

**COMPUTER TECHNOLOGY USAGE AND TEACHING EFFICIENCY IN
TERTIARY EDUCATIONAL INSTITUTIONS IN LAGOS STATE, NIGERIA.**

BY

OLISAEMEKA, BLESSING UZOMA

MARCH, 2012

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**A THESIS SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES,
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CERTIFICATION

This is to certify that the Thesis :

**“COMPUTER TECHNOLOGY USAGE AND TEACHING EFFICIENCY IN
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By :

OLISAEMEKA , BLESSING UZOMA

In the Department of Educational Administration.

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DEDICATION

This piece of work is humbly dedicated to God Almighty and to my ever loving parents .

To God for being the Beginning and Ending, my INSPIRATION and HELPER.

To my late understanding father Mr. Adolphus O. Amaefuna for sowing beautiful seeds into my life.

To my sweet mother Mrs. Cecilia Chinweoke Amaefuna for her encouragement and prayers.

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ABSTRACT

The study examined the relationship between computer technology usage and teaching efficiency in tertiary institutions in Lagos State by ascertaining how lecturers perceive their rate and mode of computer usage, enhancing and inhibiting factors and the influence of their computer usage perceptions on teaching efficiency. The target population for the study included all the tertiary institutions in Lagos State. Descriptive and correlational survey research designs were adopted and lecturers were the major participants. Stratified and simple random sampling techniques were employed to select 438 (15%) out of the 2,919 lecturers in the 13 out of the 14 tertiary institutions in Lagos State. Two sets of instruments were used to collect data. They included Computer Usage and Teaching Efficiency Questionnaire for Lecturers (CUTEQ-L), and an interview schedule. CUTEQ-L was pilot-tested and was certified valid and reliable. The reliability coefficient was 0.87. The research questions were answered using descriptive statistics such as means, percentages, ranking and frequency counts. The research hypotheses were analyzed with inferential statistics namely Pearson's Product Moment Correlation and T-test statistics. The study's major findings include: 76% of the lecturers in Lagos State were inexperienced in computer usage, there was low rate of computer technology (CT) use; 77% of the sample depended on technical assistants to operate computers; poor technical support, epileptic power supply, lack of facilities and lack of CT training/skills ranks high among hindering factors; internet surfing, multi-media projectors/power points, lecture notes on web as modules, marking /grading with rubrics and teleconferencing were among the ICT firms' recommended ways of enhancing efficiency; CT use contributed: 23.33% to teaching efficiency, 77.97% to large class management and 51.27% to lesson delivery; CT literacy levels accounted for 52.42% of its use; gender did not affect CT use while years of lecturing experience did, with the less experienced (probably younger) out using their counterparts. Contributions to knowledge included: empirical evidence to the findings, a valid model of computer adoption for efficiency with interactive factors and a comprehensive measuring instrument (questionnaire). Technical support,

compulsory CT training and increased computer usage enhance teaching efficiency.

CHAPTER ONE

INTRODUCTION

Background to the Study

In the present century, one cannot discuss computer technology without talking about globalization which has compressed the entire world into a global village. Globalization generally aims at advancement and progress of all nations. It is defined as the establishment of global market for goods and capital, leading to what could be described as multiplicity of linkages and interconnections between places, events, ideas, issues and things, irrespective of whether they are directly related or not (Oni, 2007). Goods in this case include educational services such as teaching, training and publication of research findings. Globalization nevertheless, will remain a mere oration in any nation whose educational system is not implicitly or explicitly geared towards achieving constructive, desirable and tangible change. Accordingly, the National Policy on Education (Federal Republic of Nigeria, 2004) recognizes education in Nigeria as an instrument “par excellence” for effecting national development. Since education and its teachers remain the fulcrum for development, it becomes extremely pivotal, to equip the human resources with all

the necessary, modern and standard skills and computer technological know-how. This is to ensure efficiency such that globalization does not become a mirage.

Other sectors of the economy such as legal, power and mines, agriculture, environment, transport, finance, health, food and drugs are fast embracing computer technology. This is to maximize its benefits and ensure achievement of goals with minimal resources. The education sector, being the pillar of development of every nation cannot be an exception. Over the past two decades, computer innovations and the internet have introduced rapid changes in the teaching-learning experience. Carter (1999) believes that educators slowly realized that traditional methods of teaching were no longer capable of providing students with an educational foundation strong enough to withstand the pressure of technological change. The present generations are digital natives and being born into the digital world tends to be more familiar with computers and internet than their lecturers who are digital immigrants (Presky, 2001). These students expect nothing less than a digital teaching environment such as multimedia, power point and smart board's environments.

In the educational system, lecturers are very important resource persons for effecting innovative and essential changes. They are the core facilitators of the educational system, hence the need for them to be globalization- friendly. To be globalization-friendly implies, among other things, being computer-friendly. Use of computer technologies such as electronic teaching and learning, internet browsing, web-based education, mobile phones, personal computers and automated

referencing becomes an imperative. Most students get saturated with computer technologies before enrolling into universities. Sequel to their advanced prior knowledge, they expect an educational experience that will take them further into the delectable world of technology. The teachers at all levels of education then have a big challenge to handle. They must stoop to conquer the computer world, in order to ensure teaching efficiency and to remain absolutely relevant and on top, in the great citadels of learning. Most importantly are the university teachers who must keep the flag flying in the ivory towers; they need to be computer compliant to reduce stress, stay technologically ahead of the students and generally drive the entire nation through to development. Speedy national development largely depends on efficient educational system, which invariably depends also on the extent of computer technology usage within the system (especially by the lecturers). Ayodele and Adeoye (2007) said that a constant challenge for teacher education in this information age lies in keeping courses up to date, while it is becoming more and more important that teachers know how to access and apply technology in the classroom.

Organization for Economic Co-operation and Development (OECD)(2005) and Gbenga (2006) believe that computer technology is of much benefit such as helping in school administration, training students in skills for further education/future jobs, availing information outside the classroom (via the internet), supporting teacher development via external networks, transforming the teaching and learning process and ensuring effective learning by integrating a full range of media such as sounds, vision, text and numeric data. Olaofe (2005) insists that

when teaching and learning process is critically assessed in tertiary institutions that the challenge for lecturers will no longer be in covering the course contents or in adopting appropriate teaching pedagogy, since such a grasp of computer technology should be within the capabilities of most people, regardless of age, discipline, gender or educational experience.

The prevalence and fast development of computer technology is globally transforming the human societies and nations of the world. Computer technology innovation has permeated every sector of all nations. The developed countries are already savouring the unending benefits of computer technology, while the developing nations are still struggling with computer technology adoption and adaptation.

Countries such as United States of America, Canada (Carina America Department of Management, 2006) and Australia (Schiller, 1994) record a very high level of computer literacy and a high rate of usage. The Universities in most European nations are known to have fully integrated computer technology usage. Singapore, Norway (Teo, 2006), California (Cuban's diary as cited in Sherry & Gibson, 2002) and States of Virginia ("Preparing teacher candidates", 2001) already have an age-long record of very high access to computer technology, high literacy level and very high rate of usage.

Most classrooms in States of Virginia are computer technologically equipped. University of Botswana prioritized computer and information literacy (Oluwale,

2008), while University of Bath, United Kingdom had since adopted blended learning (Combination of regular classroom face-to face and computer-based tutorials). This is to ensure high-level effectiveness and efficiency in teaching (Momma, 2007). Australia recorded high computer technology usage as evidenced in the rapid growth of AAR Net (Australian Academic and Research Network). This dramatically enhanced communication among the Australian academics and between lecturers and students. (Schiller, 1994).

Nevertheless, countries such as Malaysia (Hapiza & Zawiyah, 2009), South Africa (Carina Department of management, 2006), Uganda (Asaba & Bamuhiiga, 2009) and India (Mehra & Mital, 2007) still have records of very low access, low literacy level and low rate of computer technology usage among their university lecturers. Nigeria is not an exception in this regrettable wastage of computer resources. Several studies report a low access, low literacy level and low rate of computer usage among the lecturers. (Oluwale, 2008; Yusuf, 2005; Olubube, 2006). These studies found that the Nigerian lecturers' computer usage is below expectation. In Nigeria as a nation, the educational institutions especially the tertiary and the individual lecturer need to be alerted. There is a cogent need for the individual lecturer to arise to the challenge of embracing computer technology to maximize its benefit of enhancing efficiency. Computer technology is no doubt destined to revolutionize the entire educational system and the entire teaching - learning process such that a hundred per cent efficiency becomes achievable.

On the state of ICT integration into education in Nigeria, Uwadia's diary (as cited in

Babalola, 2010) reiterates that Nigeria's information technology literacy level is below 20%. Since the 1980's, Nigeria had been in the struggle. Realising the import of ICT, Nigeria introduced computer education into the nation's secondary school curriculum. This necessitated the inauguration of the National Committee on Computer Education (NCCE) who introduced functional strategies and operational policies. The policy included; to bring about a computer literate society by mid 1990's and to enable school children appreciate and use computers in various aspects of life and in future employment (Jegede and Owolabi's diary as cited in Babalola, 2010). While the NCCE worked, the federal ministry of education in conjunction with some tele communication companies initiated the School Net Nigeria (SNN) to provide shared internet access for schools and communities and empower teachers through training. The government later initiated the Universal Service Provision Fund (USPF) to ensure the provision of ICT resources in primary and secondary schools. Subsequently, the Nigeria Communication Commission floated the School Universal Access to Digital Life Programme, which served 109 primary and secondary schools in Nigeria with ICT resources (Akomolafe's diary as cited in Babalola, 2010).

In a meeting in 2008, the Joint Consultative Committee on Education (JCCE) recommended that computer education be taught in both primary and secondary schools in Nigeria. The National Council on Education (NCE) upheld the decision while all the 36 states of the federation endorsed the decision but administered the policy differently. Consequently, the National Open University is functional, use of online examination in Nigeria's tertiary institutions is being advocated, digitalizing

the classrooms and instructional process has become imperative but the question is how ready are the tertiary institutions? Are the lecturers equipped with adequate skill? Can the Nigerian tertiary institutions cope with the digital demands of the students who becomes digital natives before entrance into tertiary institutions? Nigerian ICT policy is for all levels of education but to provide answers to the surging questions already mentioned, the study focuses on the tertiary educational level.

The Nigerian Universities Commission (NUC) established a virtual learning website, which is having impact on administrative services, such as admissions, fee payments, form purchasing and registration. The computer technology impact is yet to be seen in the classroom teaching. Though it is true that ICT has not revolutionalized the classroom, but it is changing the learning experience of students by relaxing time and space constraints as well as providing easier access to information, online journals, e-books and students' portals (Gambari & Okoli, 2007). A study by Onasanya, Shehu, Oduwaiye & Shehu (2010), emphasize that there is little or no usage of computer technology in the Nigerian tertiary institutions. This they attributed to the fact that most institutions lack the computer technology skills and facilities for instruction and research.

The lecturers are constantly faced with the challenges of handling large classes, covering course outlines, setting examination questions, examination invigilation, marking/grading students' works, project supervision, lesson plan/delivery, result

compilation, research/publication and keeping students' record. A careful study of these challenges shows that the low computer technology usage for teaching in tertiary institutions could be aggravating the situation. Constant and proper use of computer technology by lecturers would most likely ease off their tasks of teaching and research and consequently increase overall teaching efficiency.

According to Rogers & Scott (1999), research indicates that technological innovations are not always diffused and adopted rapidly, even when the innovation has obvious proven advantages. More so, the lecturers occupying very sensitive and enviable positions in the higher institutions of learning need to be technologically empowered, so as to ease off their onerous task of engaging in research works, publications and imparting knowledge. It then became necessary to examine the relationship between lecturers' computer usage and their teaching efficiency, assess the factors hindering lecturers from maximizing the benefits of computer usage, and possibly proffer some tenable and practical solutions.

Statement of the Problem

Computer technology can be very desirable and useful to the Nigerian educational institutions, especially to the lecturers. The positive effects are not yet being realized. The problems of unavailability, lack of access and lack of skills seemed to have retarded computer technology usage. In the case of unavailability, some lecturers who lack computers and its facilities cannot use them because they are not available. Occasionally, the computer gadgets may be available but not accessible. Success in computer usage strictly requires easy access to them.

Access is beyond identifying the number and types available but extends to the ability of the lecturers to have the technology beyond the regular working hours. A 24 hour internet availability and accessibility becomes expedient. More so, lack of computer technology literacy of some lecturers would likely be a major constraint to effective use of computer technology.

Lack of funds, unavailability of computer facilities, lack of electricity supply, lack of experts to assist seemed to be among the notable problems being faced by lecturers in their computer technology usage. Other problems may include human factors (such as resistance to innovation and need for specialized training), lack of interest, lack of time, age, staff conservatism, ignorance of the benefits, lack of confidence and cyber or techno phobia.

Computer technology is to serve as a means of enhancing efficiency in teaching methods, evaluation of learning outcomes, tracking of students' records and research but the problem of usage and application of this technology seem to have persisted. The researcher observed that some institutions, faculties, departments and individual lecturers who possess computer gadgets display them in the offices, reception halls, classrooms, laboratories and seminar/conference rooms, without effectively using them. Some lecturers who may sincerely desire to acquire computer skills do complain of lack of time to learn and practice the skills. More so, it was observed that some lecturers who perhaps appreciate the usefulness of computer technology always seek the services of technical assistants, yet it is not all the lecturers that can afford the maintenance of the technical assistants. These

technical assistants are not easily available and some of them are usually the semi-illiterate road-side technicians.

It becomes imperative to ensure maximization of the benefits of computer technology such as to enhance teaching efficiency. This study therefore was motivated by the seemingly low computer usage among the lecturers and the opportunity cost of not maximizing the benefits of computer technology for teaching in the tertiary institutions. The study sets to find the relationship between CT usage and teaching efficiency.

Research Objectives

The purpose of the study was to examine how lecturers' computer technology usage influences teaching efficiency. Specifically, this study's objectives were:

1. to investigate the computer literacy levels of lecturers in tertiary institutions in Lagos state;
2. to determine the present rate and mode of lecturers' computer technology usage;
3. to identify the factors hindering lecturers' computer technology usage;
4. to identify the various ways by which computer technology usage would enhance teaching efficiency;
5. to suggest ways by which lecturers' level of computer usage could be improved;
6. to examine the nature of the relationship between teaching efficiency and lecturers' computer technology usage;
7. to examine the relationship between lecturers' ease of managing large classes

- and their computer technology usage;
8. to examine the relationship between lecturers' ease of lesson delivery and computer technology usage;
 9. to examine the relationship between lecturers' computer literacy levels and their computer technology usage;
 10. to compare male and female lecturers' rate of computer technology usage; and
 11. to compare experienced and inexperienced lecturers' rate of computer technology usage.

Research Questions

The following research questions guided the study.

1. What is the computer literacy level of lecturers in tertiary institutions in Lagos state?
2. What is the present rate and mode of lecturers' computer usage?
3. What are the factors hindering the lecturers from adequately using computer technology for teaching activities?
4. In what ways can computer usage enhance lecturers' teaching efficiency?
5. In what ways can the lecturers' level of computer usage be improved?
6. What is the nature of the relationship between teaching efficiency and lecturers' computer technology usage?
7. Does any relationship exist between lecturers' ease of managing large classes and computer technology usage?

8. What is the relationship between lecturers' ease of lesson delivery and their computer technology usage?
9. What is the relationship between lecturers' computer literacy levels and their computer usage?
10. Are there differences between male and female lecturers' rate of computer technology usage?
11. Would there be differences between experienced and inexperienced lecturers' rate of computer technology usage?

Research Hypotheses

Ho₁: There is no significant relationship between lecturers' teaching efficiency and their computer technology usage.

Ho₂: There is no significant relationship between the ease of managing large classes and lecturers' computer usage.

Ho₃: There is no significant relationship between the lecturers' ease of lesson delivery and computer technology usage.

Ho₄: There is no significant relationship between lecturers' computer literacy level and their computer usage.

Ho₅: Male and female lecturers do not differ significantly in their rate of computer usage.

Ho₆ : Experienced and in-experienced lecturers do not differ significantly in their

rate

of computer usage.

Scope of the Study

The study covered thirteen out of the fourteen tertiary institutions in Lagos state. The thirteen institutions represent 93% of the tertiary educational institutions in Lagos state. The names and other details of these institutions are subsequently given under 'sampling'. These include Universities, Polytechnics and Colleges of Education. The study was de-limited to Lagos state because it has the highest number of tertiary institutions compared to other states within the country, as evidenced in the Statistics of Education in Nigeria, released by Federal Ministry of Education (2007). More so, Lagos state being the most cosmopolitan of all urban cities in Nigeria is highly representative of what is found within the country as an entity.

On the academic content, the study covered several variables such as CT literacy levels, rates and modes of usage, factors hindering usage, ease of managing large class and lesson delivery, teaching efficiency and effects of gender and experience on computer usage.

Significance of the Study

The National Policy on Education emphasizes the importance of technological education. In addition, it is obvious that proper combinations and use of appropriate instructional materials enhance teaching efficiency, thereby ensuring high academic performance. Consequently, it is believed that adequate use of

computer technology by lecturers will not only increase their productivity in teaching and research, but will also reduce stress and empower them to cope with large students' population. The findings of this study will inspire the lecturers to explore and efficiently maximize the benefits of computer technology, especially in teaching activities. This is because it seems that adequate computer usage will grant lecturers access to current and substantial information, thereby easing off their work loads and enabling them to cope with large student population. It is also hoped that unraveling the factors hindering lecturers from fully maximizing the benefits of computer, will alert and quicken education stakeholders (policy makers, university administrators and curriculum planners) to action. More so, the students being digital natives will likely assimilate faster and learn with much ease when taught in a digital environment.

Theoretical Framework

Computer technology is a good example of application domain that is generic in nature, yet can be domesticated or adapted for individual needs. Application areas and knowledge requirements are not static but emerge as technology changes. Users must be able to adapt available computer technology to meet their unique needs. This is a function of several factors.

Unfortunately, there is no single theory that sufficiently addresses this phenomenon. Therefore, the theoretical framework of this study is based on three

theories namely:

- Diffusion of innovation / innovation Dissemination Theory
- Theory of Absorption and
- Adaptive Structuration Theory.

Diffusion of Innovation/Innovation Dissemination Theory

Rogers Everett, M. as a communication scholar, sociologist, writer and teacher was best known for originating the diffusion of innovation theory and for introducing the term early adopter. Rogers (1995) stated that an innovation is an idea, practice or object perceived as new by an individual or unit for adoption while diffusion is the process by which an innovation is communicated through certain channels, over time, among members of a social system. This definition obviously highlights four basic principles namely: innovation, communication channel, time and social system.

❖ Innovation, according to Rogers, is regularly influenced by the characteristics of an innovation which include: relative advantage, compatibility, complexity, triability and observability.

- Relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes. It may be measured in economic terms, social prestige, convenience and satisfaction.
- Compatibility is the degree to which an innovation is perceived as long consistent with the existing values, past experience and needs of potential adopters. Rogers maintains that an idea that is incompatible with the values and norms of a social system will not

be adopted as rapidly as an innovation that is complete.

- Complexity implies the degree to which an innovation is perceived as difficult to understand and use. It suggests that new ideas that are simpler to understand are adopted more rapidly than the ones that require adopters to develop new skills and understandings.
 - Triability means the degree to which an innovation may be experimented with, on a limited basis. An innovation that is triable represents less uncertainty to the individual or group who is considering it for adoption.
 - Observability on the other hand is the degree to which the results of an innovation are visible to others. The easier it is for an individual to see the results of an innovation, the more likely is its adoptability by the individual.
-
- ❖ Communication channel can be seen as the means by which message get from one individual to another. Whereas mass media have been found to be more effective in creating knowledge of innovations, interpersonal channels are more effective in forming and changing people's attitudes towards innovation
 - ❖ Time as a basic element refers to minutes, hours, days, weeks, months, year's and decades. The innovation itself, decision process and innovativeness of an individual or unit affects the diffusion time and rate.
 - ❖ The social system is defined as a set of interrelated units that are engaged in joint problem-solving to accomplish a common goal. The members of a

social system may be individuals, informal groups, organization or subsystems who constitute a boundary within which innovation diffuses. Furthermore socio- economic and individual personality characteristics will define the individual's role in the diffusion process which can be one of the following innovators; early adopters, early majority, late majority and laggards. Research finding show that early adopters of innovation are more likely to be literate, had more years of formal education, higher social status and greater degree of upward social mobility than late adopters. It therefore follows that there is a significant positive relationship between socio economic status and adoption of an innovation.

Rogers (1983) in a more extensive work proposed that adopters of any new innovation or idea can be categorized as innovators (2.5%), early adopters(13.5%), early majority (34%), late majority (34%) and laggards (16%) based on the mathematically based bell curve. Each adopters' willingness and ability to adopt an innovation depends on their awareness, interest, evaluation, trial and adoption. People can fall into different categories for different innovations (Rogers,1983). Rogers in the first edition of diffusion of innovations work stated that with successive groups of consumers adopting the new technology, its market share will eventually reach saturation level (Rogers,1962).

Rogers' diffusion or dissemination theory stresses the process of communicating an innovation within a social system. When an innovation is perceived as good and advantageous, then the individuals within the social system will likely adopt it.

Hence, if computer technology is seen to increase teaching efficiency, then lecturers are more likely to adopt it. Again, proper communication results in proper response. The means of passing information is of high essence here. This is because knowledge is power. If the benefits of computer technology are well communicated to lecturers, and if training sessions are organized for them, there is more likelihood that they will embrace computer usage faster. Mere theoretical knowledge of computer technology may be of no effect to certain people.

More so, diffusion process begins when people get first knowledge of an innovation, to the time of attitude formation towards same innovation to the decision point of either to reject or adapt, to the actual implementation of decision and then end at the point of using the new idea. Again diffusion is a type of social change, since the use of computer for teaching activities seems to yields good results, such as improved students' performance, reduced teacher stress, accuracy of records increased, ease of marking/grading and improved access to current information. All these can be termed social changes accruing from computer technology usage. The use of computers (an innovation) by the lecturers goes through diffusion process after which it gains acceptance. Davies, (1989) calls it 'user acceptance'.

Absorptive Capacity Theory

Absorbing means taking something into the mind and learning or understanding it. Absorptive capacity is the extent to which a system or an entity can take in something. Cohen and Levinthal (1990) introduced the theory of absorptive

capacity. They believe that a firm's absorptive capacity is its ability to identify, assimilate, transform and apply valuable external knowledge. It is the limit to the rates or quantity of scientific or technological information that a firm can absorb. Zahra and George (2002) extended the theory by specifying four distinct principles to absorptive capacity namely: acquisition, assimilation, transformation and exploitation.

- Acquisition implies purchasing or assembling the innovation gadgets and facilities.
- Assimilation is the process whereby people fully understand an innovation so that they are able to use it personally.
- Transformation means a complete change in character or appearance of somebody or something for better. When people's innovation absorptive capacity is high, they get easily transformed by the innovation.
- Exploitation is a state of using a situation in order to get advantage for oneself or for a firm. Innovations can be harnessed and exploited.

The absorptive capacity of an institution in respect to computer technology implies its ability to learn, understand and value computer and its applications. Cohen and Levinthal stated that absorptive capacity is the ability of a firm to value new knowledge, absorb it, assimilate it and apply it. It is basically tied to the innovative capacity of the firm. This implies that absorptive capacity theory is based on the premise that an organization's ability to effectively apply information technology (IT) is dependent on the development of IT related knowledge. Cohen and Levinthal's theory postulates that knowledge and information obtained previously

enhance the identification, adoption and implementation of similar innovations. The theory proposes that a firm's absorptive capacity stems from stocks of knowledge within the firm. The desire and ability to absorb an innovation depends on the perceived usefulness of the innovation, hence the absorptive capacity depends on the transfer of knowledge across and within sub-units. A firm's stock of previous related knowledge determines its ability to absorb knowledge. Absorptive capacity of a school is tied to its ability to distribute and transfer knowledge across and within faculties and departments. One would like to know the rate at which lecturers actually value computer technology innovations.

Adaptive Structuration Theory (AST)

Adaptation is the process of changing something to suit a new situation. To be adaptive is to be able to change when necessary in order to deal with different situation. Adaptive structuration theory is based on Anthony Giddens's structuration theory which was formulated as "the production and reproduction of the social systems through members' use of rules and resources in interaction".

De sanctis and Poole (1994) adopted Giddens's theory to study the interaction of groups and organizations with information technology and termed it Adaptive Structuration Theory (AST). They criticize the technocentric view of technology use and emphasize the social aspects whereby groups and firms use information technology for their work to dynamically create perceptions about the role and utility of the technology and how it can be applied to their activities. These perceptions do vary widely across and within groups, department and faculties.

Consequently, the perceptions influence the way and the method of technology use hence mediating its impact on group outcomes. Same technology can be introduced to many groups but the effects may not necessarily be consistent due to differences in each group's appropriation moves. AST provides a good model for analyzing the utilization and penetration of new media technologies in our societies. Such technologies as electricity, telegraph, radio, telephone, television, computer and internet. The structures of these innovations penetrated the respective societies influencing them while the social structures of those societies in turn influenced and modified innovations' original intent. Some basic principles or assumptions guide AST. The basic assumptions include:

- It deals with evolution and development of groups and organizations.
- It views groups as systems with observable patterns of relationships and communicative interaction among people creating structures.
- Systems are produced by actions of people creating structures (sets of rules and resources).
- Systems and structures exist in a dual relationship with each other such that they tend to produce and reproduce each other in an on going cycle termed structuration process.
- Structuration process can be very stable and can change substantially over time.
- It is useful to consider groups and organizations from a structuration perspective because ;
 - a. It shows the relative balance in the deterministic influences and willful choices that reveals groups' unique identities.

- b. It makes clearer the evolutionary character of groups and firms.
- c. It suggests how members may be able to exercise more influence than they otherwise think themselves capable of.

The adaptive structuration theory posits that the generic nature of computer technology makes it very easily adaptable. Different firms and institutions can structurally adapt computer applications to suit their purpose and achieve their unique goals. De Sanctis and Poole's diary (as cited in Olalusi, 2009) assert that the theory explains the use by groups, of an innovative process. This conforms to adaptive nature of computer systems. 'Adaptiveness' refers to the lecturers' ability to respond to or adapt to changes in their environment. Adaptive organizations or individuals refer to those dynamic entities that are readily able to change to new technologies.

The users of computer technology select specific structures and adapt them to their peculiar needs. This is in agreement with the assertion by Peretomode (1992), that adaptive school system are dynamic organizations that change readily as new technologies emerge. It is worth noting that adaptation is subject to group dynamics. This means that different groups of people can conveniently adapt the same technology in different ways as is suitable to their needs. De Sanctis and Poole propose that technology users can select the structural potential of any technology and adapt for their use. An institution's adaptive capacity depends on the knowledge of the computer technology usage that is relevant to teaching, administrative and research activities and which yields maximum efficiency.

Adaptive structuration theory recognizes group differences in adapting technology, hence teaching efficiency in tertiary institution may be among other factors, a function of the extent of computer usage by various institutions and individual lecturers. The puzzle of how far the lecturers have been able to adapt computer technology to their research and teaching needs agitates the mind.

A combination of the three theories already discussed becomes imperative since no single one of them can completely address the issues in the study. The integration of these theories with emphasis on their respective relevant aspects yields better result in this study. While the first two theories emphasize communication of innovation to all persons within a firm, the third one focuses on adaptation of the innovation. The three theories hinge on proper knowledge base, as a pre-requisite to diffusion, absorption and adaptation of innovation. Emerging teaching needs require quality computer technology usage, which can only be achieved by spending quality time to acquire the skills. It is obvious that knowledge of computer usage may also be a function of other factors such as availability of computer facilities, adequate training and skills, positive attitude, steady power supply and average workload, among a host of others.

Consequently, a proposal comprising the salient features of the three theories is made: Individual lecturer's knowledge and use of computer technology is a reflection of the school's ability to effectively adopt and adapt computer usage for teaching efficiency. In other words, a school that has adopted and adapted computer usage will invariably have majority of its lecturers also using computers.

This corresponds to an Ibo adage, which says, “When a snail crawls, it moves with its shell”. A snail cannot move without its shell. In the same vein, any tertiary institution that adopts and adapts computer technology naturally drags along its lecturers hence, a working model (figure 1) is created to depict the linkages and inter-dependence of these theories and to display how they would lead to teaching efficiency.

When a new technology emerges, any good social system such as tertiary institutions, through its communication channels such as seminars, workshops, notice boards, and bulletins, disseminates information on the new technology. At this point, the absorptive capacity of the firm manifests, as its ability to value, absorb, assimilate and apply the same technology, depends on the stock of previous related knowledge and its internal ability to pass the message across and within sub-units. It is the absorptive capacity of a firm that determines whether they

can accept or reject a new technology. If they accept, then they adapt the structures peculiar to their needs. This becomes evident in the number of lecturers using computers and the available application areas for teaching efficiency as is the case for a school. In other words, the number of lecturers using computer technology is reflection of an institution's extent of innovation diffusion, absorptive capacity and its adaptive structuration capacity.

The model in figure 1, which is an integration of three innovation theories, is very useful to the extent that it deals with the processes of innovation dissemination, acceptance and usage in the tertiary institution. It also covers the area of individual firm's (institution) ability to adapt specific computer structures for its use, which resultantly manifests in the number of lecturers using computer technology within the institution. Nevertheless, the three theories failed to illuminate the underlying interactive factors that can make lecturers' computer usage to either yield maximal teaching efficiency or be of no effect. These interactive factors operate between the adapted computer technology structures for teaching and teaching efficiency. These factors include availability of computer facilities, computer technology competency level, rate of usage, appropriateness of usage and lecturer demographic features such as gender, age and years of lecturing experience. Each of the interactive factors will likely influence the level of teaching efficiency.

Operational Definition of Terms

For the purpose of this study, the following terms are defined.

Computer Technology (CT)

This refers to personal computers (PCs), internet facilities, computer networks, i-pods and all other electronic gadgets considered under the umbrella term “technology”, which when connected to the computer, facilitate and expand their service. Computer technologies include multi - media and data carriers such as video, CD Rom (read only memory) which restricts access, CD Ram (random access memory) which is more flexible in accessibility, flash drive and floppy disk. It also includes e-mailing, teleconferencing and World Wide Web (w. w. w) for browsing.

Computer Competency/Literacy

This is the ability, the skill and the knowledge to operate and use computer and its accompanying facilities for productive purposes. It involves having a basic understanding of file management, printing processes, computer application soft wares and search engines.

Lecturers

These refers to all the teachers with a minimum of masters’ degree qualification, and who teach in the tertiary institutions (Universities, Poly/Mono - technics and Colleges of education).

Teaching Efficiency

This refers to the extent of accomplishment of teaching goals and tasks with minimal time, money, energy and other resources. A lecturer is said to teach efficiently if he or she employs minimal time, money, energy and various other resources to accomplish the task of; teaching, setting and marking tests/examinations, supervising students' research works, conducting researches, publications, advising students and attending seminars and conferences

Computer technology Usage

This refers to the act or process of utilizing and operating computers and its accompanying facilities.

Computer Literacy Level

This is the amount or extent of computer skills or practical knowledge that somebody can demonstrate at each given time. Note that,

- Not able implies zero ability
- Beginner is the state of being able to access the computer and software environments but may not be able to work in them unguided;
- Intermediate refers to the state of being able to access and work in different windows and computer environments but cannot conclude or perfect work without assistance;
- Experienced refers to the state of being able to perfectly access and work in different windows and computer environments unguided.

Rate of Computer technology Usage

This is the frequency or the number of times the computer is being used per given time. Note that,

- Low usage refers to once - twice per month
- sometimes refer to once - twice per week
- High refers to thrice - six times per week while
- Very High usage refers to steady daily usage.

Tertiary Institutions

These refers to the educational institutions at post secondary level. The first is primary, the second is secondary and the third (tertiary) refers to the post secondary institutions which include universities, polytechnics and colleges of Education

Technical Assistants

They refer to those people who posses the practical skills to use and operate computer technology. They may be hired to help the lecturers with computer technology works.

CHAPTER TWO

LITERATURE REVIEW

Introduction

Review of literature covers crucial areas such as;

- relevance of computer technology to teaching in tertiary institutions,

- computer technology usage,
- personnel attitude, individual characteristics, demographic features and lecturers' computer usage,
- availability and access to computer gadgets,
- application areas,
- professional and skill development,
- teaching efficiency using computers and
- factors militating against/enhancing effective use of computer technology.

Relevance of Computer Technology to Teaching in Tertiary Institutions

The usefulness of computer technology can never be over-emphasized, in that computer does not only receive, store and process data, but does so with very high speed and precision. Correspondingly, Karl (1994) said: "The computer is just a glorified pencil". Ofojebe (2006) defined ICT as "a generic term referring to technologies that are used for collection, storing, editing and passing information in various forms". He believes personal computers are the best-known examples of ICT use in education. Several studies have revealed that for effective communication, the information transmission process has to be superb. Ejiogu (1990) stated:

It is not an easy task to transfer meaning and understanding to another person.

Information is most often transmitted in form of words, printed or spoken as well

as computer-based. (p. 58).

Emphasizing the importance of technology-based learning, Bonwell and Eison (1991) noted that traditional face-to-face lectures are frequently a passive experience for students and strategies that encourage active learning and deepen understanding are known to enhance the learning process. Reiterating on the role of information technology (IT), Bello (2008)_c noted that IT based education is very necessary for schools to remain relevant to its external environment.

Consequently, many Higher Education Institutions (HEIs) are increasingly adopting electronic learning (e-learning) as a mode of delivery in an attempt to enhance the learning process. (Carina American Department of Management, Faculty of Business, 2006). Emphasizing the usefulness of technology, Helmi (2002); Pather and Erwin (2002) opined that commerce/education and technology have developed a symbiotic relationship, in that each element will continue to contribute to on-line education development. Correspondingly, Parther and Erwin are of high opinion that South Africa HEIs start taking steps to implement their programmes in a technologically enhanced learning environment. There is no doubt that this is in harmony with one of the priorities among the objectives of South Africa's national plan for higher education which is to produce graduates with the skills and competencies required to participate in the modern world in the 21st century. (Ministry of Education, S/A, 2001).

Accordingly, Sharma and Meleyeff (2003) insisted that the education of future

managers should integrate technology-supported learning processes to equip them with skills to employ technology for solution to new problems. It is true that learning through the internet does not provide a 'total solution', nor does it guarantee perfect analytical and critical thinking or match the variety of interactions in seminars and tutorials. Yet, it has the potentials to offer new means of self expression and new opportunities for students' engagement with course materials (Mann, 2000). Emphasizing the importance of computer technology, Adeogun (1999) opined that management techniques are necessary in education because of the paucity of data, scarcity of qualified data processing facilities/personnel...

In a study, Davis' diary (as cited in Carina America Department of Management, 2006) revealed that technology usage was significantly correlated with both perceived ease of usage and perceived usefulness. This means that users are always willing to cope with a degree of difficulty of use, especially if the system provides the requisite value and usefulness. Similarly, Harris, Donaldson & Campbell (2001) revealed that the utilization of World Wide Web (www) - technology is predicated by users' attitude to the use of technology. Using Technology Acceptance model (TAM) developed by Davis Fred in 1989, they found that utilization gives insight into the various antecedent factors of perceived ease of usage and perceived usefulness, such as demographic variable (age, gender, occupation), apprehension towards the technology, time constraint and organizational support.

Buttressing the extent of usefulness of ICT in teaching, Harry, (2009) stated that

efficient teachers incorporate numerous learning styles into their classroom strategies and that when instructions include text, visuals and some kinesthetic in the content presentation, they are likely to incorporate the learning styles of many students, therefore more students can be successful in their learning the first time. Harry went further to give examples that teachers may talk through the text and images on a power-point screen about the social studies economic concepts of 'supply and demand'; the talk, text and images all convey the same information. The teacher may also incorporate a movement such as one hand going down to indicate low supply and the other going up to indicate high demand. He also said that likewise during learning, teachers ... by encouraging students to learn in their learning style, maximize the students' learning opportunities within a limited time frame.

Similarly, a study of the benefits and use of on-line teaching and learning reports that understanding the materials is better with on-line than with traditional face to face method in the aspects of improving students' responsibility, improving students' confidence, increasing students' knowledge and helping students improve their critical thinking (Amine, 2007). Another report by Mudasiru and Ayotunde (2005) stated that on a global level, technological advancement has provided avenue for enriching the quality and quantity of instructional content offered through distance-education. It has also provided avenue for facilitating interaction between the teachers and group of students or among students. They further opined that computer technology has provided essentially different options for distance-education.

Buttressing the importance of computer technology, Manir (2008) emphasized that the internet has simplified the research process. He said the Internet is a medium for academic communication, collaboration, interaction and electronic publishing. If internet is used properly, it will break down barrier of dependency on traditional resources, and the information gap which exists. In agreement, Ebong's diary (as cited in Okunola, 2011) noted "scholastic mobility and knowledge transfer is becoming very popular in higher education through linkage programmes and collaboration" (p. 84). Furthermore, the blessings of globalization or rather the import of internet can never be over emphasized as they include poverty reduction, enabling environment for democracy, faster economic growth and international synergy in academic excellence.

Momna (2007) in a study found that 91% of participants opined that web tutorial as a study resource is very useful and 92% also believes that using animations in tutorials are useful. Researchers, such as Timms, Crompton, Booth & Allen (1997) and Castleford (1998) opined that e - learning revolution tends to be primarily technology led since innovations in e - learning are driven by innovations in information and communication technologies. Salmon (2002) also agrees that effective on-line learning resources can have many benefits including self-paced learning, access to the resource without any time or geographical constraints, and an active learning experience for all students. More so, on-line teaching and learning reduce piles of students'

written works, thereby decongesting lecturers' offices and at same time reducing one-on-one lecturer - student contacts.

In agreement, Schiller (1994) in his study of user perception of mixed mode teaching and learning in post graduate educational administration, University of New Castle, stated that e-mail and other forms of computer-mediated communication hold considerable promise as effective means of interacting in both on-campus and off-campus courses as they are not constrained by time or distance. He further said that the occasional face-to-face sessions, teleconferences, which allow synchronous interaction-at-a-distance in 'real time', and electronic mail, which allow asynchronous interaction-at-a-distance between class members and their lecturers, are of great benefit.

The study also found that distribution of study guides, audio tapes, computer discs, and video tapes provide content and learning activities for distant students. Again, with the increasing affordability and availability of newer communication technologies, effective interaction at a distance, through use of audio teleconferencing, video teleconferencing, and various forms of computer-mediated communication (CMC) such as audio graphics, telematics, e-mail and computer conferencing is very possible. Schiller also reports that the rapid growth of AAR Net (Australian Academic and Research Network) as a significant CMC system illustrates ways in which communication between academics is dramatically changing and demonstrates the possibilities for increased interaction at a distance between lecturers and students, and between students and students.

It is not in dispute that e - learning is especially useful and ensures efficiency since it takes care of much larger classes and guarantees less pressure on institutional resources (such as availability of large lecture halls). Holdich's diary, (as cited in Becta, 2004) revealed that computer technology programs such as web based and computer based analysis of written works save the time the teacher spends in marking. Several research studies reveal that computer technology has assisted lecturers in downloading current materials for research and teaching (Becta, 2004; Salmon, 2002). Moreover, computer technology can be used to improve students' motivation and active involvement in learning processes. This is where it serves as a student motivator, implementing innovations in teaching methodology to make education more attractive and to improve the quality of education.

Another version of the motivator variety is distance learning, decreasing lecturers' and students' dependence on place and time constraints. This would expand the scope of education beyond campus boundaries and may also boost collaboration between universities, as in virtual universities for instance. (Marjanovic, 2005). In a study, Bello (2008)_a concluded that school effectiveness, effective academic planning, effective staff and students' performance in higher institutions depended on appropriate management information system.

Computer Technology Usage

The usefulness of computer technology on a general note is inexhaustible and

specifically its importance in the tertiary institutions can never be over-emphasized. The usefulness is one thing while its usage is another. Its rate of usage can be high, moderate or low. Usage varies among nations, institutions and individuals. A study titled: "Technology in education: Are lecturers ready?" which is a case study on e-Distant learning at University of Technology MARA, Malaysia" found that the lecturers' knowledge in using technology is relatively low and rate of usage also low. (Hapiza and Zawiyah, 2009). Also, Zar, Sharifar & Than (2010) found low ICT usage in Malaysia.

A similar study in Cape Peninsula University of Technology, Cape Town, South Africa reiterated on the low literacy level and low rate of usage by lecturers. (Carina America Department of Management, 2006). Furthermore a study on "Connectivity in Africa: Use, Benefits and Constraints of e-communication - Uganda case study" revealed a regrettable low literacy level and low rate of usage by Ugandan lecturers. (Asaba & Bamuhiiga, 2009). The contrary is the case in most developed nations. Schiller (1994) found a very high level of computer technology literacy and a high rate of use in Australia while Carina America Department of Management (2006) also revealed a high level of computer literacy and high rate of its use by lecturers in United States of America. Nevertheless, Mehra and Mital (2007) in a study of the computer technology situation in Indian Universities, lamenting on the low use rate reiterated that the question that comes to the fore is that despite the availability and access of technology tools to the Faculty members and their preference for instructional technology, that why then were most of them still not using the various

technology tools available to them to make their teaching more effective.

There is a general need to consider what support can be offered or are needed and how, on a national or global level. Basically, there seems to be poor level of computer compliance by Nigerian teachers. Sequel to this, Onuh and Ofojebe (2007) found that teachers do not have adequate knowledge of computer programs that can be used to improve learning processes. This implies that they have limited knowledge on computer usage. In Nigeria, several studies reveal that teachers' computer technology competence is below expectation. (Yusuf, 2005; Olubube, 2006; Agu, Omenyi & Odimegwu, 2007). More so, a study on 'using ICT for secondary education development in Lagos state' revealed that computer usage by the teachers is very low and cannot ensure sustainable educational development. (Onyene, Oshionebo, & Olisaemeka, 2009).

On modes or patterns of computer usage a similar study in Uganda reveals that 50.9% of e-mail users logged in themselves, 26.0% brought in ready processed documents on diskettes, 11.5% gave hard copies to secretaries to type in messages, 5.8% dictated their messages to technical assistants (Asaba & Bamuhiiga, 2009). This study shows that the users adopt various patterns ranging from personally doing it, to involving a technical assistant.

Personnel Attitude, Individual Characteristics, Demographic Features and Lecturers' Computer Usage

The attitude and characteristics of the individual university teacher surely affects their teaching work. It is imperative that teachers develop positive disposition, such as to gainfully influence lives. Ejiogu's diary (as cited in Ejiogu and Alani, 2000)_b opined;

“surely, I make bold to say that good teachers are the stars of the age in which they live; theirs is a duty to show the light so that the nation will find the way”. (p. 283).

Some authors (Lundall & Powell, 2000; Steward, 2002; Kim & Bretschneider, 2004) have found that attitudes are both affected by, and dictate the levels of computer usage, with high level usage correlating with positive attitudes and very low level usage correlating with negative attitudes. Several studies reveal that computer usage may show some differences according to individuals' personal characteristics, demographic features (such as age, gender, experience) and the fields of study (Palmer, 2000; Hawkins & Paris, 1997; Igharia & Livari, 1995). A Malaysian study by Zar, Sharifah & Than (2010) showed that old lecturers use of ICT is lower than the younger ones use. Furthermore, a study of UK communities revealed that age increased with decreasing internet use. (Wilson & Boone, 1998).

Research on gender and computer anxiety in most cases has shown that females are more computer phobic than males. (Schumacher & Morahan-Martin, 2001; Brosnan & Lee, 1998; Umoren & Bassey, 2000). Considering gender issue in context of variables such as self efficiency, computer anxiety and computer

experience, Chua, Chen & Wong (1999) and Coffin & Mackintyre (2000) in a meta-analytical study found some certain differences associated to gender. Females usually have more negative attitude towards computers and greater computer anxiety than males. (Durndell & Thopson, 1997; Mcllroy, Blunting, Tierrey & Gordon, 2001). Teo (2006) in a study in Singapore schools reported gender differences in computer usage. Also, Margolis & Fisher (2002); Todman (2000) and MarkausKaite (2006) found gender disparity in computer usage. However, in a study of U.S students, Freeman (2004) found no gender difference in computer use. A similar study on overall ICT use in Canada revealed that there is no significant difference between male and female ICT use (Looker and Thiessen, 2003). Another study on gender stereotype of Russians towards the internet shows no significant difference between male and female computer use. (Mitina and Voiskounsky, 2005). A similar study by Zar et al (2010) confirms gender equality in CT use. Oyelaran - Oyeyinka and Adeya (2004) in a study on internet use by the academics at 10 Universities in Nigeria and Kenya found no gender difference.

In contrast, some research findings reveal no significant relationship for age, gender and computer attitudes/usage. (Teo, 2008). Several other findings show no difference between male and female attitudes towards computer usage (McCoy , Heafrer, Burdick & Nagle, 2001; Antoniou, Patsi, Bebetsos & Infantidou, 2006; and Bebetsos & Antoniou, 2009). Buttressing the finding that gender is of no effect in computer usage, a study posited that the gender of a person does not have an effect on the person's attitudes toward computers rather that his/her actions do have the effect. Nash & Moroz's diary (as cited in Bebetsos & Antoniou, 2009).

A study of present use and usefulness of a computer based learning at a technical university by Baillie and Percoco (2000), revealed that although there are many advantages in the use of computers in teaching and learning, there are many difficulties for lecturers in using the new technologies because of logistic problems, such as lack of time, technical support, appropriate software and hardware.

Availability and Access to Computers

Authors such as Long (1994) and Ogu (2003), observed that success in computer and internet usage basically requires easy access to them. Access is beyond identifying the number of computers and types available, but has to do with the ability of the personnel to obtain the technology during and even outside regular working hours. However, Cuban et-al's diary (as cited in Sherry & Gibson, 2002) in a study in silicon valley, California reported that access to equipment and software rarely led to wide spread use. They explained that their findings may be due to other contextual factors in the high school environment rather than personnel factors of hostility to technology, inertia and passive resistance. Omenyi, Agu & Odimegwu (2007) reiterated that in Nigeria, access to ICT resources such as the internet and computers is mostly limited even in universities, polytechnics and colleges of education.

Ray (1999) reporting on a 'computer access' survey by Market Data Retrieval (MDR) in United States of America, revealed that in 1998, the number of computers

available per student was in the ratio of 1:6. This same study found that within a year, the number of students for every multimedia computer (i.e. a computer equipped with a CD-Rom and a sound card) dropped from 21 in 1997 to 13 in 1998. On internet access, Ray reported that the National Centre of Educational Statistics (NCES) showed that as at 1997, 78% of U.S. public schools had internet access and that 20% of all classrooms had internet access. The survey data by Market Data Retrieval showed that percentage of schools with internet facilities sharply increased from 54% in 1994 to 90% in 1997.

A survey of Indiana teachers revealed that computers were rarely used for instructions, but were used in elementary schools for drills and practice and in secondary schools, for computer-related skills such as word processing. The survey further showed that the ratio of computers in public schools reduced to 6:1(Reiser, 2002). Although most schools had internet access, students' access was limited, says Anderson and Ronnkvist (1999). Nevertheless, Alena, Ying, Rajat and Michael (2006) reported that use of micro computers in Indian schools is growing tremendously. Another study of availability and accessibility of ICTs in the rural communities of Delta state, Nigeria, found that only a relatively small numbers have access to computers, television and radios, while virtually none have internet access. This off course is also the case in certain urban cities in Nigeria, (such as Lagos) since there is generally low internet access in Nigeria (Monday and Esoswo, 2008).

Buttressing the importance of access, Shaw (1994) stated that increased access 'to' and 'use' of the internet is making a unique contribution to the teaching and

learning process.

Application Areas

Kanugo & Chuothoy (1998) revealed that IT-related failure or success is highly dependent on the functional areas of application. In education, much statutory records and information to be handled exist; hence there are several established functional application areas of computer technology for professional development of academics. Marjanovic (2005) opined that electronic learning environments such as blackboard play a prominent role in education. He further emphasized that ICT is increasingly used in taking exams, as in computer - based testing (CBT). He said that all these developments are increasingly running counter to traditional teaching methods, in which lecturers and students assemble in a lecturing hall with text books, a black board... and students study theory from textbooks at home. These developments are called e- learning. E-learning is an umbrella term for new, innovative computer technology applications and tools that are used in education. It is worthy to note here that application areas keep changing and increasing with changing technology.

Professional and Skill Development

The National Policy on Education, (FRN, 2004) stated that the goals of science and technology are to train the mind in the understanding of the world around and acquisition of appropriate skills, abilities and competence both mental and physical, to equip the individual for life and to face the challenges of the society

where he belongs. Buttressing the need for skill development, it was laudably said “without well trained and motivated teachers, education comes to naught” (Ejiogu’s diary as cited in Ejiogu & Onyene, 2008. Pp. 289). Ward & Parr (2003) found that the provision of professional development for staff is a key ingredient in the successful implementation of computer technology. Askar, Usluel & Muncu (2006) opined that one of the most critical obstacles of diffusion of computer technology is insufficient in- service training. Despite having access to computer in schools, many teachers do not use them regularly because they feel inadequately skilled while some others are ignorant of the benefits accruing from computer technology (Paul, 1999).

Studies show that skill plays a major role in technology acceptance (Igbaria, Shayo & Guthrie, 1999). These skills can be acquired by lecturers through training. Emphasizing the importance of training, Ejiogu (2000)_a said:

This is why we must agree with Texaco Nigeria Limited’s slogan which states: ‘you can’t blame them if you don’t train them’, our universities are no doubt, producing a good number of graduates potentially qualified to manage our public and private institution. However, it does not take long before they become obsolescent in the continuing knowledge explosion, technological advancement and ever-changing social, economic and political environment of our society. (p. 145).

In fact, we make haste to recommend the creation of a department of training and development in all ministries and parastatals as they exist in most

private firms. The public /civil service institutions may have grown in size, but they still have to be mature, for maturity involves adaptability, flexibility and responsiveness in this period of technological and sociological innovations worldwide. (p. 146).

The question now is: Will it not be good to create some department of training and development in all the universities? Is it not very imperative that the department of training be created and mandated to continuously train and empower lecturers with computer skills? Excellence is the goal of every firm or institution. Aristotle's diary (as cited in Ejiogu, 2011) noted: "Excellence is an art won by training and habituation". (p. 139). Sequel to this, Ejiogu (2011) emphasized:

Training activities should be strategically handled especially in businesses where technical know-how are of utmost importance. With rapid changes in such technical know-how, companies that fail to accord training its rightful position are most likely to loose their abilities to compete favourably.... It is necessary that employees' knowledge and skills are current and in sync with the organisation's vision and mission. (p. 143).

Pearce and Robinson's diary (as cited in Ejiogu, 2011) reported that BB &T, a USA based firm in recognition of the importance of training stated:

Competitive advantage is in the minds of our employees. We are committed to making substantial investment in employee education to create a

knowledge-

based learning organization, founded on the premise that knowledge properly

applied is the source of superior performance. (p. 143).

Emphasizing the essence of personnel training and development, Dess, Lumpkin and Eisner's diary (as cited in Ejiogu, 2011) revealed that employees receive an average of 95hours of company training each year in Solectron (a company) in USA. The company's chairman Winstein Chen noted:

Technology changes so fast that we estimate 20% of an engineer's knowledge

becomes obsolete each year. Training is an obligation we owe to our employees. If you want high growth and high quality, then training is a big part

of the equation. (p. 143).

Effective training helps the lecturers to become knowledgeable on the technology, hence the acquisition of the skills to operate and understand the said technology (Cronje and Murdoch, 2001). One can then say that training is a facilitating factor or rather as Jawahar (2002) put it, an essential contributor to the productive use of computer system and technology. Studies report a consensus by trainers that the more complex, ineffective and confusing the training, the more unlikely the user will implement the skill (Ely, 1999; Tannenbaum and yukl, 1992; Jawahar, 2002; Klein and Soria, 1996). Most researchers agree that effective training is inevitable

for productive use of technology by lecturers, but a controversial question still arises; whether training should be customized or; whether it should be “one size fits all” (Rosenberg, 2001; Aggarwal, 2003).

Effective training requires matching lecturers' current skills to the skills required to use the innovation. Klein and Sora (1996) asserted that to foster a climate for just technology acceptance that training must not just be uncomplicated and readily available, but additional assistance in the innovation use should be available even after the main training. Alani (2000) suggested that any gap between expectation of personnel and that of the school might indicate the need for in - service education in order to change the attitude of personnel. Correspondingly, it is imperative that the lecturers be properly trained on computer usage to ease off the accompanying stress attached to their onerous task of teaching, examining and grading students and researching.

In the presence of lack, retention of the training material or skills acquired is often impossible (Parther and Erwin, 2002). Hence, for skill retention and usage, educational institutions must reduce lecturers' work load, so as to afford them flexible time for training, commensurate time for information search on the internet, and enough time for their teaching and research task. Skills are developed effectively, when they are properly applied and utilized. Again, Jawahar (2002) found that persons who hold favorable attitudes towards working with computers are more likely to practise and learn computer skills, and achieve higher results on task requiring the use of computer skills, than those who hold less favourable

attitudes. Computer competency manifests through personal innovativeness, playfulness and computer skills which are simply determinants of use, achieving effects through ease of use and perceived usefulness (Saeed et al, 2003). But computer anxiety indicates lack of computer literacy and skill (Jawahar and Elango, 2001). Moreso, Rosenberg (2004) believed that the implementation of knowledge and skills to operate computer varies. He insists that for e-learning to be effective, it is imperative that competence (the learning, practice and demonstration of performance) is matched to the “right delivery vehicle”. Right delivery vehicle refers to the web- based application.

A study in Kirk’s INTIME journal, on preparing teacher candidates to integrate technology into content area instruction (2001), reported:

According to the standard of learning for the state of Virginia, Virginia students entering the teaching profession ‘should’ be at the apprentice stage of computer/

technology development for those are the competencies required for all students

by the state, and that is the level at which they enter the university. It is my job as

a teacher trainer in methods instructions to help teacher candidate’s move beyond

the apprentice stage of computer /technology awareness and to help them

become more proficient and comfortable in using a powerful, modern method of

teaching technology. (p. 6).

In the future..., Power point presentation will become a standard part of my classroom lectures and they will be required component of all students' classroom presentation as well. (p. 7).

The use of electronic text such as hyper media and hyper text will be used to enhance teaching. They can watch the videos of teachers from other states incorporating technology in their teaching and, since most classrooms in the states of Virginia are computer technologically equipped and most teachers are becoming aware of the usefulness of technology in their own teaching. Such demonstrations by competent teachers serve as spring board for how teacher candidates might incorporate computer/technology into their future classrooms. As an example, a teacher candidate in the Cumberland country partnership programme witnessed his mentor science teacher using a laser disk connected to a television monitor to teach her students about the ocean floor and how scientists use sounding devices to measure the depth of the ocean. He, in turn, saw a way which he could incorporate such technology into his own teaching. In other words, acquiring computer technology competence and skills for professional development has become inevitable. Oluwale (2008) in a comparative study stated that while two Nigerian universities; Federal University of Technology, Akure and Lagos State University, Lagos, on the one hand were deficient in computer and technology literacy, that University of Botswana prioritized computer and information literacy but was deficient in library literacy.

A Nigerian study on a faculty use of a cyber café for internet access reveals that more than half of its respondents acquired their internet skills through self study/instruction; more than one-third rated their internet skills as average. One-fifth used their internet daily, while 10 percent spent 10-20 hours per week on the internet. (Akobundu, and Okafor, 2008). Reiterating on the importance of lecturers' professional development, Mehra and Mital (2007) stated that in some cases, integrating technology into the teaching-learning transaction has been found to transform the teachers' role from being the traditional 'sage on the stage' to also being a 'guide on the side', and students' roles also changed from being passive receivers of content to being more active participants and partners in the learning process. In congruence, other studies found that computer technology is relevant to professional development. (Alley, 1996; Repp, 1996; Roblyer, Edwards and Havriluk, 1997).

Several authors (Ezeliora, 2003; Runge & Lee, 2004) agreed that computer literacy is necessary for effective use of computer technology, while Sherry and Gibson (2002) emphasized that for systematic change (such as from manual to automation) to be sustained, there must be continuous and extensive flow of expertise to fuel its sustainability. Consequently, the need to find out the computer skill development programmes available to the lecturers can never be over-emphasized. Also, Bello & Adeoye (2007) in a study, found a strong relationship among computer technology, teacher performance and overall school effectiveness. Onwuasoanya and Olisaemeka (2007) noted that development and rural growth depended not only on number of human resources but also upon the

level of skills and knowledge developed by the human elements. They made a call for total mobilization of human and natural resources, and intensification of the application of science and technology to the process of growth and development. More so, rapid changes in society necessitate the upgrading of the skills and competencies of school leaders to cope with a more complex school environment. (Schiller,1994).

Teaching Efficiency Using Computers

National Planning Commission (2004) on economic empowerment and development strategy, emphasizing on the importance of teaching efficiency insists that the Nigerian educational system should be so designed to enhance efficiency, resourcefulness and competence of teachers. Momna (2007) in a study in the University of Bath, U. K, found that the use of blended learning (combination of regular classroom face - to - face and computer based tutorials) is a means of improving both the effectiveness and efficiency of large group teaching. Becta (2004) emphasized that computer technology is used to achieve teacher efficiency because it facilitates quicker and easier communication and network which allows teachers to perform administrative task more quickly and more thoroughly. He also says that it facilitates the exchange of resources, expertise and advice. Adequate computer technology usage ensures greater collaboration between teachers, educators and global experts in education, thereby empowering especially the university teachers with innovations in education, teaching methods and research.

Having observed the great potentials of using computer technology to ensure

teaching efficiency, America's national initiatives supporting infusion of technology in instruction include federal legislation such as 'Goals 2000' and Secretary of Education Richard Riley's 1997 goal that students should be entitled to have their classroom connected to the internet by the year 2000 to be technologically literate (Kenneth, 2002). This researcher went on to say that effective teachers use a variety of tools since technology has given teacher the ability to adjust the relationship between time and space for student and themselves in support of the potential for highly engaged learning. Re-iterating on actualizing teaching efficiency, Cuban's diary (as cited in Kenneth, 2002) stated that he believes that the motion picture is destined to revolutionize our educational system and that in a few years, it will supplant largely, if not entirely, the use of text books. He said that on the average, we get about 2% efficiency out of school books as they are written today but that the education of the future, as he sees it, will be conducted through the medium of the motion pictures...where it should be possible to achieve one hundred percent efficiency.

Emphasizing on achieving teaching efficiency using computers, Daniel (1997) opined that instructional technology may support and increase the efficiency of the teaching-learning transaction or even modify educational processes, especially with regards to distance education and 'anytime, anywhere' access. Another research work revealed that computer technology is increasingly being used by teachers in day - to - day work leading to increased efficiency in planning and preparation of teachers' work (Balanskat, Blamire & Kefala, 2006). Wheeler (2000) asserted that computer is intended to serve as a means of improving efficiency in

the educational process and effecting changes in teaching methodology, assessment of learning, student tracking, communication and evaluation while Coombs' diary (as cited in Oguntoye & Alani, 1998) stated that efficiency is the relationship of output to input. They termed this relationship internal efficiency or cost effectiveness.

Factors Militating Against and Enhancing Effective Use of Computer Technology

Among the factors hindering effectiveness of computer technology education are; unawareness, low computer literacy level amongst the students/lecturers, and cost (Folorunso, Ogunseye & Sharma, 2006). Buttressing the assertion that fund is one of the factors hindering adequate computer technology use, Akpotu (1998) found that education like other consumer goods is becoming extremely expensive in Nigeria. Peoples' beliefs can be inhibitors to computer usage, said Confetelli (2004). He opined that while several studies show that irrespective of the much pressure being mounted on faculties to integrate computer technology, many remained adamant and reluctant. He therefore, believes the biggest obstacle to using computers even in the classrooms is not necessarily the lack of technology or funds but simply unwillingness to use the technology since they see it as a source of stress. Studies over the years have identified the predictors of user adoption such as, ease of use, system design quality, perceptions of usefulness, download delay, data security, navigation, instability of the system, responsiveness, information content, accuracy and interactivity (Saeed, Hwang & Yi, 2003).

Bello (2008)^b in a study opined:

Teachers feel threatened by the impact of technology on the previously sacrosanct subjects. Responsibility for computer in the school has fallen on the computer specialists who are not always familiar with ideals of computer across the curriculum. Again, computer usage has often been limited to computer studies, while many schools have tied down their machines to one room, computer is still an alien element in the classroom. (p. 599).

Certain research works categorized the enhancing and inhibiting factors of computer technology into situational and dispositional factors. Jawahar (2002) stated that situational factors are issues largely beyond the control of individual users e.g. lack of resources, faulty equipment, time constraints that restrict the range of the individual's acceptance of innovation. Dispositional factors include preconceived attitudes and already known behaviour characteristic of the user that may influence user acceptance and performance such as, influence of attitudes, aptitudes, gender, learning style, experience, cognitive styles and education (Chau, 2001; Jawahar and Elingo; 2001; Harris, Donaldson & Campbell, 2001; Harris, 2000).

In a study by Carina America department (2006), time constraint and the complexity/ ineffectiveness of training are termed situational factors while

computer competency and attitude towards computers are dispositional factors. Ignorance, regarding web technology (a specific technology), 'mindset' and preference for the traditional face to face teaching method were identified as hindering factors to learning and using ICT by lecturers. The study identified 'user-friendliness' of web technology as one of the facilitating factors of web CT use but found that some lecturers felt that 'Respondus' (a software program used to design short answers/multiple questions for assessment on web CT) is not user-friendly, thereby creating a general impression that web technology is difficult to use. If lecturers have a negative attitude, towards computers in general, they are more likely not to find specific program easy to use.

Simply put, lack of time, lack of computer gadgets/ineffective training, lack of skills and computer - phobia are inhibiting factors of computer usage. In agreement, Broere, Geyser & Kruger (2003) found that lecturers often said that due to time constraints, they are unable to fit technology into their busy schedules and to cover the curriculum, especially if it involves much use of technology in the classroom. Amongst the inhibiting factors of computer usage is 'fear of computers'. Joy's diary (as cited in Orr, Allen and Poindexter, 2001) used similar terms such as cyber phobia, computer phobia, computer anxiety and technophobia. 'Computer phobia' has been defined as resistance to talking about computers or even thinking about them, fear or anxiety towards computer and hostile or aggressive thoughts about computers. Novice users of technology express among other personal factors, the fear of looking foolish in front of their colleagues or the students (Mulqueen's diary, as cited in Broere, et al., 2003). In a practical study of teaching with

telecommunication in an educational administration course of the University of Newcastle, Schiller (1994) said that for the lecturers, an enormous amount of time was required to understand the complexities of the many options of hard ware or soft ware combinations available for e-mail use. They need time to unravel the issues of incompatibility, or at least, mismatches, of hard wares and soft wares, and to cope with the complexities of learning to use e-mail. The study also found that lack of interest by teachers in using technology due mainly to lack of expertise or a lack of understanding of its applicability to interacting at a distance, was also a factor inhibiting use of e-mail. This finding lends credence to the enormous hurdles to be crossed and surmounted for effective computer technology usage by lecturers.

A similar research on media in distance learning, indicated that lack of funds and computer facilities, lack of electricity supply in rural areas, epileptic power supply in urban areas, lack of access, poor maintenance of electronic media and lack of experts to operate the available equipment, amongst others, are factors militating against effective use of CT. The same study reports that contemporary technology like computer applications, satellite broadcast, and audio conferencing were not used by Nigerian National Teachers' Institute. (Mudasiru and Ayetunde, 2005). These buttress the fact that CT has not been properly integrated and adopted in Nigeria.

In agreement, Molenda and Bichelmeyer (2005) asserted that human factors such as resistance to things that require new ways of working and the need for

specialized training impinges on trainers', teachers' and professors' use of CT. These human factors, as they play out in training and education makes it inevitable for technology use to lag behind availability. Oguzhan, Bilal & Vahit (2006) in a study related to CT usage, found a meaningful relationship between preferences to use a computer and variables such as gender, economic power, academic department, insufficient facilities and time poverty. Sheila (1990) in engineering computing newsletter, reports among other issues, several factors affecting computer use. These include; lack of suitable soft wares, programs not fitting into curriculum, poor quality of available soft wares, lack of cheap realistic programs, poor designs of some teaching soft wares, lack of complete descriptions and evaluations and lack of awareness of the availability or existence of soft wares. The report lamented that all these factors put lecturers off using computers in teaching. More so, the findings included in the lists of hindering factors; lack of interest, belief that computing requires much effort and is too demanding, lack of staff familiarity with computing, staff conservatism, lack of conviction of the pedagogic values, much apathy, lack of awareness of new and better packages, and lack of confidence.

Schiller (1994) in a study found that senior staff were especially reluctant to engage computers in their teaching. He enumerated the inhibiting factors of computer use as; low priority assigned to use of e-mail, difficulties in obtaining access to a school-based computer and modem, complexities in connecting and using a modem at home, lack of interest by teachers in using technology due to lack of expertise and lack of understanding of its applicability to interacting at a

distance, frustration of not being able to access e-mail easily, large amount of time required to learn how to use the communications soft wares, lack of computer skills, particularly the use of word processing, complexity of e-mail jargons among devotees, complex soft wares, difficulties of compatibility, 'difficult to read and understand manuals' and equipment malfunction.

Mehra and Mital (2007) working on integrating technology into teaching-learning, confirm that experience in use of instructional technology, perception about usefulness, accessibility of hard wares, time for lecture preparation, age, training availability and academic background of faculty members do affect the extent of use of technological tools for instruction. General reluctance to adopt more complex computer-based activities or other teaching innovation besides use of power - point slides and internet was reported. The study also found that most faculty members expressed fear and doubts regarding technicality of computer use, insists it is very complex and hence feels intimidated by the use of computers in classroom teaching. Mindset, resistance to new changes, lack of computer training and short sightedness on the part of management were among the inhibiting factors.

According to Okafor (1997), poor conditions of service of the Nigerian teacher has so much affected teaching and learning that even the learner does not experience a permanent change in behaviour. The teachers give time to their personal business to earn their living. This implies that the lecturers need a better condition of service to be able to create time for computer technology skill acquisition and to

concentrate on teaching.

Appraisal of Literature

Related literature on the relevance of CT to teaching in tertiary institutions, CT usage, personnel attitude, demographic features, application areas, availability and access, professional and skill development, teaching efficiency using CT and factors hindering CT usage were reviewed.

The reviewed literature showed that computer technology was relevant in tertiary institutions and that several developed nations of the world had already gotten their lecturers to utilize CT while many African countries were yet to fully adopt CT in tertiary institution. Personnel attitudes, individual lecturer characteristics and demographic features were seen to affect computer usage. Availability and access were high in developed nations and very low in developing nations. Computer technology application areas kept evolving and seemed endless because CT is generic hence specific structures could always be adapted according to unique needs of institutions and emerging firms. Available literature revealed prevalent needs for professional and CT skill development. It also revealed some factors militating against and enhancing CT usage.

The puzzle then becomes; is there really any significant relationship between CT usage and teaching efficiency in tertiary institutions? If there is, then what is the

extent of the influence? Could there be environmental and demographic factors affecting the Nigerian lecturers CT usage? What CT features should be adapted in the institutions? The study focused on exploring the relationship between lecturers computer usage and teaching efficiency.

CHAPTER THREE

RESEARCH METHODOLOGY

Introduction

This chapter explains the methodology adopted for the study. It deals with the research designs, population of the study, sample and sampling techniques, research instruments, validity and reliability of the instruments, pilot study, procedure for data collection and data analytical methods.

Research Design

The study is a descriptive and correlation survey. Descriptive because it is primarily concerned with data collection for the purpose of describing and interpreting existing conditions, attitudes and prevailing practices. It is correlational because the study tested the relationships between variables.

Population of the Study

The target population for the study included lecturers in thirteen out of the fourteen tertiary institutions in Lagos state. There are fourteen tertiary institutions in Lagos state as at the time of this study. These include a federal university, a state university, a private university and an inter-university, five polytechnics and four

colleges of education. One institution was excluded from the study because it was fairly new, still at the teething stage and yet to be stabilized. As a result, the Federal Ministry of Education does not yet have substantive data on it as regards the gender and number of lecturers. More so, they had just a few number of lecturers because they were still carrying out recruitment exercise. The total number of the lecturers in the thirteen institutions was 2,919.

Table 1

Number of lecturers by gender in tertiary institutions in Lagos state

S/n	<i>Universities</i>	Males	Females	Total
1	University of Lagos (UNILAG)	891	240	1,131
2	Lagos state university (LASU)	476	101	577
3	Pan African University (PAU)	14	10	24
4	Nigerian French Language village (NFLV)	23	6	29
5	Caleb University, Ikosi-Ketu	-	-	-
<i>Polytechnics</i>				
6	Yaba College of Technology (YCT)	370	155	525
7	Grace Polytechnic, Surulere (GPS)	53	2	55
8	Wolex Polytechnic, Ikeja (WPI)	7	0	7
9	Lagos City Polytechnic, Ikeja (LCPI)	32	4	36
10	Ronik Polytechnic (RP)	20	4	24
<i>Colleges of Education</i>				
11	Federal College of Ed. (Tech)-FCET	82	40	122
12	Michael Otedola Coll. of Ed. - MOCE	64	29	93
13	Adeniran Ogunsanya Coll. of Ed-AOCOE	180	68	248
14	St Augustine's Coll. of Ed. - SACOE	<u>32</u>	<u>16</u>	<u>48</u>
	Totals	<u>2,244</u>	<u>675</u>	<u>2,919</u>

Source: Federal Ministry of Education (FRN, 2007)

Note: Nigerian French Language is not a university but an inter-university centre.

Sample and Sampling Technique

The Federal Ministry of Education statistics show that there are 2,919 lecturers in the thirteen institutions selected for this study. The sample size constitutes 15% of the population, which amounts to 438 lecturers. An analysis of the trend of decrease and increase in the number of lecturers (Federal Ministry of Education, 2007) show a negligible variation. The number of lecturers that exit the system due to brain drain syndrome, retirements and deaths may probably equal the number of new lecturer intakes. Furthermore, an update in the number of lecturers as at February, 2011, obtained from the academic staff personnel units of some of the sampled institutions revealed only a marginal increase. More so, to cushion any effect that might emanate from the differential, the sample size was put at 15% of the entire population.

Proportionate and disproportionate stratified random sampling techniques were adopted. The sample was stratified according to gender and experience. These act as extraneous variables by equally influencing teaching efficiency alongside computer usage. The population was proportionately stratified based on gender. This ensured that the relative contribution in the population is exactly its relative contribution in the sample, hence the sample possesses specific characteristics in exactly the same proportion as those existing in the parent population.

Disproportionate stratified sampling was done based on years of lecturing experience. This is because the information on the ratio of experienced to inexperienced lecturers was not readily available hence the relative proportions of the strata in the sample may not necessarily correspond to their relative proportion in the population. Each stratum was assigned the same weight irrespective of their weight in the parent population.

After grouping the sample into two strata, the selection of specific subjects or sample participants within each stratum was done randomly to increase the likelihood of eliminating sources of invalidity due to selection other than those controlled through stratification. Combination of stratification and random selection ensured that a sample is an adequate representation of a population.

The information in Table 1 shows the ratio of male: female lecturers per institution. Exactly 15% samples were taken from male and female subpopulations. This ensured that the sample retained the same sex ratio as the parent population. Further Sample stratification was done with regards to years of lecturing experience. The sample includes 50% experienced and 50% inexperienced lecturers. The fifty percents were applied to the 15% sampled males and females. This helped to obtain a sample that was representative of the population.

Table 2
Sample distribution (15% of the population)

Schools	M	F	Total	Exp.	Inexp.
Unilag	134	36	170	85	85
Lasu	71	15	86	43	43
PAU	2	2	4	2	2
NFLV	3	1	4	2	2
YCT	56	23	79	39	40
GPS	8	0	8	4	4
WPI	1	0	1	1	0
LCPI	5	1	6	3	3
RP	3	1	4	2	2
FCET	12	6	18	9	9
MOCE	10	4	14	7	7
AOCOE	27	10	37	18	19
SACOE	5	2	7	4	3
Total	337	101	438	219	219

Keys

Exp = experienced

Inexp = Inexperienced

Assumptions

For the purpose of this study, it was assumed that;

Experienced are lecturers with above 10 years lecturing experience

Inexperienced lecturers are lecturers with below 10 years of lecturing experience

Note: six ICT firms were interviewed in the course of the study. They provided answer to research question four.

Research Instruments

Two instruments were developed for this study. They include Computer Usage and Teaching Efficiency Questionnaire for Lecturers (CUTEQ - L) and an Interview Schedule on Ways of Using Computers to Enhance Teaching Efficiency (ISWUCETE).

Computer Usage and Teaching Efficiency Questionnaire for Lecturers (CUTEQ-L)

This instrument was a multi-item questionnaire, which consisted of nine sections. Section A subtitled 'personal data', sought for participants' personal data such as age, experience and gender. Section B subtitled 'computer availability' with five items sought information on computer availability, while section C with 10 items, subtitled 'lecturers' computer technology literacy levels, sought responses on lecturers' levels of computer literacy. Section D which was subtitled 'rates and modes of lecturers' computer usage' had three items. Five itemed Section E, titled 'lecturers' computer technology usage' sought information on lecturers' computer technology usage. Section F, subtitled 'lecturers' teaching efficiency perception' had 25 items which addressed the perception of lecturers on teaching efficiency

using computers. Section G subtitled 'ways of improving lecturers' CT usage' contained eight items, while section H, subtitled 'factors hindering lecturers from computer usage' comprised ten items and lastly, section I with eight items was subtitled lecturers' CT needs. This sought for the CT needs of lecturers.

Interview Schedule on Ways of Using Computers to Enhance Teaching

Efficiency (ISWUCETE)

This was an unstructured interview schedule, used to obtain information from top managers of ICT firms, including University of Lagos centre for Information and Technology System (CITS).The interview schedule sought information on other ways of enhancing teaching efficiency using computer technology.

Validity of the Instruments

The content validity of the instruments was established in two ways: firstly, the research instruments were confirmed valid by five lecturers and the my two supervisors who are experts in Educational Administration Department of University of Lagos. They checked the appropriateness, applicability and adequacy of the items from personal perspectives. Secondly, three experts in data analysis and two experts in test and measurement also certified the instruments as being capable of testing what it is intended to test, thus ensuring face and content validity. Modifications arising from their professional inputs, comments and suggestions were made. This ensured that the instrument is standardized and of high quality.

Pilot Study

A pilot study was carried out at the University of Lagos. This was done to identify and correct methodological and logistic issues or problems that could threaten the internal and external validity of the study. The pilot study was further used to validate the research instruments. The participants in the pilot study were excluded from the main study but the non participants among University of Lagos lecturers were still included in the study.

Reliability of the Instruments

The reliability of the study instruments was determined by testing the internal consistency using split half reliability method during the pilot study. The items were divided into odd and even, per questionnaire, then each individual's score on the two halves were computed. The correlation coefficient between the two sets of scores per participant was calculated. This was done on the entire questionnaire responses included in the pilot study. Then all the reliability coefficients were averaged. The split half reliability coefficient obtained was high. Sequel to the fact that split half reliability coefficient represents the reliability of only half of the test items, a corrective statistics, the Spearman-Brown prophecy formula was applied. The overall reliability coefficient for all the variables was 0.87 for CUTEQ-L. This implied that the instrument was very reliable. The interview schedule with only one simple question was considered reliable. The reliability coefficients of the sections of the instruments CUTEQ - L is shown in table 3.

Table 3

Reliability coefficients of sections of the instrument CUTEQ-L

Sections	Titles of the Sections	Reliability coefficients
A	Personal data	---
B	Computer availability	0.86
C	CT literacy level	0.87
D	Rates and modes of CT usage	0.81
E	Computer technology usage	0.86
F	Teaching efficiency perception	0.95
G	Ways of improving CT usage	0.79
H	Hindering factors of CT usage	0.93
I	Lecturers CT usage	0.89
Totals		6.967

N = total number of the sections of the questionnaire.

The instrument has sections A to I, which equates to nine. Section A was excluded in the calculation of reliability coefficient because it only needed personal data.

This left the study instrument with eight sections. The overall reliability coefficient

for all the variables was obtained by summing the coefficient of all the sections and dividing by eight. Average reliability = 6.967 divided by 8, to give 0.87.

Procedure for Data Collection

The researcher and five trained research assistants administered all the questionnaires. The managers of ICT firms were interviewed to find out other ways through which computer technology usage can enhance lecturers' efficiency. Several visits were made to the sampled institutions. This enabled the researcher and the trained research assistants to effectively administer and collect back the filled questionnaires.

A total of 584 copies of the questionnaires were randomly given out to lecturers in all the sampled tertiary institutions. This amounted to 20% of the population. The return rate was 86.13% which equated to 503 questionnaires. These were sorted. On obtaining 438 validly filled returned questionnaires, which matched the sample plan of minimum of 15% of the entire population, the analysis was done on them. Basing the analysis on the 438 responses ensures that the sample size was a true and good representation of the population.

The researcher interviewed some of the top managers of six ICT Firms. The firms included Aptech Computers, Karrox Computers, Unilag CITS, 4 Site Computer Technology Limited, Nextgen Computers and Logos Computer College. They supplied their expert information on ways of enhancing teaching efficiency through

ICT usage.

Scoring of Measuring Instrument

All the measures used in the study were selected to address the nine sections in the questionnaire. Section A with only five items yielded nominal and ordinal data. The item gave information on department, gender, age, experience and academic qualification. These were rather used for sorting the questionnaires to fit into sample plan, hence there was no need for scoring the responses. Section B consisted of five items, which yielded responses to a four-point scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD).

The scale measuring lectures computer technology literacy levels comprised ten items in section C. The items were assessed on a four-point level of Not-able, Beginners, intermediate and experienced. Frequency counts and percentage were used to analyse the data in section B, C and D. Section D consisted of three items, which sorted information on rates and modes of computer usage. Section E on CT usage comprised five items. The first item was assessed on a five-point scale of never (1), Not often (2), Sometimes (3), Often (4), and very often (5). Items 2 to 5 were assessed on a four-point scale of SA (4), A (3), D (2) and SD (1). The negative statements were scored in the reverse form of SA (1), A (2), D (3) and SD (4). This applied to sections E and F. Pearson statistic was applied to test relationship between two interval variables while t-test statistic was applied to test

the relationship between one interval and one nominal variable with only two conditions, as in section A (gender and experience).

Sections G, H and I consisted of eight, ten and eight items respectively. The items were coded, frequencies counted and ranked from the most important to the least important. In section H, which was on factors hindering lecturers from computer usage, frequency counts, percentages and ranks were also used to analyze data. The most important item had the highest frequency and percentage hence ranked first while the item with least frequency and percentage ranked last i.e. tenth.

The interview schedule yielded information on methods of enhancing teaching efficiency. The ICT firms severally suggested eleven methods and strategies of using computer technology to increase teaching efficiency. Frequency counts and percentages were used to analyze the data, which were finally ranked from one to eleven accordingly.

Method of Data Analysis

Descriptive and inferential statistics were used for data analysis. Means, percentages, ranking and frequencies were used to present and describe data. They were used to answer the research questions. Pearson product moment correlation technique was used to test hypotheses one, two, three and four, to find the relationships between the variables. Coefficient of Determination (R^2) was used for further analysis.

Hypotheses five and six were tested using T-test statistics which allowed the comparison of two means, so as to determine the probability that the difference between the means reflected a real difference between the groups of subjects and not due to a chance variation in data.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

Introduction

This chapter presents, analyzes and interprets data as obtained in the study. It gives a detailed description of the research findings as regards answers to the research questions and also the hypotheses testing.

Data presentation

The five research questions that were not converted to hypothesis were answered and the seven hypotheses tested. The results are presented.

Answers to Research Questions

Research Questions 1: What are the computer literacy levels of the lecturers in tertiary institutions in Lagos state.

Table 4 shows the responses of participants with respect to the question on literacy levels.

Table 4**Lecturers' response on computer literacy levels**

Literacy levels items	N	Not able	Percentage			Total (%)
			Beginner (%)	Intermediate (%)	Experienced (%)	
Switch on and off	438	0.5	13.9	22.4	63.2	100
Using Microsoft word	438	1.6	18.0	29.7	50.7	100
Using spreadsheet	438	15.3	46.1	23.3	15.3	100
Editing files	438	5.9	34.9	33.1	26.1	100
Storing/saving files	438	5.5	37.0	32.0	25.5	100
Data transfer via devices	438	7.8	44.5	22.6	25.1	100
Printing works /files	438	9.8	43.4	22.6	24.2	100
Handling e-mails	438	29.5	37.9	13.2	19.4	100
Working with internet	438	33.3	34.7	13.9	18.1	100
Using power points/multimedia	438	22.1	48.2	18.5	11.2	100
Means		13.1	35.9	23.1	27.9	100

In the study, 13.1 per cent of those sampled were not able to handle the various categories of computer applications that qualified them as computer compliant. Infact, as many as 33.3 per cent could not work with internet. Another 22.1 per cent could not operate power point and multi-media. About 38 per cent, 35 per cent and forty eight per cent were mere beginners in handling e-mails, working with internet and power point / multimedia respectively. A large percentage

(35.9%) were beginners, 23.1 per cent were intermediate while only 27.9 per cent were experienced in computer operations. The latter, of course, were largely efficient only in switching off and operating micro-soft word, the most basic in computer knowledge. In a nutshell, table 4 depicts a very low CT literacy level (72.1% were not experienced). Excluding the most basic or elementary item of switching on and off a computer, only 19.1% of the sampled lecturers were experienced in CT usage.

Research Question 2: What is the Rate and Mode of Lecturers’ Computer Usage?

The findings on the rate and mode of lecturers’ computer usage are presented in tables 5 and 6.

Table 5

Lecturers’ Rate of Computer Usage

Rates	Frequency	% f
Nil	13	3.0
Low	149	34.0
Sometimes	218	49.8
High	57	13.0
Very high	1	0.2
Total	438	100

Table 5 shows that only a negligible number of lecturers used computer at a very

high rate, about one tenth used it at a high rate, while half of the participants sometimes used computers. Another one third either have low rate or zero rate of usage. This implies that the general rate of computer usage by lecturers is still low. Only 2 per cent of the sampled lecturers used computer at a high rate while 3 per cent never used computer at all. As much as 50 per cent sometimes used computer and 34 per cent acknowledged low usage.

Table 6

Lecturers' Mode of Computer Usage

Mode of use	Frequency	% f
Not at all	10	2.3
Technical assistance only	137	31.3
Both technical assistance & myself	188	42.9
By myself only	102	23.3
	1	0.2
Total	438	100.0

Table 6 shows that less than one quarter (23.3%) of the lecturers operated computers by themselves, a little less than half (42.9%) operated computers either by themselves or with the help of technical assistants while another one third (31.3%) either completely depended on technical assistants or do not operate computer at all. A total of 76.5% needed the help of technical assistants to use computer technology. This finding reveals that most lecturers operate computer with the help of technical assistants.

Research Question 3: What Factors Hinder the Lecturers from Adequately Using Computer Technology for Teaching Activities?

Table 7

Factors Hindering Lecturers' Computer Usage.

Factors	Frequencies	%	Ranks
Poor technical support	420	95.9	1
Epileptic power supply	417	95.2	2
Inadequacy of computer facilities	397	90.6	3
Lack of commensurate CT training.	388	88.6	4
Constant computer breakdown	372	84.9	5
Lack of computer literacy/skills	374	85.4	6
Lecturers' lack of interest	344	78.5	7
Lack of time for lecturers	332	75.8	8
Poor remuneration	321	73.3	9
Much work load on lecturers	276	63.0	10

It was observed from table 7 that poor technical support for lecturers was the major hindering factor of CT usage. Epileptic power supplies, inadequacy of CT facilities, lack of training and constant computer breakdown were among the high ranking

hindering factors. Lack of CT literacy and skills were also found to be one of the factors hindering computer use by lecturers. More so, lack of interest, lack of time, poor remuneration and much workload were also shown as factors hindering usage.

Research Question 4: In What Ways can Computer Usage Enhance Lecturers' Teaching Efficiency?

Table 8

Interview Excerpts from ICT Firms on Enhancing Lecturers' Teaching Efficiency.

ICT Firms' Suggestions	Frequency	%	Rank
Lecture note/tutorials on the web as learning modules.	6	100	1
Internet surfing for updates	6	100	1
Use of multimedia projectors for lectures.	6	100	1
Use of power point to summarize lessons	6	100	1
Marking/grading with computer rubric (software).	5	83	5
Teleconferencing or video/audio/phone conferencing	5	83	5
Use of on-line tutorials/assignments via e-mails.	5	83	5
Storing records in computer, i-pods, compact disks and flash drives	4	67	8
Taking exams by computer-based-training(CBT)	4	67	8
Extensive communication via e-mails and text message	4	67	8
Use of smart board (interface between lecturers and students) and joystick.	4	67	8

Thorough content analyses of the six ICT firms' responses to research question five were summarized in table 8. Emphasis is mainly on internet surfing, use of multimedia projector, power point and lecture notes on web as learning modules. Other prominent suggestions include; marking/grading with computer rubrics, teleconferencing and online tutorials and assignments, storing records with computer facilities and taking computer-based exams. All these imply electronic teaching and learning. Some of the top executives of the ICT firms however, warned that it is worthy to note that computer technology application areas keep changing and increasing with changing technology.

Research Question 5: In What Ways can the Lecturers' Level of Computer Usage be Improved?

Table 9

Ways of Improving Lecturers' Computer Usage.

Improving ways	Frequency	%	Ranks
Compulsory/free computer training	434	99.1	1
Modern /functional computer gadgets	432	98.6	2
Periodic computer seminars/workshop	430	98.2	3
Constant power supply	429	97.9	4
Provision of technical assistance	413	94.3	5
Motivation/incentives to regular users	387	88.4	6
Computer repair unit per dept/faculty	378	86.3	7

Reduction of work load	330	75.3	8
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Table 9 shows that provision of compulsory /free computer technology training and modern/functional computer gadgets are predominantly the major ways of improving lecturers' computer usage. Periodic computer technology seminars/workshops, constant power supply and provision of technical assistance are other ways of improving usage.

Hypotheses Testing

Hypothesis 1: There is no significant relationship between teaching efficiency and lecturers' computer usage

To test this hypothesis, the respondents' opinions were analyzed using means(x) and standard deviation (SD). Furthermore, Pearson's product moment correlation statistical procedure was employed to ascertain whether there is a significant relationship between lecturers' computer usage and teaching efficiency.

Table 10

Relationship between lecturers' computer usage and teaching efficiency

Variables	N	Mean	SD	DF	r-cal	r-crit	R ²	Rem
Usage	438	11.05	2.48	436	0.483	0.098	0.23	sig
T/efficiency	438	51.36	7.71					

The result in table 10 shows a significant relationship between lecturers' computer

usage and teaching efficiency. The calculated r-value 0.48 is greater than the table r-value 0.098 at a 0.05 level of significance. Consequently, the null hypothesis is rejected while the alternative hypothesis is accepted. Hence, there is a significant relationship between lecturers' computer usage and teaching efficiency. The correlation, r-cal is 0.483. The R^2 is 0.2333. Therefore, computer technology usage explained 23.33% of the variability in teaching efficiency, leaving 76.67% of the variability to be explained for by the other variables.

Hypothesis 2: There is no significant relationship between lecturers' ease of managing large class and computer technology usage.

In testing this hypothesis, the responses were analyzed using means and standard deviation (SD), while Pearson's Product Moment Correlation statistics was used to determine whether there is significant relationship between ease of managing large classes and computer usage

Table 11

Relationship between lecturers' ease of managing large class and computer usage

Variables	N	Mean	SD	DF	r-cal	r-crit	R^2	Remark
Usage	438	11.05	2.48	436	0.883	0.098	0.78	Sig
Ease of mgt of large class	438	4.99	1.30					

Table 11 shows that there is a significant relationship between ease of managing large classes and computer usage. The calculated r-value of 0.883 is greater than the critical r-value of 0.098 at 0.05 level of significance. Therefore, the null hypothesis is rejected while the alternative hypothesis of a significant relationship is accepted. The correlation coefficient is 0.883 and the R^2 is 0.7797. This implies that computer usage by lecturers explained 77.97% of the variability in the ease of managing large classes.

Hypothesis 3: There is no significant relationship between lecturers' ease of lesson delivery and computer technology usage.

In testing this hypothesis, the responses in the questionnaire were analyzed using means (\bar{x}) and standard deviation (SD). Then, Pearson's Product Moment Correlation statistics was used to determine whether there is a significant relationship between ease of lesson delivery and computer usage.

Table 12

Relationship between lecturers' ease of lesson delivery and computer technology usage.

Variables	N	Mean	SD	DF	r-cal	r-crit	R^2	Rem
Usage	438	11.05	2.48	436	0.716	0.098	0.51	sig
Lesson delivery ease	438	26.40	7.66					

Table 12 shows that there is a significant relationship between ease of lesson

delivery and computer usage. The calculated r-value of 0.716 is greater than the critical r-value of 0.098 at 0.05 level of significance. Therefore the null hypothesis is rejected while the alternative hypothesis of a significant relationship is accepted. The correlation is 0.716 and the R^2 is 0.5127. This implies that computer usage by lecturers explained 51.27% of the variability in the ease of lesson delivery.

Hypothesis 4: There is no significant relationship between computer usage and

lecturers' literacy levels

In testing this hypothesis, the responses in the questionnaire were analyzed using means (\bar{x}) and standard deviation (SD). Then, Pearson's Product Moment Correlation statistics was used to determine whether there is a significant relationship between computer usage and lecturers' literacy levels.

Table 13

Relationship between computer technology usage and literacy levels.

Variables	N	Mean	SD	DF	r-cal	r-crit	R^2	Remark
Usage	438	11.05	2.48	436	0.724	0.098	0.52	sig
Literacy level	438	26.58	7.65					

Table 13 shows that there is a significant relationship between lecturers' computer

literacy levels and computer usage. The calculated r-value 0.724 is more than the critical or table r-value 0.098, hence the alternative hypothesis of a significant relationship is accepted, while the null hypothesis of no significant relationship is rejected at a 0.05 level of significance. The correlation coefficient is 0.724 while the R^2 is 0.5242. This implies that lecturer's computer literacy explained 52.42% of the variability in computer technology usage.

Hypothesis 5: Male and Female Lecturers do not differ significantly in their extent of computer usage.

To test this hypothesis, the responses on the questionnaire were analyzed to get the means (\bar{x}) and standard deviations (SD). The participants were previously categorized into males and females during sampling hence independent t-test statistical procedure was adopted to determine whether significant differences exist between male and female lecturers' computer usage.

Table14

Difference between Male and Female lecturers' computer usage.

Variables	N	Mean	SD	Mean diff	Df	t-cal	t-crit	Sig
Male usage	337	11.0267	2.5052	-0.1218	436	-0.432	1.96	0.66
Female usage	101	11.1485	2.4099					

The result of the analysis of hypothesis 5 on table 14 indicates an almost equal

means. The calculated t-value of 0.432 is less than the critical t-value of 1.96, given

436 degrees of freedom, at a 0.05 significance level. Therefore, the null hypothesis is accepted, since the calculated t-value is not significant. Again, the significant probability of 0.666 is greater than 0.05. This further implies that there is no significant difference between male and female lecturers' computer usage. We then infer that both male and female lecturers use computer technology equally.

Hypothesis 6: Experienced and In-experienced Lecturers do not differ significantly in their rates of Computer Usage.

In testing this hypothesis, the lecturers' responses were computed into mean(x) and standard deviation (SD). Sequel to the fact that the respondents were previously categorized into inexperienced and experienced, the independent t-test statistics was used to determine whether significant difference exists between inexperienced and experienced lecturers in their rates of computer usage.

Table 15

Differences between Experienced and Inexperienced Lecturers' Computer Usage.

Variables	N	Mean	SD	Mean diff	Df	t-cal	t-crit	Sig
Inexperienced	219	11.9772	2.4237	-3.8400	436	9.654	1.96	0.013
Experienced	219	8.1324	2.7168					

Table 15 shows that the mean of the inexperienced is greater than that of the experienced lecturers. The calculated t-value of 9.654 is greater than the critical t-value of 1.96, given 436 degrees of freedom at a 0.05 significant level. Hence, the null hypothesis is rejected. More so, the significant probability of 0.013 is less than 0.05. It is then inferred that there is a significant difference between inexperienced and experienced lecturers' computer usage. The inexperienced lecturers use computer technology more often than their experienced counterparts do.

Summary of Findings

Sequel to the analyses of data obtained, the following is the summary of findings in this study;

1. The findings indicate low computer literacy among sampled lecturers. Fifty-three percent either were beginners or were not able to operate computers while seventy six per cent were inexperienced in computer technology use.
2. The rate of computer usage by sampled lecturers was still low. Thirty-seven percent had low usage and eighty-seven per cent used computers either sometimes or at a low pace. Only thirteen per cent had high or very high usage. A few lecturers (twenty three per cent) could operate computers by themselves, while most (about seventy-seven per cent) depended on technical assistants.
3. The factors hindering CT usage by lecturers in the study included; poor technical support, epileptic power supply, inadequate facilities, lack of CT training, constant computer breakdown, lack of CT literacy/skills, lack of

interest and time.

4. Several ways of CT usage to enhance teaching efficiency suggested by the study included; internet surfing, use of multimedia and projectors, use of power points, putting lecture notes on the web as learning modules, marking/grading with computer rubrics, teleconferencing, video/audio/phone conferencing and use of on-line tutorials/assignment.
5. The suggested ways of improving computer usage included; free/compulsory CT training, provision of modern/functional gadgets, periodic CT seminars/ workshops, constant power supply, and provision of technical assistance.
6. There was a significant relationship between computer technology usage and teaching efficiency. CT use by lecturers influenced teaching efficiency. It contributed about 23 per cent of the variability in teaching efficiency.
7. There was statistically significant relationship between CT usage and ease of managing large classes. In other words, computer technology usage by lecturers eased off their management of large classes. CT use accounted for seventy eight per cent of the variability in teaching efficiency.
8. There was a statistically significant relationship between CT usage and ease of lesson delivery. Computer technology usage accounted for fifty one per cent of the variability in teaching efficiency.
9. Lecturers' computer technology literacy had a positive significant effect on their computer usage. Literacy levels of lecturers accounted for fifty-two per cent of variation in teaching efficiency. Forty-eight per cent of the variability in teaching efficiency was explained by other variables.

10. There was no significant difference between male and female lecturers computer usage. Gender did not affect CT usage.

11. There was a statistically significant difference between inexperienced and experienced lecturers computer usage. The inexperienced lecturers, who were more likely to be younger, used computer technology more often than their older more experienced counterparts.

CHAPTER FIVE

DISCUSSION OF FINDINGS, IMPLICATIONS, RECOMMENDATIONS AND CONCLUSION

Introduction

This chapter presents discussion of findings relating to the research questions and hypotheses. It highlights the contributions to knowledge and the implications of the findings for educational policy, administration and practice in Nigerian tertiary institutions. The balance of the chapter presents suggestions for further research, recommendations and conclusion.

Discussion of Findings

The results and all the findings of the study are discussed.

Lecturers' Computer Technology Literacy Levels

The result of this study indicates a low CT literacy level by lecturers in Nigeria as shown in table 4. About 52.85% of lecturers were either CT illiterate or beginner, 23% were intermediate and 24% experienced. Seventy six percent of lecturers were inexperienced in computer usage. This corresponds to previous research findings that Nigerian teachers' CT competence level was low and below expectation. (Yusuf, 2005; Olubube, 2006; Agu et al, 2007; Onuh & Ofojebe, 2007; Onyene et al, 2009).

This finding corroborates the findings of several other studies done in some developing nations such as; Uganda, South Africa, Malaysia and Pakistan. A study of connectivity in Africa using Uganda as a case study found low computer literacy (Asaba and Bamuhiga, 2009). Another study on management education via the internet, found that 77% of participants (lecturers in South Africa) had no or low CT competence (Carina America Department of Management, 2006). Hapiza and Zawiyah (2009) in a study on 'Technology in Education; A Case study on the Distant Learning at University of Technology MARA, in Malaysia, also discovered that the lecturers' knowledge in using technology was relatively low. Also, a similar study in Pakistan Public and Private Universities revealed a low CT competency level among the lecturers (Khushnoor, 2008).

It seems logical to state that lecturers in most African and other developing nations' universities still have low computer competency level. This, of course, calls for immediate attention, since several literatures reveal a very high rate of

computer literacy among lecturers in developed nations of the world, such as America and Australia (Carina America Department of Management, 2006; Schiller, 1994). In Congruence, Oluwale (2008) in a comparative study stated that while two Nigerian Universities; Federal University of Technology, Akure and Lagos State University, Lagos, on the one hand were deficient in computer and technology literacy, University of Botswana Prioritized computer and information literacy but was deficient in library literacy.

The present study showed that only 24% of lecturers in the sample were experienced in computer usage, thus implying that majority of the lecturers were either computer illiterates, novices/beginners at CT usage or operated computer at a mediocrity level. Having found that the lecturers' CT literacy level in Lagos, the most cosmopolitan state in Nigeria, was low, the situation would likely be worst in less cosmopolitan states in the country. This is because other states in the country are most likely to experience less power supply and less supply of CT gadgets and facilities.

Lecturers' Rates and Modes of CT usage

On the rates of lecturers' computer usage in tertiary institutions, the findings indicate that there was relatively low rate of usage. The result on table 5 shows that 3% of lecturers never used computers, 34% confirmed their low usage, 49.8% agreed that they used CT sometimes while only 13% affirmed that they used CT at a high rate. This implies that 86.8% of the lecturers in the tertiary institutions did not use computer at a high rate but rather at a low rate or sometimes.

This finding is congruent with several other findings indicating low rate of computer usage: in South Africa (Carina America Department of Management, 2006); in Uganda (Asaba and Bamuhiiga, 2009), in Malaysia (Hapiza and Zawiyah, 2009); and even in India (Mehra and Mital, 2007). Findings from previous studies in Nigeria corroborates the result of this study on the low rate of computer use by lecturers. (Onuh and Ofojebe, 2007; Monday and Esoswo, 2008; Akobundu and Okafor, 2008; Yusuf, 2005; Olubube, 2006; Agu et al, 2007; Onyene et al, 2009).

It was found that lecturers employed different modes or patterns in their computer usage. Some operated computer by themselves, some out rightly engaged technical assistants while some combined personal efforts and that of the technical assistants. The result of this study in table 6 indicates that 23% of lecturers operated the computers by themselves, 31.6% relied on the help of technical assistants, 42.9% depended on both personal efforts and technical assistants while 2.3% confessed that they did not use computers at all. This implies that 76.5% of the lecturers did not use CT by themselves alone.

A study on connectivity in Africa by Asaba and Bamuhiiga (2009) confirmed that people adopted various modes/patterns of computer use. The study found that 50.9% of participants in Uganda logged-in themselves, 26.0% brought in ready processed document on diskettes, 11.5% gave hard copies to secretaries to type in the message, 5.8% dictated their messages to technical assistants to type for them and another 5.8% used other methods. This implies that a total of 49.1%

were not operating computers themselves while using electronic communication. This Ugandan study's finding corroborates the findings of this study except for the variation in population type. The present study used lecturers in tertiary institutions as the target population while the Ugandan study sampled their participants from different sectors (academic, research, self-employed and business etc) though, the study's predominant indications were that e-mail was used in academic and research work.

Factors Hindering Lecturers from Computer Technology Usage

This study ranked ten top factors that hindered CT usage by lecturers as depicted in table 7. Poor technical support (95.9%) and epileptic power supply (95.2%) were tops on the list. Ninety percent ranked inadequacy of CT facilities as the third factor, another 88.6% and 84.9% of lecturers' ranked lack of commensurate training and constant computer breakdown in the fourth and fifth positions respectively. Lack of literacy/skills, lecturers' lack of interest and lack of time were ranked sixth, seventh and eighth (85.4%, 78.5% and 75.8%) respectively. About 73.3% and 63% of lecturers ranked poor remuneration and heavy workload respectively as the ninth and tenth factors hindering CT usage by lecturers.

Several research findings were in agreement with this study's finding. For example, Mudasiru & Ayotunde (2005) in a study that investigated the use of media by distance learners, in Nigeria found that lack of fund, CT facilities, electricity, among others, militated against the use of technology media. Pollard (1989) through the CT Centre for Engineering, on a study of the factors influencing

the use of computers in Engineering Education, grouped the findings under five categories, namely; hardware, software, time, people and miscellaneous. This means that inadequacy of hard/soft wares, lack of time, lack of interest by the staff and lack of funds to maintain computer service units were factors that hindered effective and efficient CT usage. Baillie & Percoco (2000) found that logistic problems, such as lack of time, technical support, appropriate software and hardware constituted some of the difficulties being faced by lecturers in using new technologies.

Buttressing this same finding, Aska et al (2006); Paul, (1999); Folorunso et al (2006); Akpotu (1998) and Carina America Department of Management (2006) also listed the inhibiting factors of CT use as: insufficient in-service training, lack or low level of CT skills/competency, cost (which translates to inadequacy of CT facilities and poor remuneration), lack of resources, faulty equipment, time constraints (due to much work load) and lack of technical support. More so, Confetelli (2004) believed that the biggest obstacle to using CT even in the classrooms is not necessarily the lack of technology or funds but simply the unwillingness to use the technology since it is seen as a source of stress. This translates to lack of expertise and interest (Schiller, 1994), or rather, it is probably due to cyber phobia/techno phobia according to Joy's diary (as cited in Orr et al, 2001).

Furthermore, the finding by Mudasiru & Ayotunde (2005) that lack of electricity/epileptic power supply, poor maintenance of electronic media and lack of

experts or technical assistants were factors militating against effective use of CT, corroborated the findings of this study. More so, Khushnoor (2008) in a comparative study of public and private Pakistan Universities' ICT integration, listed the obstacles facing teachers in CT use as; lack of skill, time, access and non-availability of CT facilities.

Ways of Enhancing Teaching Efficiency, Using Computer Technology

Table 8 shows the ICT firm's suggested ways of enhancing teaching efficiency using CT. These were ranked in the order of importance as follows: putting Lecture note/tutorials on the web as learning modules, internet surfing for updates, teaching with multimedia projectors, using power point to summarize lessons, marking/grading with computer rubrics, teleconferencing, on-line tutorials/assignments, record storage with computer facilities, computer-based exams, use of e-mails/text messages and use of smart board/joystick (an interface between teacher and learner).

In the opinion of Carina America Department of Management (2006), a Web-based software programme is necessary to assist educators to effectively manage courses, enhance the learning programme, manage student progress, conduct on-line evaluations, and make course materials/evaluations available and accessible for the convenience of both lecturers and students. Supporting the above findings Schiller, (1994) stated that e-mail and other forms of computer mediated communication hold considerable promise as effective means of interacting.... He added that the occasional face-to-face sessions, tele-conferences, which allow

synchronous interaction at-a-distance in 'real time' and electronic mail, which allow asynchronous interaction at- a- distance between class members and their lecturers, are of great benefit. Schiller recommended the use of audio tapes, computer discs, video tapes, audio teleconferencing, video teleconferencing, and other forms of computer-mediated communication such as audio graphics, telematics, e-mail and computer conferencing. In agreement with this study's finding, Momna (2007) found that 91% of respondents recommend web tutorials and 92% insisted on use of animation in tutorials.

Ways of Improving Lecturers' CT Usage

Sequel to this study's finding of low rate of CT usage by the lecturers, the various ways of improving lecturers' computer usage became inevitable. These ways were ranked in the order of importance as follows: Compulsory/free training for lecturers, provision of modern/functional gadgets, Periodic CT seminars/workshops, Constant power supply, provision of technical assistance, motivation/incentives to regular users, computer repair unit per department and reduction of lecturers' workload to create free time for computer training/learning.

A total of 99.1%, 98.6% and 98.2% of the lecturers respectively believed that compulsory/free CT training, provision of modern/functional gadgets and periodic seminars/ workshops, in this order, will improve lecturers' computer usage. Provision of constant power supply had 97.9% of the lecturers' recommendation, while provision of technical assistance was highly recommended by 94.3% of the lecturers. Motivating/giving incentives to regular users and creating computer

repair unit per department/faculty were next in ranking (88.4%) and (86.3%) respectively. Another 75.3% of the lecturers in the study also believed that their CT usage can be improved by reduction of their workload such as to create free time for them to study and practice computer usage. This finding was in agreement with those of other previous studies that believed that training is an essential contributor to the productive use of computer systems and technology (Jawahar, 2002; Tannenbaum & Yukl, 1992; Klein & Sorra, 1996; Ely, 1999). Cronje and Murdoch (2001) also supported the finding when they reported: "Through effective training, the lecturers can become more knowledgeable about the technology in addition to the acquisition of the skills to operate and understand the technology." Also, in agreement with the finding that training is essential to lecturers CT use, Aggarwal (2003) and Rosenberg (2001), came up with the question of whether training should be customized or whether it should be "one size fits all." Emphasizing the importance of training, Ejiogu (2000) said that he made haste to recommend the creation of a department of training and development in all ministries and parastatals as they exist in most private firms.

Several literatures reiterate that time poverty hinders effective CT usage. This implies that there should be reduction of workload to create flexible time for training, experimenting and searching for information with computers. (Jawahar, 2002; Harris et al, 2001; Sherry, Billing, Tavalin & Gibson, 2000; Saeed et al, 2003; Klein & Sora, 1996, Ely, 1999; Cronje & Murdoch, 2001, Pentland, as cited in Jawahar, 2002; Pather & Erwin, 2002). In agreement, Broere et al (2003) reported that lecturers often voice their concern that because of time constraints,

they were unable to fit technology into their busy schedules and to cover the curriculum. Reduction of lecturers' workload could be effected by employing more lecturers.

Supporting the finding that motivation and incentive to regular users can improve usage, the study by Carina America Department of Management recommended giving incentives to users. The study found that provision of modern/functional CT gadgets and provision of technical assistance would improve lecturers CT usage. This is congruent with study reports by Baillie and Percoco (2000); Newby & Fisher (1998); Shaw (1994); Klein & Sora (1996). Supporting the finding on the need for technical assistants, Carina America Department, (2006) opined that a dedicated specialist should drive WebCT in the faculty. In further support of the finding that creation of computer service units per department/faculty would enhance CT usage, Pollard (1989) emphasized that the huge costs of running a computer service unit for departmental collaboration is burdensome and yet inevitable.

Teaching Efficiency and Lecturers' CT Usage

The relationship between teaching efficiency and lecturers' CT usage was found to be statistically significant. The implication is that lecturers who adopt CT usage in their teaching, recording and research practices are more likely to achieve higher efficiency than their counterparts who do not engage its use in their work practices. This finding is consistent with those of Davis (1989), Amine (2007), Momna (2007), Salmon (2002), Holdich's diary (as cited in Becta, 2004), Bello & Adeoye (2007), Kenneth (2002), Daniel (1997) and Balanskat et al, (2006). Reiterating the relationship between technology usage and teaching efficiency, Cuban's diary (as

cited in Kenneth, 2002) stated his belief that motion picture is destined to revolutionize our educational system. He said that we get about 2% efficiency out of school books...today and that the education of future... will be conducted through medium of the motion pictures... where it should be possible to achieve 100% efficiency.

Buttressing the extent of influence of CT use on teaching efficiency, Harry (2009) reported:

Efficient teachers incorporate numerous learning styles... when instructions include text, visuals and some Kinesthetic in the content presentation, they are likely to incorporate the learning style of many students; therefore, more students can be successful in their learning the first time....The teacher maximizes the students' learning opportunities within a limited time frame. (p. 4).

Further more, Andy (2000) on the use of R^2 for interpretation of correlations, emphasized:

Although we cannot make direct conclusions about causality, we can take Correlation coefficient a step further by squaring it. The correlation coefficient squared (R^2) is a measure of the amount of the variability in one variable that is explained by the other...(pg 90).

The study found that computer technology usage explained 23.33% of the variability in teaching efficiency. There is presently no known study finding that

negates that of this study on the positive influence of CT usage on teaching efficiency.

Lecturers' Ease of Managing Large Classes, Lesson Delivery and Computer Usage

This study found that there was a significant relationship between lecturers' ease of managing large classes, ease of lesson delivery, and computer usage. In effect, use of computer technology such as multi-media projectors, smart boards, microphones, animations and power points reduces the difficulty in managing large classes and lesson delivery. This is in agreement with many research findings (Harry, 2009; Momma, 2007; Balanskat et al, 2006).

Lecturers' Computer Literacy Levels and Usage

In discussing the relationship between computer literacy and usage, it seems that competency may stimulate usage. This study found a significant relationship between CT literacy levels and computer usage. Lecturers with higher computer competence were more apt to engage in higher computer usage, or vice-versa. The finding of this study supported that of Igbaria et al. (1999), Ezeliora (2003) and Runge & Lee (2004) who insisted that computer literacy is essential for effective CT use. Furthermore, Igbaria & Livari's diary (as cited in Chau, 2001) and Carina America Department of Management (2006), showed a statistically strong significant relationship between computer self efficacy/competency and its usage. Although, in contrast, Chau (2001) found a statistically insignificant relationship between computer literacy and usage. A plausible explanation for the

inconsistency could be that the differences between the types of technology applications, and again, the competencies required in the various studies were also varied. For example, Chau's study focused on a particular software package (Microsoft Word), while Igbaria and Livari's diary (as cited in Chau, 2001), and this present study focused on micro-computer use in general. Also, the construction of each study's survey questions was adopted to suit the particular technology under study. This could also have affected the findings.

It then becomes reasonable to conclude that lecturers with high CT competence would likely outperform their counterparts with low levels of computer competency.

Lecturers' Demographic Features and CT Usage

Concerning lecturers gender and computer usage, this study found that there is statistically no significant difference between male and female lecturers' computer usage. The implication is that both males and females use computers equally, hence, gender do not really affect CT usage among the lecturers. The finding here is in disharmony with several previous findings such as those of Palmer (2000); Hawkins & Paris (1997); Igbaria & Livari (1995); Chau (2001). Jawahar & Elingo (2001); Harris et al. (2001); Oguzhan et al. (2006); Asaba & Bamuhiiga (2009); Brosran & Lee (1998); Umoren & Bassy (2000); Chua et al. (1999); Coffin & Mackintyre (2000); Schumacher & Moharan-Martin (2001) and Vicario, Henniger, Austin & Chamblies (2002). These various studies reported male's superiority over females with regards to computer usage. From their findings, males generally engaged in computer usage more than the females.

But in a more practical or experimental study where laptop computers were given and a technology programme administered to all respondents, no significant difference was found between the female and male participants in their computer usage as a tool and for communication (McCoy, Heafner, Burdick & Nagle, 2001).

The study by Gay, Mahon, Devonish, Alleyne & Alleyne (2006) in the University of West Indies, Barbados also found no significant difference between male and female preferences for ICT use. Again, in a 7 month cross-sectional study by Zar, Sharifar & Than (2010) in Malaysia, it was found that male & female lecturers used CT equally. In further validation of the present study finding, a Singapore Survey on teachers' attitudes towards computer use found no significant relationship by gender (Teo, 2008). Studies such as : Freeman (2004) on U.S. students, Oyelaran-Oyeyinka and Adeya (2004) on Nigerian and Kenyan 10 universities, Mitinna et al. (2005) on gender stereotypes in Russia and Looker and Thiessen (2003) on Canadian overall CT use, all found no gender difference in computer use. This variation was explained to be due to constantly changing attitudes among female computer users. It is suggestive that females may have socialized differently in today's computer era, to be more confident with computers and this may have contributed to reducing the barriers perceived by females, (Ray, Sormunen & Harris, 1999).

Again North & Noyes (2002) explained that increased use of computers for teaching and learning in schools have worked against the development of gender

differences as reported in previous research, a situation consistent with the use of computer in this present study.

Other plausible explanations for the variation of this study's finding from some previous ones could be that;

- there is presently a 'bridging up' of the inequality gap existing between males and females;
- most of the studies hinged on a particular technology area such as e-mail use, power-point usage, internet browsing etc, rather than on general CT use, and
- the methodological differences especially in the sampling strategies could have affected the result on gender influence.

On a general note, it is safe to state that there is no gender difference among lecturers in their CT usage. This is because it is more logical to acknowledge that gender inequality is gradually eroding with the changing times and modern sophistication, advancement and increasing knowledge.

In discussing the rates of computer usage by the experienced and in-experienced lecturers, or rather old and young, this study found that the inexperienced or young lecturers use computers more than the experienced older lecturers do. The finding of the present study is congruent with those of Harris et al, (2001); Palmer (2000); Zar et al. (2010); Wilson and Boone (1998); Hawkins & Paris (1997); Igbaria & Livari (1995) and Teo, (2008), who concluded that age influences the rate of

computer use. It appears that it is generally accepted, biologically more tenable and naturally more reasonable to assert that younger persons are likely to engage in computer usage more often than the older ones. This remains an obvious fact since there is yet no known literature to counter the present trend.

It also seems logical to assume that most experienced lecturers are likely to be older than the inexperienced lecturers. This correspondingly will imply that inexperienced lecturers are younger than the experienced, hence are more apt to use computer technology. This is in agreement with the finding of this study, which posits that there is statistically a significant difference between experienced and inexperienced lecturers' computer usage. That is, inexperienced lecturers use computer technology more often than the experienced lecturers. This is in agreement with the findings of Palmer (2000); Zar et al (2010); Jawahar (2002) and Harris (2000). These findings reveal that the more the years of lecturing experience of an individual, the less his/her disposition towards CT usage.

Contributions to Knowledge

The following are the contributions to knowledge made by this study:

1. The study has called attention to the threats posed by low computer literacy levels, non-usage and low usage of computer technology by Nigerian lecturers. It also provided empirical evidence authenticating that; CT usage influences teaching efficiency, eases large class management and lesson delivery; computer literacy levels affect its usage; gender does not affect

computer usage while years of lecturing experience does, with the inexperienced or young lecturers using computers more often. This corresponds to the adage: “You cannot teach old dogs new tricks”. Furthermore, the study draws attention to the factors hindering computer usage, which include poor technical support, epileptic power supply, lack of facilities, training, skills and others. It also highlights the ways of improving lecturers’ CT usage such as computer training, provision of functional gadgets, constant computer seminars and workshops, and provision of technical assistants.

2. The study provided a working model of teaching efficiency resulting from CT adaptation in tertiary institutions. The model in figure 1 depicts processes of computer technology (an innovation) diffusion/dissemination, absorption and adaptation for teaching efficiency and it proposed five interactive factors that control or determine the extent to which CT usage influences teaching efficiency. These interactive factors include: availability of facilities, lecturers’ computer competency level, rate of CT usage, appropriateness of usage and demographic features of the individual user.
3. The study developed a five-paged, novel, comprehensive and valid research instrument, which by application to this current research is standardized and highly reliable. The instrument titled Computer Usage and Teaching Efficiency Questionnaire for Lecturers (CUTEQ-L), consists of

nine sections which captures lecturers different perception on computer technology usage and teaching efficiency. The CUTEQ-L has different sections dealing with demography, computer availability, computer literacy levels, CT rates and modes of usage, computer usage, teaching efficiency perception, ways of improving CT usage, factors hindering CT usage and lecturers computer technology needs.

Further more, this instrument may not just be adopted and adapted for other uses, but specific sections of it may be structurally beneficial to other researchers.

4. This work has added tremendous volume to the body of existing literatures, in the areas of CT literacy levels, rates and mode of usage by lecturers and their teaching efficiency, particularly with regard to Nigeria.

5. The study through ICT firms, suggests practical ways of integrating CT into teaching-learning to enhance efficiency. As in table 8, they include extensive internet surfing for updates, use of multimedia projectors and power points, lecture notes and tutorials on web as learning modules, marking/grading with rubrics (soft wares), tele/video/phone conferencing and others.

Implications of Findings for policy

This study has authenticated the fact that computer usage can increase teaching efficiency. It becomes imperative for the federal, state government, all the policy

makers, curriculum planners and institutions management to make policies that will ensure lecturers proper CT usage to actualize teaching efficiency. Availability of facilities, competency levels and rates of computer usage were found to seriously affect teaching efficiency in the great citadels of learning. The government and the policy makers should as a matter of urgency, make necessary policies to ensure adequate provision of facilities, provision of enabling structures, provision /enforcement of computer training and retraining for lecturers. They should put in place necessary motivatory structures to evolve high rate of CT usage. This is necessary to increase teaching efficiency and assist in salvaging the education system, most especially as this study revealed an inadequacy of CT facilities, low literacy levels and low rates of computer usage among lecturers in Nigerian tertiary institutions.

Further more, the government needs to device policies that will ensure provision of technical support for lecturers, especially the older ones. The technical support includes skilled individuals who will be employed and attached to individual lecturers or departments to readily assist in usage and in gadgets repairs. Effort should be made by government to provide constant electricity for the tertiary institutions since epileptic power supply and poor technical support were among the factors found in this study to be hindering usage.

In providing computer facilities, both federal and state government and even the institution's management should as a matter of policy ensure good and constant internet connectivity in tertiary institutions to enable lecturers engage in on-line

tutorials and tele/audio conferencing. This is because this study found that web tutorials and on-line teaching/learning can increase teaching efficiency.

Implications of Findings for practice.

The findings of this study when carefully utilized will increase the teaching efficiency in the Nigerian educational institutions. Since a relationship was found to exist between computer usage and teaching efficiency, institutions and lecturers should strive to maximize the benefits of CT to achieve optimal efficiency. The available gadgets ought to be effectively used, all lecturers must endeavor to acquire the competency to enable him/her use it gainfully and efforts should be made by the institutions authorities, faculty deans, heads of departments and all lecturers to increase the rates of use. This way, maximum efficiency is guaranteed. The institutions management should endeavor to employ more lecturers to help in teaching. This is to reduce the much workload on the few lecturers, and avail them free time to learn, practice and use computers for teaching efficiency.

Computer technology experts consulted during this study recommended the use of tele/video/audio/phone conferencing, on-line tutorials/assignments, lecture notes on web as learning modules and marking /grading with computer rubrics. The institutions and the lecturers should work in harmony such as to be able to explore these resources, and savour technology benefits. Assignments and tutorials can be given on-line without stress of physically conveying at a geographical location. The convergence is simply and conveniently done electronically. Marking and grading is done with much ease and within a short time by just using soft wares or

rather specific programmes. Multimedia projectors and power points should be made part of classroom teaching. This enhances learning hence ensuring efficiency.

In a nutshell, computer technology literacy campaign should be taken more seriously in the great citadels of learning.

Suggestions for Further Research

This study proposed a conceptual model with five interactive factors of CT usage and its influence on teaching efficiency. The factors include availability of computer facilities, CT competency levels, rate of computer usage, appropriateness of usage and demographic features of users. This study concentrated on three of the factors hence other studies could be conducted on the availability of CT gadgets, appropriateness of CT usage and on effects of other demographic features such as economic status, academic background/qualification and departmental affiliation on computer technology usage.

Again, this study adopted descriptive design specifically ex-post factor method. A similar study can be replicated using experimental research design. This will serve as a comparative study. Another study could be embarked upon to explore the influence of subject discipline on lecturers' attitudes towards CT use, and network learning. CT rate and modes of usage across departments and faculties could also be studied in a comparative form. The relationship between other teaching efficiency indices could be explored in relation to computer usage. For instance,

studies could be conducted on the influence of CT usage on level of students' performance, quality of students supervised, accuracy level and speed in compiling results, ease of completion of scheme of work, student tracking, communication between lecturers and students and ease of marking/grading students' works. Further more, a comparative study of rates of CT usage across the tertiary institutions (universities, polytechnics and colleges of education) could be done.

Conclusion

The entire world has become a global village with the ever increasing technological discoveries. Interconnectivity is the focus of every nation, institution and individual who is ready to move with the trend for achieving maximum efficiency and excellence. Corporations, societies, firms, schools, businesses and religious bodies are all yearning for productivity with minimal resources. Information and communication technology has the answer to the present general yearnings for globalization, interconnectivity and efficiency. Educational institutions should be at the centre of technological advancement for the actualization of the necessary and expected changes.

This study concluded on empirically established facts such as; level of CT competency and rate of computer usage had lots of influence on teaching efficiency; that gender did not affect the rates of CT use while years of lecturing experience did, computer literacy levels and rates of usage were very low among the Nigerian lecturers; and that the use of tele/video conferencing, on-line tutorials,

lecture notes on web as modules and marking/grading with computer rubrics should be further explored by lecturers as CT application areas.

The study concluded that adequate provision of computer technology facilities, constant and continuous seminars/training/re-training for empowerment, provision of steady power supply and enough technical supports inevitably implied higher computer usage which consequently results in greater teaching efficiency.

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**Department of Educational Administration
School of Post Graduate Studies
University of Lagos
Akoka, Lagos.**

**COMPUTER USAGE AND TEACHING EFFICIENCY EVALUATION
QUESTIONNAIRE (CUTEEQ). (To be filled by lecturers)**

Dear Respondent,

This questionnaire aims at collecting realistic data for research purpose. The study is to find out the relationship between computer usage and teaching efficiency in tertiary institutions. Be assured that the information you give will be handled with strict confidentiality and will be used purely for research purpose.

There is no need for respondent's names and institution. Please, kindly give your sincere and highly valued responses. Thanks for your cooperation.

Section A: Personal Data

1. Department: _____
2. Gender: _____ Male Female
3. Age groups: 25 – 40 years 41 – 50 years Above 50 years
4. Years of experience: Less than 5 years 6 – 10 years
11 – 15 years Above 15 years
5. Academic qualification: Ph.D Masters
First Degree Others

Section B: Computer Availability

Please tick (✓) in the column that represents your position on each item.
(SA=Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree).

		SA	A	D	SD
1.	Computer facilities are available for use in my school.				
2.	Video recorders and players are available for use in my school.				
3.	Internet facilities are not available for use in my school.				
4.	Microphones/speakers are either unavailable or non-functional for lecture delivery in large classes.				
5.	Multimedia projector is unavailable for use in my school.				

Section C: Lecturers' CT Literacy Levels and Usage

(CT stands for Computer Technology)

Note: Literacy Levels

Not able: Zero ability

Beginner: Able to access the computer and software environment but unable to work in them unguided

Intermediate: Able to access computer and process data but unable to conclude and perfect

works without assistance
 Experienced: Able to perfectly access computer, process data and conclude works unassisted

(Please indicate according to your personal CT literacy level)

NA = Not Able, BGN = Beginner, INT = Intermediate, EXP = Experienced.

		NA	BGN	INT	EXP
1.	Switching "ON" and "OFF" a computer system				
2.	Using Microsoft word				
3.	Using spreadsheet				
4.	Opening and editing files in computer				
5.	Storing or saving files in the system				
6.	Transferring data from one storage device to another				
7.	Printing works and files				
8.	Accessing/sending e-mails				
9.	Browsing the internet/downloading materials				
10.	Teaching with power points/multimedia projector				

Section D: Rates and Modes of Lecturers' Computer Usage

(Tick in the appropriate box only)

1. I carry out the computer operations in 1-10,

- a). Not at all b). Only with the help of a technical assistance
 c). Both b & d d). By myself

2. Out of the computer operations in 1-10, I usually carry out

- a). None b).Very few c).Few d).Many e).Most

Note: Usage Rates

Low: Once or twice a month
 Sometimes: Once to three times per week
 High: Four to six times per week
 Very High: Regular daily usage

3. The rate at which I use computer is

- a).Nil b).Low c).Sometimes d).High e).Very high

Section E: Lecturers' Computer Technology Usage

1. I use computer to document students' records

- a).Never b).Not often c).Sometimes d) Often e).Very often

		SA	A	D	SD
--	--	----	---	---	----

2	Teaching with computer technology is very helpful for large classes				
3	I do browse the internet for update				
4	Teaching with multimedia yields better results				
5	I use Computer technology to ease off lesson plan/delivery				

Section F: Lecturers' Teaching Efficiency Perception

Please tick (✓) in the column that represents your position on each item.

(SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree).

		SA	A	D	SD
1.	Students perform much better when taught with computer facilities.				
2	Computer and internet related assignments make students to perform poorly.				
3	CT assisted instruction does not increase understanding and retention.				
4	Computer assisted instruction motivates students towards learning.				
5	Computer assisted instruction sharpens students' reasoning.				
6	Using CT increases the quality and number of students supervised.				
7	CT usage reduces the quality of students supervised.				
8	Greater accuracy is ensured when marking /grading with computer rubrics (software).				
9	Compiling results with computer reduces accuracy.				
10	Greater speed is guaranteed when marking /grading with computer rubrics (soft ware).				
11	Compiling results with computer wastes so much time.				
12	Planning lessons with CT can be easier and faster.				
13	Lecture delivery with CT is neither easier nor faster.				
14	Teaching abstract concepts could be made concrete through the use of CT.				
15	Recorded lessons do not in any way enhance learning.				
16	Constant teaching-learning process which guarantees greater learning is ensured via replay able video and CD tapes.				
17	Recorded lectures afford students opportunities to see their mistakes.				
18	Recorded lectures reduce lecturers' workload since they do not need to repeat lectures.				
		SA	A	D	SD
19	Large classes can be easily managed using CT gadgets such as projectors and microphones.				
20	Computer-assisted instruction reduces the stress of managing large				

	classes.				
21	CT usage facilitates the completion of scheme of work.				
22	Tracking of students' records is not made easier with computers.				
23	CT facilitates lecturer-student communication.				
24	The internet offers an endless source of information for research.				
25	CT has removed the geographical barrier of distance; hence, lecturers can make local/international publications from right inside their office.				

Section G : Ways of Improving Lecturers' Computer Usage

(Please tick accordingly)

		SA	A	D	SD
1	Compulsory and free training improves lecturers' computer usage				
2	Provision of technical assistance improves lecturers' computer use				
3	Workload reduction to create time improves lecturers' CT use				
4	Periodic CT seminars/workshops improves its use by lecturers				
5	Motivation/incentives to regular users will improve CT usage				
6	Adequacy of modern/functional computer gadgets improves its use				
7	Constant power supply improves lecturers CT usage				
8	Creation of computer repair unit per department improves usage				

Others: please specify _____

Section H : Factors hindering lecturers from computer usage

(Please tick accordingly)

		SA	A	D	SD
1	Lecturers' lack of interest in CT is a hindrance				
2	Epileptic power supply seems to be a hindrance to CT use				
3	Poor remuneration is a hindrance to CT use				
4	The use of CT is hindered by Poor technological support				
5	Lack of literacy and skills are hindrances to computer use				
6	Much workload on lecturers hinders their computer use				
7	Another hindrance is lack of time				
8	Inadequacy of CT facilities is a big hindrance				
9	Constant computer breakdown hinders its use				
10	Lack of commensurate CT training is a hindrance				

Section I: Lecturers' CT Needs

[Please tick (✓) as applicable]

The general computer technological needs of lecturers include:

		Yes	Can't Say	No
1	Lecturers need free time			
2	Lecturers need technical assistance			
3	Lecturers need constant CT training and re-training			
4	Reduced workload is a great CT need of lecturers			
5	Provision of CT gadgets is a great CT need of lecturers			
6	CT seminars/workshops are great CT needs of lecturers			
7	Lecturers need motivation and incentives			
8	Lecturers need CT enlightenment talks			

Others: Please specify _____

**Department of Educational Administration
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University of Lagos, Akoka, Lagos.**

***INTERVIEW SCHEDULE ON WAYS OF USING COMPUTER TECHNOLOGY TO
ENHANCE TEACHING EFFICIENCY***

Dear Manager, please kindly assist us by attending to the following issue.

The ways to use computer technology to enhance teaching efficiency in tertiary institutions include;

1. -----

- 2. -----

- 3. -----

- 4. -----

- 5. -----

- 6. -----

- 7. -----

- 8. -----
