive tools. In D. Jonassen (Ed.), *Handbook of Research for Educational Communications and Technology* (693-719). New York: MacMillan Library Reference.
- Khan, B. (1997). *Web-based instruction*. Englewood Cliffs, New Jersey: Educational Technology Publications.
- Kilby, T. (2008). What constitutes quality in web-based training? WBTIC. Retrieved November 20th, 2013, from http://www.webbasedtraining.com/primer_quality.aspx
- Kolb, D.A. (1984). *Experiential Learning: Experience as the source of learning and development*. New Jersey: Prentice-Hall.
- Korhonen, V. (2004). *Verkko-opetus ja yliopistopedagogiikka*. Tampere.
- Kwan, R., & Fong, J. (2005). Web-based learning: Technology and pedagogy. Proceedings of the 4th International Conference: Hong Kong. Singapore: World Scientific Publishing. Retrived date 13th March, 2014.
- Leahy, S., Lyon, C., Thompson, M., & Wiliam, D. (2005). Classroom assessment, minute by minute, day by day. *Educational Leadership*, 63(3), 19-24.
- Lebow, D. (1993). Constructivist values for instructional systems design: Five principles toward a new mindset. *Educational Technology, Research and Development*, 41(3), 4-16.
- Light, D., & Pierson, E. (2011). Increasing ICT use with students around the world: Intel Teach Essentials survey results from 13 participating countries. EDC/Center for Children and Technology.
- Loch, B., & Reushle, S. (2008). The practice of web conferencing: where are we now? In: Ascilite, 25th annual conference of the Australasian society for computers in learning in tertiary education: hello! Where are you in the landscape of educational technology? Melbourne, Australia.
- Magnusson, L., Ishida, D., & Itano, J. (2000). The impact of the use of inquiry-based learning as a teaching methodology on the development of critical thinking. *Journal of Nursing Education*, 39(8), 360-364.

- Magoulis, G.D., & Chen, S. Y. (2006). *Advances in web-based education: Personalized learning environments*. Hershey, PA: Information Science Publishing.
- Mahwish, W., & Farooq, H.M. (2009). *Empirical study of learner contentment towards e-Learning: Influential Role of Key Factors*. International Islamic University.
- Manochehr , N.N. (2006). The influence of learning styles of learners in e-learning environments: An Empirical Study. Information systems department, Qatar university. CHEER, 18, 10-14.
- Maor, D. (2003). The teacher's role in developing interaction and reflection in an online learning community.
- McClelland, B. (2001). Digital learning and teaching: evaluation of developments for students in higher education. *European Journal of Engineering Education*, 26, 107-115.
- Minna, N.(2007). *Emotions in a Web-based Learning Environment*. University of Turku: Finland.
- Morahan-Martin, J. (2004) Women and the Internet: Promise and Perils. *Cyber Psychology and behaviour* 3 (5). 683-691 Routledge
- Morgan, G. (2001). Thirteen "Must Ask" Questions About E-Learning Products And Services. *The Learning Organisation* 8(5): 203-211.
- Morss, D. A., & Fleming, P. A. (1998). WebCT in the Classroom. A Student View. North American Web Developers Conference.
- National Universities Commission Board (2013). Retrieved date; 23th May, 2014 from <http://www.nuc.edu.ng/pages/universities.asp>.
- Ndume, V. (2008). Challenge of adaptive e-learning at higher learning institutions: A case study in Tanzania. *International Journal of Computing and ICT Research*. 2 (1), 104-111.
- Nielsen, J. (2010). *Usability engineering*. Academic Press: Boston.
- Nworgu, B. G. (2006). *Educational research: Basic issues and methodology*. Second & Enlarged Edition, Ibadan: Wisdom Publishers.
- Ofoegbu, T., Agboeze, M.U., & Anyanwu, J.I. (2013). Web browsing competencies of pre-service adult facilitators: implications for curriculum transformation and distance learning. University of Nigeria, Nsukka.
- Okeke, E.A.C. (2008). Access in Nigerian education. In B.G. Nworgu & E.I. Eke (Eds.) *Access, quality and cost in Nigerian education* (pp. 20- 34). Published Proceedings of the 23rd Annual Congress of the Nigerian Academy of Education.

- O'Neil, H.F., & Perez, R.S. (2003). *Web-based learning: Theory, research, and practice*. Mahwah, N.J: Lawrence Erlbaum Associates.
- Onuzulike, I. (2011). Information and communication technology competencies of english language teachers in unity schools of south-east zone of nigeria. Masters thesis, University of Nigeria: Nsukka.
- Pachler, N., Mellar, H., Daly, C., Mor, Y., Wiliam, D., & Laurillard, D. (2009). *Scoping a vision for formative e-assessment: A project report for JISC*. London: London Knowledge Lab.
- Pantel, C. (2007). A Framework for comparing web-based learning environments. Master's thesis, School of Computing Science, Simon Fraser University, Canada.
- Porter, L.R. (2004). *Developing an online curriculum: Technologies and techniques*. Hershey, PA: Information Science Publishing.
- Rosenberg, M.J. (2001). *e-Learning: Strategies for delivering knowledge in the digital age*. New York: McGraw Hill.
- Salovaara, H. (2005). Achievement goals and cognitive learning strategies in dynamic context of learning, Acta Universitatis Ouluensis: Scientiae Rerum Socialium.
- Sandra, H. (2004). The Feminist Standpoint Theory reader: Intellectual and political controversies, study, Learn Link Project, Academy for Educational Development. Retrieved on 13th february, 2014 from http://learnlink.aed.org/Publications/Gender_Book/pdf/Gender_Book_Photos.pdf
- ScanNews (2013). UTME: Only 500,000 Prospective Students to Gain Admission to Nigerian Universities. Retrieved from <http://scannewsnigeria.com/featured-post/utme-org>
- Sendall, P., Ceccucci, W., & Peslak, A. (2008). "[Web 2.0 Matters: An Analysis of Implementing Web 2.0 in the Classroom](#)". *Information Systems Education Journal*, 6 (64). Retrieved date 4th April, 2014.
- Serpil, H. Y.(2012). *The effects of web-based distance mathematics instruction on mathematics attitudes and achievements: The case of Erzurum vocational school: Atatürk University*.
- Shneiderman, B. (2011). *Designing the user interface: Strategies for effective human-computer interactions*, (3rd ed). Addison-Wesley.
- Smith, A.D., & Ragan, W.T. (2005). "Managerial implications of computer-based online/face-to-face business education: a case study" *Online Information Review*, 28 (2), 100-109.
- Storey, M.A., Bavelas, J., Wang, M., & Phillips, B. (2009). *Invited plenary presentation: The importance of usability testing for web-based learning tools. Educational Technology Conference Series, University of Victoria: Victoria, B.C. Canada*.

- Web-Based Education Commission. (2005). *The power of the Internet for learning: Moving from promise to practice*: Report of the Web-Based Commission to the Congress of the United States. Retrieved date March 7, 2014. From <http://www.ed.gov/offices/AC/WBEC/FinalReport/WBECReport.pdf>
- Ugwoke, S.C. (2013). Secondary school srincipalsô perception of problems associated with web-based learning in Nsukka Education Zone. Review of education. *Institute Of Education Journal, University Of Nigeria, Nsukka*. 24 (1), 89-102.
- UNESCO Bangkok. (2006). *Web-based tools for educators*. Thailand, Asia-Pacific Programme of Educational Innovation for Development (APEID) CD ROM.
- Vainionpää, J. (2006). Erilaiset oppijat ja oppimateriaalit verkko-opiskelussa. *Tampere* 102, (7), 371-380.
- Verkko-tutor. (2005). Tampereen yliopiston täydennyskoulutuskeskus. Available: <http://www.uta.fi/tyt/verkkotutor>.
- Vygotski, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, Massachusetts: Harvard University Press.
- Weigel, V. B. (2002). *Deep learning for a digital age: Technology's untapped potential to enrich higher education*.
- Wong, S. L., Sidek, A. A., Aida, S. M. Y., Zakaria, S., Kamariah. A.B., Hamidah. M., & Hanafi, A. (2005). Gender Differences in ICT Competencies among Academicians at Universiti Putra Malaysia. *Malaysian Online Journal of Instructional Technology (MOJIT)*. 2 (3), 62-69.

APPENDIX A

Lists of Federal Universities in Nigeria

S/N	NAME OF UNIVERSITY	LOCATION
1	Abubakar Tafawa Balewa University	Bauchi
2	Ahmadu Bello University	Zaria
3	Bayero University	Kano
4	Federal University of Petroleum Resources	Effurun
5	Federal University of Technology	Akure
6	Federal University of Technology	Minna
7	Federal University of Technology	Owerri
8	Federal University, Dutse	Jigawa State
9	Federal University, Dutsin-Ma	Katsina
10	Federal University, Kashere	Gombe State
11	Federal University, Lafia	Nasarawa State
12	Federal University, Lokoja	Kogi State
13	Federal University, Ndufu-Alike	Ebonyi State
14	Federal University, Otuoke	Bayelsa
15	Federal University, Oye-Ekiti	Ekiti State
16	Federal University, Wukari	Taraba State
17	Michael Okpara University of Agriculture	Umudike
18	Modibbo Adama University of Technology	Yola

19	National Open University of Nigeria	Lagos
20	Nigerian Defence Academy	Kaduna
21	Nnamdi Azikiwe University	Awka
22	Obafemi Awolowo University	Ile-Ife
23	University of Abuja	Gwagwalada
24	University of Agriculture	Abeokuta
25	University of Agriculture	Makurdi
26	University of Benin	Benin
27	University of Calabar	Calabar
28	University of Ibadan	Ibadan
29	University of Ilorin	Ilorin
30	University of Jos	Jos
31	University of Lagos	Lagos
32	University of Maiduguri	Maiduguri
33	University of Nigeria, Nsukka	Nsukka
34	University of Port-Harcourt	Port-Harcourt
35	University of Uyo	Uyo
36	Usman Danfodio University	Sokoto

Lists of State Universities in Nigeria

S/N	NAME OF UNIVERSITY	LOCATION
1	Abia State University	Uturu
2	Adamawa State University	Mubi
3	Adekunle Ajasin University,	Akungba
4	Akwa Ibom State University of Technology	Uyo
5	Ambrose Alli University	Ekpoma
6	Anambra State University of Science & Technology	Uli
7	Bauchi State University	Gadau
8	Benue State University,	Makurdi
9	Bukar Abba Ibrahim University	Damaturu
10	Cross River State University of Science & Technology	Calabar
11	Delta State University	Abraka
12	Ebonyi State University	Abakaliki
13	Ekiti State University	Ado-Ekiti
14	Ekiti State University of Science and Technology	Ekiti State
15	Enugu State University of Science and Technology	Enugu
16	Evan Enwerem University (Imo State University)	Owerri
17	Gombe State Univeristy	Gombe
18	Ibrahim Badamasi Babangida University	Lapai
19	Kaduna State University	Kaduna

20	Kano University of Science & Technology	Wudil
21	Kebbi State University	Kebbi
22	Kogi State University	Anyigba
23	Kwara State University	Ilorin
24	Ladoke Akintola University of Technology	Ogbomoso
25	Lagos State University Ojo,	Lagos.
26	Nasarawa State University,	Keffi
27	Niger Delta University, Yenagoa	Yenagoa
28	Olabisi Onabanjo University	Ago-Iwoye
29	Ondo State University of Science & Technology,	Okitipupa
30	Osun State University,	Oshogbo
31	Plateau State University,	Bokkos
32	Rivers State University of Science & Technology	Port Harcourt
33	Sokoto State University,	Sokoto
34	Tai Solarin Univ. of Education,	Ijebu-Ode
35	Taraba State University,	Jalingo
36	Umaru Musa Yar'Adua University,	Katsina
37	University of Education,	Ikere Ekiti

Lists of Private Universities in Nigeria

S/N	NAME OF UNIVERSITY	LOCATION
1	Achievers University	Owo
2	Adeleke University	Ede.
3	Afe Babalola University, Ado-Ekiti	Ekiti State
4	African University of Science & Technology	Abuja
5	Ajayi Crowther University, Oyo Town.	Ibadan
6	Al-Hikmah University	Ilorin
7	American University of Nigeria	Yola
8	Babcock University	Ilishan-Remo
9	Baze University .	Kuchigoro
10	Bells University of Technology	Otta
11	Benson Idahosa University	Benin City
12	Bingham University	New Karu
13	Bowen University	Iwo
14	Caleb University	Lagos
15	Caritas University	Enugu
16	CETEP City University	Ibadan
17	Covenant University	Ota
18	Crawford University	Igbesa
19	Crescent University	Abeokuta

20	Elizade University	Ilara-Mokin
21	Evangel University	Akaeze
22	Fountain Unveristy	Oshogbo
23	Godfrey Okoye University, Ugwuomu-Nike	Enugu State
24	Gregory University	Uturu
25	Igbinedion University	Okada
26	Joseph Ayo Babalola University	Ikeji-Arakeji
27	Katsina University	Katsina
28	Landmark University.	Omu-Aran
29	Lead City University.	Ibadan
30	Madonna University	Okija
31	Mcperson University, Seriki Sotayo.	Ajebo
32	Nigerian-Turkish Nile University	Abuja
33	Novena University	Ogume
34	Obong University	Obong Ntak
35	Oduduwa University, Ipetumodu .	Osun State
36	Pan-African University	Lagos
37	Paul University, Awka	Anambra State
38	Redeemer's University	Mowe
39	Renaissance University	Enugu
40	Rhema University, Obeama-Asa	Rivers State
41	Salem University	Lokoja
42	Samuel Adegboyega University.	Ogwa
43	Southwestern University	Oku Owa
44	Tansian University	Umunya
45	University of Mkar	Mkar
46	Veritas University	Abuja
47	Wellspring University, Evbuobanosa .	Edo State
48	Wesley Univ. of Science & Tech.	Ondo
49	Western Delta University	Oghara
50	Wukari Jubilee University	

APPENDIX B

Lists of Universities in South-South Geo-Political Zone of Nigeria

S/N	NAME OF UNIVERSITY	LOCATION
1	Akwa Ibom State University of Technology	Uyo
2	Ambrose Alli University	Ekpoma
3	Benson Idahosa University	Benin City
4	Cross River State University of Science & Technology	Calabar
5	Delta State University	Abraka
6	Federal University, Otuoke	Bayelsa
7	Madonna University	Okija

8	Niger Delta University, Yenagoa	Yenagoa
9	Igbinedion University	Okada
10	Rhema University, Obeama-Asa	Rivers State
11	Rivers State University of Science & Technology	Port Harcourt
12	University of Benin	Benin
13	University of Calabar	Calabar
14	University of Port-Harcourt	Port-Harcourt
15	University of Uyo	Uyo
16	Wellspring University, Evbuobanosa .	Edo State
17	Wesley Univ. of Science & Tech.	Ondo

APPENDIX C

POPULATION IN FACULTY OF EDUCATION IN SOME SELECTED UNIVERSITIES IN SOUTH-SOUTH GEO-POLITICAL ZONE OF NIGERIA

YEAR Name of university	YR 1	YR 2	YR 3	YR 4	PG	LECTURER S	TOTA L
Calabar	345	319	319	317	28	107	13406

	4	4	2	4	5		
University of Sci. & Technolog y	485 1	473 1	466 8	430 6	39 5	138	19089
Igbinedion	880	824	761	671	-	49	3185
TOTAL	918 5	874 9	862 1	815 1	68 0	294	35680

APPENDIX D

Using the Taro Yemenô's formula (1964) to obtain the sample size

$$n = \frac{N}{1 + N (e)^2}$$

Where n = Sample Size

N = Population

e = level of Significance

1 = Constant

Therefore

n =?

N = 35680

e = 0.05

1 = 1

Factoring in, we have

$$n = \frac{35680}{1 + 35680 \times (0.05)^2}$$

$$n = \frac{35680}{1 + 35680 \times (0.0025)}$$

$$\frac{35680}{1 + 89.2}$$

$$\frac{35680}{90.2}$$

$$n = 395$$

APPENDIX E

QUESTIONNAIRE ON

Availability and Utilization of Web-based tools for Effective Delivery of Instruction

Dear respondents,

This questionnaire is part of a research project on the study of the Availability and Utilization of web-based tools for effective delivery of instruction in Nigerian Universities. Kindly respond as honestly as possible to the questions below by ticking (ã) on whatever option you feel is most appropriate in each case, only one option is accepted. Your responses will purely be used for research purposes to improve the standard of education in Nigerian universities.

Section A

PERSONAL INFORMATION OF RESPONDENTS

Instructions:

Please fill in the blank spaces or tick (ã) as applicable

1. **NAME OF UNIVERSITY** _____

2. **Sex:** male ☐ female ☐

3. Status of Respondent:

A. Lecturer ☐ B. Student ☐

Section B

kindly use the following key to indicate your chosen response to the following questionnaire items:

(a) Very High Extent (VHE); High Extent (HE); Low Extent (LE); Very Low Extent (VLE).

(b) Strongly Agree (SA); Agree (A); Disagree (D); Strongly Disagree (SD).

NOTE: Lectures are to respond to section A and section B; clusters A, B, C, and F. while students are to respond to section A and section B; clusters A, D, E, and F.

Cluster (A)

To what extent are resources available for the utilization of web-based tools for effective delivery of instruction in Federal, State, and Private universities in Nigeria?

S/N	ITEMS	VHE	HE	LE	VLE
	Availability of				
1	Internet services in the university.				
2	Web-based learning software such as Moodle and blackboard for instruction in my university.				
3	Personal laptops.				
4	Scanners to aid instruction.				

5	Smart board in the departments for instruction.				
6	Document Management system to enhance instruction.				
7	On-line library in your university for use by students and lecturers.				
8	Weblog for academic purpose,				
9	Wikis for academic purpose				
10	Podcast for academic purpose.				

Cluster (B)

To what extent do lecturers utilize available web-based tools in the delivery of course content in Nigerian universities?

S/N	ITEMS	VHE	HE	LE	VLE
11	I download and upload files on the web effectively.				
12	I design and change homepage on the web.				
13	I develop course content on the web using content management system.				
14	I add images, sound clips, and video clips to course content on the web.				
15	I create and update website for my class with new materials.				
16	I make Backups of my lecture notes and important documents online.				
17	I use the News forum link to give general announcements and reminders to students about upcoming events.				
18	I use flash drives/external hard drives to store documents for future references				
19	I scan and edit articles and upload online for academic purpose.				
20	I add and attach document in blogs entry for academic purpose.				

Cluster (C)

To what extent do lecturers use web-based tools in e-assessment of students in Nigerian universities?

S/N	ITEMS	VHE	HE	LE	VLE
21	I log into the system with my personal username and password.				
22	I engage and track students' interaction online.				
23	I conduct discussion class with my students online.				
24	Students post their assignments to my e-mail box.				
25	I conduct quizzes for my students online.				

26	I conduct e-testing for my students.				
27	I use the calendar feature, (giving date) to post assignments and announcements to students online.				
28	I refer students to educational sites.				
29	I assess students' ability to use web tools in learning process online.				
30	I grade assignments submitted by students online using the grade book.				

Cluster (D)

To what extent do students utilize web-based tools for academic purposes in Nigerian universities?

S/N	ITEMS	VHE	HE	LE	VLE
31	I boot and shut down the computer system.				
32	I log on to the internet using different search engines.				
33	I use weblog for academic purpose.				
34	I send messages through e-mails.				
35	I use smartboard for educational purposes.				
36	I use the web for my research work				
37	I use wikis for academic purpose.				
38	I use video navigations to support my learning				
39	I save my lecture notes from online using storage devices, for future reference.				
40	I use the News forum link to get announcements and reminders about upcoming events.				

Cluster (E)

To what extent do students utilize web-based tools in content accessibility in Nigerian universities?

S/N	ITEMS	VHE	HE	LE	VLE
41	I access course content on the internet more frequently.				
42	I engage in online forum discussion with classmates .				
43	I submit assignment to lecturers online.				
44	I use podcast for recording my lectures.				

45	I access lecture material through moodle, blackboard, Google document, etc.				
46	I take some exams online.				
47	I access any of the web pages included in the search results, and navigate through the results for desired information.				
48	I use webquest, for my academic purposes.				
49	I access online library for academic information.				
50	I use mobile phones that can access, store, send, and read audio and visual information for my academic purposes wherever I am				

Cluster (F)

Factors that hinder the use of web-based tools for effective delivery of instruction in your university?

S/N	Items	SA	A	D	SD
51	Unreliable power supply for the use of electronic devices in teaching and learning.				
52	Poor internet service providers for browsing.				
53	High cost of 'air time' for browsing.				
54	Unavailability of ICT compliant staff for teaching using web based tools.				
55	Inadequate funds for the development of web-based instruction.				
56	Refusal of Lecturers to adopt new methods of teaching.				
57	Time constrains for developing educational computer applications for instruction.				
58	High cost of maintaining electronic gadgets discourages their use for learning.				
59	Restrictions in accessing online educational materials.				
60	Lack of ICT technicians to fix up problems when the need arises.				

APPENDIX F

A CHECKLIST ON AVAILABILITY OF WEB-BASED TOOLS FOR INSTRUCTION.

INSTRUCTION: check the available items whether they are in use.

NAME OF UNIVERSITY_____

FACULTY_____

DEPARTMENT_____

NO. OF STUDENTS SERVED_____

NO. OF STAFF SERVED _____

S/N	Items	AV	NAV
1	An ICT centre.		
2	An effective internet service on campus.		
3	Smart board in the departments.		
4	An e-library for students and lecturers use.		
5	Content management system.		
6	Picture management.		
7	school management		
8	document Management		
9	Web conferencing systems.		
10	Simulation.		
11	Personal laptops.		
12	Online survey.		
13	Weblog.		
14	Bluetooth.		
15	Wikis.		
16	Webcam.		
17	learning management system,		
18	Podcast		

NAME OF CHECKER_____

SIGNATURE_____

DATE AND TIME_____

APPENDIX G
VALIDATES' LETTER

Department of Arts Education
University of Nigeria,
Nsukka.
Enugu State.
May, 2014.

Dear Sir/Madam,

VALIDATION OF RESEARCH INSTRUMENT

I am a Post Graduate Student of the above mentioned university carrying out a research on the "Availability and Utilization of Web-based tools for Effective Delivery of Instruction in Nigerian Universities". Kindly read through the purpose of study, research questions, and researcher made questionnaire on the "Availability and Utilization of Web-based tools for Effective Delivery of Instruction" (QAUWEBTS), and a checklist on resources that may aid web-based instruction. Your comments and corrections will be of great help to this study.

Thank you for your anticipated co-operation.

Yours faithfully

HARRY NIMITEINBO-OFORI.

PG / MED / 12 / 62725

APPENDIX H
VALIDATES' RECOMMENDATION

APPENDIX I

UNIVERSITY OF NIGERIA, NSUKKA



DEPARTMENT OF ARTS EDUCATION

FACULTY OF EDUCATION

UNIVERSITY OF NIGERIA, NSUKKA.

July, 2014.

The H.O.D

Dear Sir/Madam,

LETTER OF INTRODUCTION

I wish to introduce miss Harry Nimiteinbo-ofori a Post Graduate Student of the above mentioned university carrying out a research on the ñAvailability and Utilization of Web-based tools for Effective Delivery of Instruction in Nigerian Universitiesò (QAUWEBTS). It will be much appreciated if you could provide any form of assistance she is seeking from you in connection with her project.

Thank you for your anticipated co-operation.

Yours faithfully,

H.O.D department of Arts Education

APPENDIX J

RELIABILITY OF THE INSTRUMENT

SECTION A

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded ^a	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.763	10

SECTION B

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded ^a	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
------------------	------------

Reliability Statistics

Cronbach's Alpha	N of Items
.647	10

SECTION C

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded ^a	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.765	10

SECTION D

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded ^a	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.791	10

OVERALL RELIABILITY OF THE INSTRUMENT**Case Processing Summary**

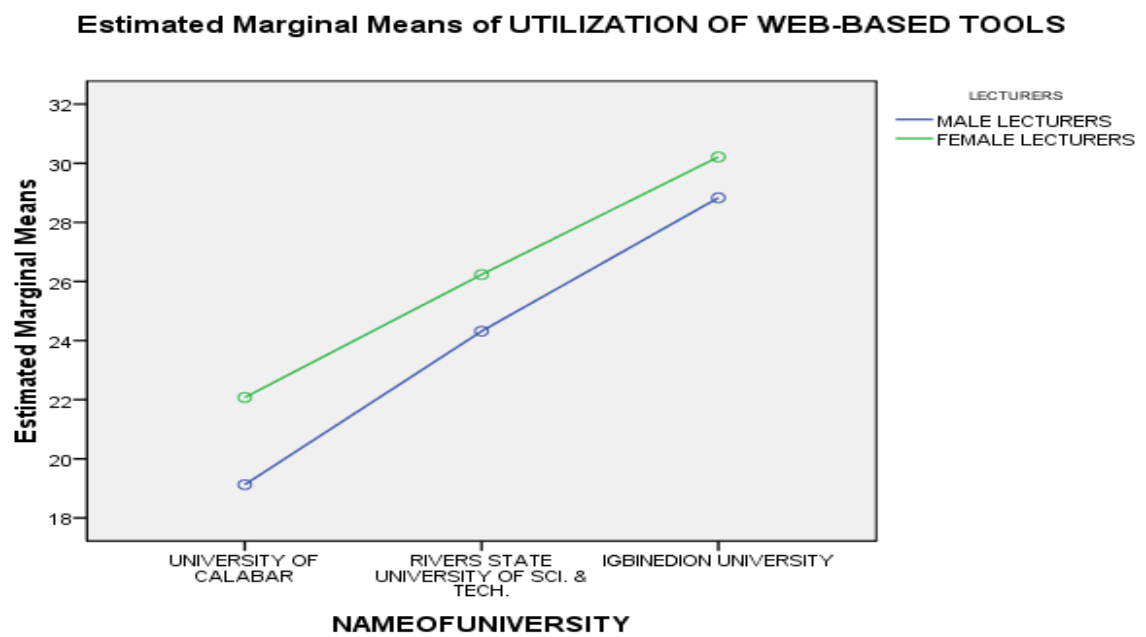
		N	%
Cases	Valid	30	100.0
	Excluded ^a	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

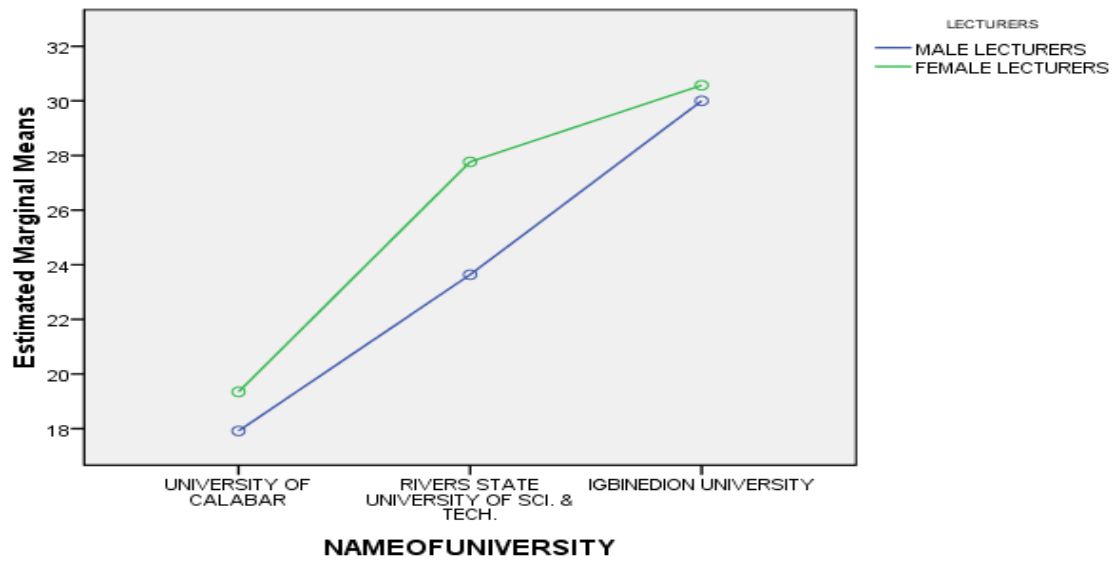
Reliability Statistics

Cronbach's Alpha	N of Items
.764	40

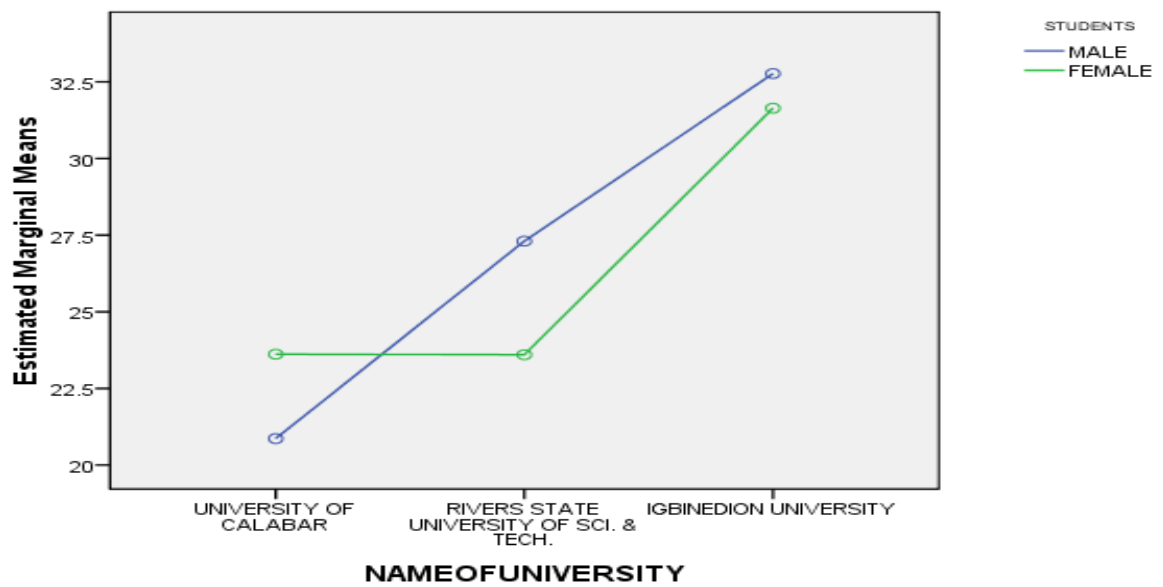
APPENDIX K



Estimated Marginal Means of E-ASSESSMENT



Estimated Marginal Means for Utilization of Web-Based Tools by students



Estimated Marginal Means of ACCESS TO COURSE CONTENT

