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Higher Institutions Lecturers' Attitude Towards Integration of ICT into Teaching and Research in Nigeria

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Abstract: The study surveyed the attitude of lecturers towards integration of Information and Communication Technologies (ICTs) in tertiary institutions in Kwara State, Nigeria. To elicit responses for the study, four research hypotheses were formulated. One hundred and fifty lecturers, 90 males and 60 females from three tertiary institutions in Kwara State participated in the study. Data were collected for the study through the administration of 29-item questionnaire. A test re-test method was used to determine the reliability of the instrument, the result was appropriately scored. The data obtained were analysed using t-test and ANOVA in testing the hypotheses. The findings showed that gender has no effects on the attitudes of lecturers towards integration of ICT into teaching and research in tertiary institutions. Science oriented lecturers attitudes towards integration of ICT in tertiary institution is higher than other non science oriented lecturers. Less experienced lecturers are more exposed to the use of ICT than moderately and highly experienced lectures. University lecturers acquired more ICT skills than their counterparts in polytechnics and colleges of education. Many lecturers lacked adequate training and competence in using computer as a tool for effective teaching and research purposes. It was recommended among other things, that higher institutions should encourage their lecturers to be computer literate by organising conferences, seminars and workshops. Old lecturers should be encouraged to develop good attitudes toward the use of ICT for teaching and research work. Recommendations were made toward effective integration of ICTs in tertiary institutions in Nigeria.

Key words: ICT, attitude, teaching, research, higher institution, lecturers

INTRODUCTION

The need for the development of ICT is a global resolution and has been a subject of great significance to all mankind (Olaofe, 2005). These technologies have become central to contemporary societies. Whether one is talking on phone, sending an email, going to the bank, using a library, listening to sports coverage on the radio, watching the news on

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television, working in an office or in the field, going to the doctor, driving a car or catching a plane, one is using ICTs. Information and communication technology is a shorthand for the computers, software, networks, satellite links and related systems that allow people to access, analyse, create, exchange and use data, information and knowledge in ways that were almost imaginable (Association of African Universities, 2000). The prevalence and rapid development of ICTs has transformed human society from the information technology age to the knowledge age (Galbreath, 2000).

Most Nigerian tertiary institutions are already having computer study as part of their academic programs, most of them are still theoretical in nature to impact meaningfully on the society. The Nigeria University Commission recently established a virtual learning website but its impact is yet to be seen and it is too early to be assessed (Gbenga, 2006). In fact, ICT has had more impact on administrative services such as admissions, registration, fee payment and purchasing than on the fundamentals of classroom teaching and learning. But even if ICT has not revolutionized the classroom yet, it is changing the learning experience of students by relaxing time and space constraints as well as providing easier access to information online journals and e-books; students portals; etc.) an achievement that should not be downplayed (Gambari and Okoli, 2007).

Kitschner and Davis (2003) identified the following competencies required by lecturers in ICT application in education. These include: competence to make personal use of ICT, competence to master range of educational paradigms that make use of ICT, sufficient competence to make use of ICTs as mind tools, competence to make use of ICT as a tool for teaching, competence in mastering a range of assessment paradigms which make use of ICT, competency in understanding the policy dimensions of the use of ICT for teaching and learning.

Lecturers in tertiary institutions are involved basically in two things: teaching and research, with auxiliary administrative assignments. The ICTs have the potentials of not only ensuring effectiveness and efficiency in these two areas of teaching and learning; they have the potentials of erasing the administrative duties. According to Organisation for Economic Co-operation and Development (2005) and Gbenga (2006) ICT can work in a number of general ways:

- It can be used to help in school administration
- It can be used to train students in skills which they will need in further education and as an ongoing learning process throughout the rest of their lives and for their future jobs, e.g., word processing,. email communications etc.
- It can provide access to information and communication outside the classroom e.g., via the Internet
- It can be used to support teacher development via external networks
- It can support and potentially transform the learning and teaching process

ICT has a number of features which it particularly suitable for tertiary education:

- It combines and integrates a full range of media essential for effective learning. The ICT uses sounds, vision, text and numeric data
- It provides lecturers with new opportunities and in particular, distance learning and involvement in the real-world

- There is an opportunity to increase the interest and involvement of students by the one to one relationship provided by the student and computer
- It provides students with opportunity with an opportunity to work and learn on their own

When teaching and learning process is assessed critically in tertiary institutions in Nigeria, it could be observed that the challenge for lecturers in tertiary institutions is no longer in covering the course contents or in adopting appropriate teaching pedagogy, but it is in having access to ICT and using it to embrace teaching and learning (Olaofe, 2005). Olaofe (2005) argued that such a grasp of ICT should be within the capabilities of most people, regardless of age, area of discipline, gender, or educational experience.

Milken Exchange on Education Technology (1999) cited by Yusuf and Onasanya (2004) identified three major ways of using ICT for teaching and learning. These are Information Technology (IT) assisted learning; technology as a tool and computer and information science.

Information Technology (IT) Assisted Learning

This is divided into (1) Computer Assisted Learning (CAL), which is the interaction between a student and computer system designed to help the students learn (drill and practice, tutorials, simulations and virtual realities). (2) Computer assisted research implies where ICT is used as an aid to doing library and empirical research. This is enhanced through the growth of World Wide Web which has created virtual library that can only be accessed by the technologically literate. (3) Distance learning, which is the use of telecommunications, designed to facilitate students learning through e-mail, interactive web sites and two-way audio/video teleconferencing.

Technology as a Tool

This involves the use of a large array of hardware and software: word processors, graphic packages; digital camera, presentation applications, database and spreadsheet, among others. These hardware and software do not have limited educational purpose, but they are designed to help people extend their abilities to do work. Digital science probes, for instance are more specialised.

Computer and Information Science

These deals with speciality in computer as an area of study for students with particular interests in technology. The ICT should be used as a pedagogically powerful tool for the construction and modelling of knowledge.

Association of African Universities (2000) and Yusuf (2005) identified the following application of ICT in teaching and learning:

- To provide basic computer literacy skills
- To provide basic computer literacy skills relevant to respective academic disciplines
- To improve students motivation
- To improve access to remote resources
- To improve communication skills
- To improve higher order thinking skills
- To provide content (e.g., CD-ROM, www, etc.)
- To support teaching methodology (e.g., group work tools for group assignments on the internet)

- To improve course management (both in the regular curriculum and in distance education)
- To collaborate in online teaching and learning with others faculty and students from around the world

Abimbade (1998) reported the benefits of ICT to lecturers in the areas of teaching as: (1) increase the time learners devote to learning, (2) enhance the speed of availability of data and information, (3) provide immediate feedback, (4) assist less qualified teachers and (5) increase teachers efficiency and effectiveness. Abimbade (1998) explained further that one needs to be literate in the use of computers to effectively use them in teaching.

Research is another core business of the university. Distance research collaboration has been made possible using ICT, virtual lab technology making it possible for researchers located in different geographical regions to participate in joint projects. Yusuf and Onasanya (2004) identified three specific areas of relevance of ICT to lecturers in the area of research as follows:

- It provides opportunities for scholars to communicate with one another through e-mail, mailing lists and new groups and chat rooms. These ICT resources enable communication between scholars as they can post research, assignments, books or journal lists references to on-line materials. Problems and solution can be discussed between researchers and scholars can react to the work of others in an electronic manuscript. The ICTs further provide greater opportunities for research collaboration and networking among scholars spread throughout the world, thus, national and international dimensions of research issues can be studied as they can allow for communication with peers and experts around the world. Through collaborative knowledge building, studies can spotlight trans-national trend analysis through human and instrumentation collaboration
- The ICTs can facilitate research in any discipline as they provide quicker and easier access to more extensive and current information through digital libraries that provide digitised full-text resources to learners and researchers. Others are the electronics list- a directory of scholarly and professional e-conferences containing relevant topics and articles relevant to researchers and electronic reference desks or virtual libraries. Others include electronic journal and catalogues and image database. Others are Internet resources; gopher and CD-ROM can provide a researcher with current, in depth, firsthand information
- ICTs can be used to do complex mathematical and statistical calculations which are important in research. They can be used for data manipulation and analysis. The ICT will facilitate the compilation of data on time, performance of statistical analysis. In fat, complex statistical analysis are not only performed instantaneously but also more accurately than possible manually

Association of African Universities (2000) identified the following application of ICT in research:

- As a research tool (statistical packages, simulation software etc.)
- To collect academic information (e.g., www, discussion groups, on-line catalogues, etc.)
- To disseminate academic information (e.g., www, electronics publishing houses, etc.)

- To collaborate with other researchers worldwide
- To advertise research plans/efforts to create networks, find donors, etc. on the www

Middleton (2000) asserted that ICTs provide researchers with ready avenue for the dissemination of research reports and findings. Publication outlets include e-book, e-journals or through personal web sites. The ICT provide ready means for production of research reports. Furthermore, digital video, audio, software simulation, synchronous and asynchronous charts and interactive software, among others, bring dynamism in describing a method or reporting result.

Association of African Universities (2000) identified some obstacles in the introduction and utilization of ICTs in African universities. These include the following among others:

- Poor national telecommunication infrastructure (especially inadequate telephone access)
- Lack of enabling environment, including highly regulated telecommunications industry, unsatisfactory performance of internet service providers and absence of incentives to promote innovation and risk taking
- In some countries, the hostile social climate and potential instability prevent opportunities of international collaboration and support
- Absence of National Information and Communication Infrastructure policy (NICI policy)
- Internet points of presence in several countries are not easily accessible to university communities, even with high-speed telephone systems
- Internet traffic congestion or saturation due to limited bandwidth
- Non reliability of electricity supply
- High Internet Service Providers (ISP) fees
- Inadequate and irregular funding of ICT initiatives
- Prohibitive importation costs of ICT equipment, often compounded by national import tariff levels
- Others are organization internal obstacles, human resources-related obstacles etc.

Dogara *et al.* (2003) and Gambari and Okoli (2007) identified other problems as bureaucracy, lack of well-equipped ICT labs, lack of qualified personnel to maintain the ICT materials and no connectivity to internet, lack of adequate training programme, Head of department/Deans' militating against the use of ICT in teaching and learning.

Hogarty and Kramer (2000) and Agbatogun (2006) found that sex and academic qualifications of teachers do not affect teachers' attitude towards the teaching and learning of computer science in schools. However, both male and female teachers normally exercise fear of failure in implementing any new idea or phenomenon. Agbatogun (2006) discovered that younger teachers are more amiable to new challenges than the older teachers. He concluded that with global technological wave that is affecting every sector and every aspect of teachers' life weather male or female, experienced or inexperienced, humanities, science or vocationally oriented need to struggle zealously to be computer literate in order to face the present educational challenges.

Nigerian lecturers have been polarised in their acceptance of the new technologies. Whilst some have enthusiastically integrated computers and Internet into classroom, other have cautious in their welcome and some have simply rejected the technologies. However, this study investigated the availability and utilization of ICTs among lecturers in tertiary institutions in Kwara State.

MATERIALS AND METHODS

Research Hypothesis

The following hypothesis were formulated from the research questions and tested at 0.05 level of significant:

- There is no significant difference between male and female lecturers' attitude towards integration of ICT into classroom teaching and research work
- There is no significant difference between science and science related lecturers' willingness to use ICT facilities for teaching, learning and research in tertiary institutions
- There is no significant difference between less experienced and highly experienced lecturers competence in the use of ICT for teaching and research at university, polytechnics and colleges of education
- There is no significant difference between lecturers in the universities, polytechnics and colleges of education level of computer skills in the use of ICT for teaching and research work

Sample and Sampling Technique

Three tertiary institutions in Kwara State were selected for the study. These are University of Ilorin, Ilorin Nigeria, Kwara State Polytechnic, Ilorin and Kwara State College of Education, Ilorin, Nigeria between 2006 and 2007 academic session. One Hundred and fifty lecturers participated in responding to the questionnaire. Among the participants, 90 were males, while 60 were females. They cut across all the departments within the institutions, giving a total of 150 lecturers. Among the 150 lecturers 50 whose teaching experience was less than 7 years were treated as less experience, 50 whose teaching experience was less than 16 years were treated as moderately experience, while 50 who had more than 16 years and above were treated as highly experienced lecturers. Ninty Science and technology related discipline lecturers and 60 arts related discipline lecturers participated in the study, giving a total of 150 lecturers.

Instrumentation

The instrument used for this study is a 29 item questionnaire designed by the researcher. The questionnaire focused on demographic data (sex, years of experience, nature of subject taught, types of institutions). The instrument has four sections. Section A requires centres on gender influence on the integration of ICT; section B asks whether lecturers' areas of discipline affects their attitudes towards the use ICT; section C was specifically designed to assess the lecturers' level of experience in relative to integration of ICT into teaching and research in tertiary institution; while section D enquires about the level of competence of lecturers at university, polytechnics and college of education in the use of ICT for teaching and research purposes. The 29 questions of a four-point Likert Scale was with different interpretation were used. Section A of the questionnaire was rated as 1 refered to Strongly Disagree (SD), while 4 referred to Strongly Agree (SA). In other to validate the instrument, the questionnaire was given to a computer educationist and two educational technologists to critically look at the face and content validity. Alpha reliability score of instrument was 0.85 meaning that is suitable for the research.

Procedure for Data Collection

The researcher visited the institutions and some lecturers were chosen as research assistant. The questionnaire was administered on the first visit to the lecturers across all the

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departments. At second visits, the questionnaire was collected from the research assistants. 10-questionnaires mortality was discovered out of 160 questionnaires prepared for the research. After responses have been collated, they were sorted into different groups according to the research hypothesis. A questionnaire was not considered for analysis if it was not well completed (omission of items) and if the respondent gave contradictory information evidence that he/she did not understand the demand of some questions or was not honest in his response. Inferential statistics were used to analyze the data. The t-test and one-way ANOVA was used to assess differences between groups of lecturers. Analysis were conducted at 0.05 level of significance.

RESULTS

Hypothesis 1

There is no significant difference between male and female lecturers attitude towards integration of ICT into classroom teaching and research work.

Table 1 shows the t-test comparison of the males and females lecturer's attitudes towards the use the ICT facilities/equipment for teaching and research work. From the Table 1, the calculated t-value (14.56) is higher than the critical t-value (1.94). This indicates that there is statistical significant difference in the attitudes of males and females lecturers at 0.05 level of significance (t_{cri} = 1.94, df = 6, p>0.05).

Hypothesis 2

There is no significant difference between science subject related lecturers and others (Arts, humanise, social sciences) lecturers on the attitudes towards the use of ICT facilities/equipment for teaching and research in tertiary institutions.

Table 2 shows the t-test comparison of the science related lecturers and other counterparts' attitudes towards the use of ICT/equipment in tertiary institutions. From the Table 2, the calculated t-value (5.51) is higher than the critical t-value (1.65). This indicates that there is statistical significant difference in the scores of science lecturers and others (Arts, Humanities and social sciences) lecturers at 0.05 level of significance (t_{crit} = 1.65, df = 148, p>0.05). Therefore, hypothesis is rejected. Hence, there is statistical significant difference in the attitudes of science lecturers and others in respects of utilization of ICT facilities/equipment in higher institutions.

The result on Table 3 shows that there is significant difference between less experienced, moderately experienced and highly experienced lecturers' attitudes towards the

Table 1: The t-test comparison of attitudes male and female lecturers towards the use of ICT facilities and equipment for teaching and research in tertiary institutions

Variables	No in paired sample	df	Mean (X)	SD	t-value calculated	t-value critical	Significance level
Male lecturers	4	6	1.86	0.12	14.56*	1.94	0.001
Females lecturers	4		2.78	0.49			

*Significant at 0.05 level of significance

Table 2: The t-test comparison of attitudes of science and other subject related lecturers towards the use of ICT facilities and equipment in for teaching and research in tertiary institutions

Variables	No in paired sample	df	Mean (X)	SD	t-value calculated	t-value critical	Significance level
Science related subjuct lecturers	90	148	2.52	0.95	5.51*	1.65	0.001
Art and social science lecturers	60		2.15	0.82			

*Significant at 0.05 level of significance

Table 3: The ANOVA comparison of the attitudes of less experience, moderately experience and highly experience lecturers towards the use of ICT facilities and equipment for teaching and research in tertiary institutions

SOV	Sum of squares	df	Mean squares	F-value calculated	F-value critical	Significance
Between groups	234.02	2	117.01	261.01*	3.00	0.001
Within groups	334.89	747	448.00			
Total	568.91	749				

*Significant at p<0.05 level

Table 4: The ANOVA comparison of the ICT skills acquisition in the use of ICT between lecturers in the university, polytechnics and colleges of education

SOV	Sum of squares	df	Mean squares	F-value calculated	F-value critical	Significance
Between groups	4.680	2	2.340	97.19*	3.89	0.001
Within groups	0.289	12	0.240			
Total	4.969	14				

*Significant at p<0.05 level

integration of ICT facilities and equipment into teaching and research work. The F-calculated value (261.01) is higher than F-critical value (3.00) thus, the hypothesis was rejected.

However, Scheffe's post hoc test shows that, the less experienced lecturers have highest mean scores (3.236), followed by moderately experienced (2.264) and highly experienced (1.916) lecturers, respectively. This indicates that the less experience lecturers' attitudes towards the use of ICT is commendable than moderately and highly experienced one.

The results on Table 4 shows that there is significant difference between university, polytechnics and colleges of education lecturers' ICTs skills acquisition for teaching and research work. The F-calculated value (97.19) is higher than F-critical value (3.89) thus, the hypothesis was rejected.

However, Scheffe's post hoc test shows that, the universities lecturers have highest mean scores (3.236), followed by polytechnics lecturers (1.916) and colleges of education lecturers (1.00) lecturers, respectively. This indicates that the university lecturers acquired more ICT skills than polytechnics and colleges of education, respectively.

DISCUSSION

The world is fast becoming a global village, as a result of developments in Information and Communication Technology (ICT). The challenge of integrating Information and Communication Technology (ICT) into tertiary institutions is a very big task. It's obvious that there is little or no usage of ICT at this level of our educational system. Most institutions do not have the necessary ICT facilities for instruction and research neither do the lecturers possess skills in ICT for effective classroom interactions. The position of this study is supported by the findings of Hogarty and Kramer (2000) and Agbatogun (2006) which showed that sex and academic qualifications of lecturers do not affects lecturers' attitude towards the use of ICT facilities and equipment. Similarly, it is surprising that the younger lecturers are more amiable to new challenges than the old ones. Science lecturers are more interested in the use of ICT facilities than their counterparts. The level of competences and skills acquisition of colleges of education and polytechnics lecturers in the use of ICT facilities and equipment is worrisome.

The major findings of the study therefore include that:

- Gender has no effect on lecturers' attitudes towards the use ICT facilities/equipment in tertiary institutions

- Science subject lecturers are more interested in the use of ICT facilities/equipment for teaching and research work than their counterparts
- The less experience lecturers are more dispose towards the use of ICT facilities than their senior colleagues
- University lecturers possessed more ICT skills than Polytechnics and colleges of education, respectively

CONCLUSIONS AND RECOMMENDATIONS

Global trends in the application of ICTs demonstrate that the power of ICTs can transform the several interconnected functions of universities. The ICTs offer the potential to strengthen conventional education while rapidly transforming distance education. They not only expand the research and development opportunities of the institutions but also strengthen libraries with access to an unlimited body of digital information globally and bring considerable efficiency and effectiveness to university management. Information and Communication Technologies (ICTs) offer innumerable benefits in enhancing the quality and quantity of learning in tertiary institutions. Despite the prevalent nature of ICT in virtually every aspect of human endeavours, they have not been widely integrated into the teaching and learning process in schools. Their integration will not only revolutionise teaching in tertiary institutions, they will engender the development of students' innate scientific inquiry mind and their critical thinking abilities. There is need to sensitise and encourage lecturers towards computer literacy because when this is done, the success of integration of computer education into school will be guaranteed.

The recommendations are as follows:

- The tertiary education curriculum should reviews to reflect more practical courses in ICT for pre-service and in-service lecturers
- Workshops/seminar organised specifically for the purpose of facilitating their literacy, awareness and skills using ICT in teaching will greatly improve their condition
- Tertiary institutions should be well equipped with adequately functional and well-furnished computer laboratory/cyber café for lecturers and students use
- Computer literacy should be one of the pre-requisites for appointing lecturers into the teaching profession
- National University Commission, National Commission for Colleges of Education and National Board for Technical Education should provide the necessary ICT facilities and equipment to tertiary institutions
- Female and highly experienced lecturers should be encouraged to face the challenges of new technologies
- New lecturers must be inducted to develop the needed skills in the use of ICTs and to develop positive attitude towards their use for teaching and research while old lecturers should be encourage to have basic knowledge of computer appreciation

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