Journal of Education and Practice
ISSN 2222-1735 (Paper) ISSN 2222-288X (Online)
Vol.8, No.17, 2017

Information and Communication Technology Skills Retraining Needs of Technology Education Lecturers for E-Learining in Universities

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Abstract
The study is necessitated by the emerging modern approach to learning through information and communication technology. It specifically investigated the information and communication technology skills retraining needs of technology education lecturers for implementation of e-learning in universities. The study was conducted in all the public universities in northern Nigeria that have degree programmes in technology education. One hundred and seventy five lecturers made up of 83 technology education lecturers, 42 computer science lecturers and 50 information and communication technology lecturers. A descriptive survey design was used for the study. A 68-item questionnaire developed on a five point rating scale was used for data collection. The instrument was trial tested in University of Nigeria Nsukka on 30 lecturers. Cronbach alpha was used to compute a reliability and a coefficient of 0.91 was obtained. Three research questions and one null hypothesis guided the study. Mean and standard deviation were used to answer the research questions. The hypothesis was tested at 95% confidence interval using z-test. Findings indicated that technology education lecturers lack the requisite ict skills to use the e-learning platform. Among the recommendations made was that, universities in collaboration with NUC should organize workshops and seminars for technology education lecturers to avoid extinction in the nearest future.
Keywords: information and communication technology, lecturers, learning, e-learning, skills, technology education

Introduction

The Nigerian educational system just like any other developing country is faced with the challenges posed by the technology–driven economy. According to Tinio (2008), the most fascinating of all the technological innovations of the 21st century is the information and communication technology (ICT). The Wikipedia (2010) defined ICT as the application of computers and other technologies to ***the*** acquisition, storage, organization, retrieval and dissemination of information. Similarly, Andural and Ikyumen (2006) defined ICT as the systematic application of computers and other technologies to acquire, process, store, retrieve and disseminate information to bring about effective exchange of information in communications.

These definitions imply that ICT is restricted to systems dependent upon a microelectronic-based combination of computing and telecommunication technology. Tinio stressed that ICT have been touted as potentially powerful enabling tools for educational change and reform. When used appropriately, different ICTs are believed to be helpful in strengthening the relevance of education to the increasing digital workplace, and raise the educational quality among others, helping to make teaching and learning into an engaging, active process connected to real life. This modern approach to learning through information and communication technology has therefore continued to dictate the pace in the emerging learning world. It is partly in response to this that the Federal Republic of Nigeria (FRN, 2004a) reiterated her commitment to 'overhauling' the educational sector considering the relevance of ICT in rapid development of the country. It specifically stressed that education in Nigeria in this millennium is seriously viewed as an instrument "par excellence" for effecting National development. Consequently, in an attempt to cope with the recognized dynamics of social change and the demands on education, the Federal Government of Nigeria, reviewed her National Policy on Education, to be in rhythm with a new Nigeria National Policy on Information Technology (NNPIT) (F R N, 2001). The vision statement of the policy on ICT is to make Nigeria an ICT capable country in Africa and a key player in the information society by the year 2005, using ICT as an engine for sustainable development and global competitiveness. Similarly, the mission statement of the policy is to use Information Technology for education, creation of wealth, poverty eradication, job creation and global competitiveness. One of the basic objectives of the Nigeria National Policy on Information Technology is to integrate ICT into the main stream of education and training. However, after more than half a decade Nigeria doesn't seem to realize the potential effect of this modern technology especially on education.

In order to meet up with the demand for ICT in teaching and learning, the Federal Government of Nigeria stressed the need for providing teachers with the intellectual and professional background adequate for their assignment and make them adaptable to the changing situations (F R N, 2004a). Thus, teachers are encouraged to acquire relevant skills through in-service training, workshops and seminars to improve their performance. According to Ikyumen and Gbodi (2006), ICT in this era, becomes the knowledge provider and

this knowledge is disseminated and made available to many users via information technology advances in instructional software facilities, communication and networking systems. This is a new challenge to Nigeria as a nation in general and educational institutions in particular.

Dahiru (2005) stressed that for Nigeria to achieve a reasonable and speedy level of development and be able to compete favorably with the technologically developed nations, ICT literacy also known as electronic literacy, (e-literacy) is not only required but is indispensable in view of its roles in today's world. This is because with the tools of ICT all learners and professionals are updated with current developments in their fields.

Ezennaya (2003) stressed that e-literacy enables an individual to use these technologies to design, deliver, select, administer and extend learning or communicate with expert colleagues and professional peers both in and outside the organization. The new technologies allow for the creation of learning environments and situations which are enriched by multimedia and hypertext dimension which can also be linked by means of networks. According to Roller and Wavermart (2001), the key idea is to use technology to stimulate the development of intelligence, the ability of solving problems, creativity and technological flexibility. There is therefore the need to strengthen a critical capacity, a proactive attitude, a creative drive and familiarity with technology as well as develop skills required to express, expound, and present ideas necessary for the use of ICT for effective delivery of educational contents.

Nwachukwu (2004) asserts that progress in ICT is rapidly changing the way people live, the way people work, and the way people will live in the future. Perhaps this was what prompted Ochogwu (2005) to state that until a conducive harmonization of the expectations and the forces of change is achieved, a number of students, teachers, professionals and even leaders in Nigeria will not only suffer some 'techno stress', but also experience technological obsolesce in the current competition for the delivery and use of information- with speed, timeliness, accuracy and cost-effectiveness. According to Ochogwu the forefront of this extinction will be those professionals or workers who do not have the required ICT skills. Thence, ICT skills should be seen as a necessity for the acquisition of knowledge and application of relevant technologies to information delivery services. Acquisition of adequate skills in ICT by technology education lecturers is indispensable tool to guarantee their ability to participate in the electronic learning, (e-learning).

Osuji (2004) stressed that the growing trend worldwide towards the adoption of e-learning as a framework for enhancing the delivery of quality education is thus a big challenge for Nigeria in general and University lecturers in particular. He challenged the universities in Nigeria to evolve ways of integrating ICT in instructional delivery.

According to Garrison and Anderson (2000); Hall and Sander (2000); Rosenberg (2001) and Carry and Willis (2001), e-learning in its broadest sense can be defined as instruction delivered via an electronic media including the internet, intranets, extranets, satellite broadcast, audio/video tapes, interactive television, and CD-ROM. Challis, Lidgey and Robertson (2003) see e-learning as using ICT in teaching and learning. Similarly, the concept of e- learning according to Wajiga, Clegg, Nachamada,and Muazu (2006) is interpreted broadly to embrace any teaching and learning activity that involves the use of ICT. These range from the use of on-line or CD-based resources by the teacher in preparation work to the use of ICT in teaching activities to the use of on-line or CD-based resources by the student including self- instruction learning platforms. In a similar way, Ajelabi and Wellington in Kyumen and Gbodi (2006), defined e–learning as a comprehensive framework for the delivery of education using ICT tools. These definitions of e-learning are all based on combinations, implementation and relationships of activities of learning and teaching via different electronic media, whether on line or off line. It therefore embraces any form of teaching, learning, management, administration, counseling and other educational activities that engages the use of ICT for its delivery.

Wajiga et al (2006) have identified a number of promising programmes that address aspects of e-learning that have been outlined by the Federal Government of Nigeria such programmes include the use of open source materials both as an e-learning platform and for developing curriculum, the Virtual Library Project and the recent establishment of the Open Universities which if the ideas currently in their pipeline come to fruition should begin to provide the much needed experience of the benefits associated with e- learning.

Osuji (2004) stressed that for teaching and learning to be appealing to the mind and the auditory sense organs, educators should seek to utilize audio, visual and audio-visual equipment and materials in the delivery of instructions. Currently, according to Twinnumogisha (2005), instructional software, internet, electronic mail, (e-mail) and the World Wide Web (WWW) are being added to the catalogue of ICTs that are used in education for teaching, learning and research. Ajellabi and Wellington in Ikyumen and Gbodi (2006) have rightly noted that the growth in the use of technology has brought outstanding development into modern education.

Olaofe (2008) also noted that the 21st century has witnessed significant changes in the global environment that bear heavily on the role, functions and mode of operation of teacher education programs all over the world including developing countries like Nigeria. He stressed that a retrogressive teacher education programme constitutes a potential threat in a world where knowledge is a driver of growth and socio-economic transformation. Olaofe (2008) was especially more concerned with the low response of teacher education

programmes and the indifference of female teachers to ICT revolution which facilitates easy access to knowledge dissemination and information retrieval. He stressed that the process of globalization is accelerating shrewd competitive spirit among nations of the world, which implies that the less developed the teacher education programme of a particular nation is, the better and more advantageous it is for other nations that are ready to improve on their teacher education programmes to prey on them.

Technology education lecturers in universities need to be adequately equipped with the necessary ICT skills if they should remain relevant and effective in their teaching job in universities. Evidences abound in literature such as Ukungwu (2004), Wajiga et al (2006), Peter, Trough and Nevkar (2006) Agbe and Akume (2006) among others pointing at the low level of ICT skills among technology education lecturers in universities. It is also in literature such as Jegede (2009) that lecturers in universities are yet to understand the role of ICT in facilitating effective delivery of technology education. Female lecturers were also reported to have relatively low ICT skills and therefore do not integrate them in their teaching and learning. The fact is that, there cannot be any meaningful instruction and research in this millennium university education especially in Technology education programme without the acquisition of relevant ICT skills by teachers of Technology education in Universities. Iji (2008) particularly pointed out that teachers in tertiary institutions are required to acquire specific knowledge and skills in the use of computers to manage records (e.g. grades, attendance and assignment records), communicate through print media and should be able to:

i. Examine a variety of current educational digital media and use established selection criteria to evaluate materials like multimedia, internet resources, telecommunications, and computer-assisted instruction among others.
ii. Choose software for its relevance, alignment with content standards and value added to student learning.
iii. Demonstrate knowledge of current basic instructional soft ware technology
iv. Optimize lessons based upon the technological resources.
v. Collaborate with other teachers and experts to support technology enhanced curriculum.

Technology education lecturers therefore require retraining in the use and integration of these new ICT devices like the computer, internet, electronic mail and World Wide Web among others to improve their professional performance and to avoid extinction in the global world. Their ability to use and integrate the ICT devices in teaching, learning and research will determine how they will cope with the above specific skills necessary for effective e- learning, vis-à-vis its implementation in Universities. This research intends to determine the ICT skills retraining needs of Technology education lecturers in Universities for the implementation of e-learning in universities to enhance their productivity.

Purposes of the Study

The general purpose of the study was to determine the ICT skills retraining needs of technology education lecturers for implementation of e-learning in universities in Nigeria. Specifically, the study sought to:

1. Determine the perceived level of ICT skills possessed by technology education lecturers in Universities to enhance the implementation of e-learning
2. Determine the ICT skills retraining needs of technology education lecturers perceived important by technology education lecturers for the implementation of e-learning in Universities
3. Determine the skills needed by technology education lecturers to enable them integrate ICT in their teaching

Research Questions

The following research questions in accordance with the purposes of the study were formulated to guide the study.

1. What is the perceived level of ICT skills possessed by technology education lecturers in Universities to enhance the implementation of e-learning?
2. What are the ICT skills retraining needs of technology education lecturers perceived important by technology education lecturers for implementation of e-learning in Universities?
3. What are the skills needed by Technology Education Lecturers that can facilitate the integration of ICT in their teaching?

Hypotheses

One null hypothesis was formulated and tested at 95% confidence interval as follows:

H_{O1}: There is no significant difference in the mean ratings of technology education lecturers, information technology lecturers and computer science teachers on the skills needed by technology education lecturers to integrate ict in their teaching activities

Methodology

Opinion survey research design was adopted for the study. All the Technology and Vocational Education (VTE) lecturers from all the universities in Northern Nigeria formed the population of the study. A sample size of 175 lecturers made up of 83 VTE lecturers, 42 computer science lecturers and 50 information technology lecturers were selected using simple random sampling technique out of the population. A 68-item questionnaire developed by the researcher titled ICT skills needs Questionnaire was used to collect data for the study. The questionnaire was developed based on a five-point rating scale. The questionnaire was then subjected to face, construct (using factor analysis) and content validations by specialists. A final draft copy of the instrument was then trial tested on 25 Vocational and Technology Education lecturers from three Colleges of Education in the North East geopolitical region. A reliability index of 0.91 was obtained using Cronbach Alpha formula. The three research questions were answered using mean and standard deviation, while the Z-test of difference was used to test the hypotheses at 0.05 level of significance. The real limit of each number was used to describe the mean ratings of each item.

RESULTS AND DISCUSSIONS

Analysis of data as presented below is in accordance with the stated research questions and the hypotheses. Each research question and hypothesis was restated followed by the analysis. Also presented here are the findings of the study and the discussions of the findings.

Research Question 1: What is the perceived level of ICT skills possessed by technology education lecturers in Universities to enhance the implementation of e-learning?

Only technology education lecturers responded to this research question. These lecturers were asked to rate the level of ICT skills they possessed from among the list of ICT skills identified in the questionnaire for enhancing e-learning in universities. Sixty eight ICT skills related to the computer soft and hard ware applications, internet application, electronic mail and World Wide Web were obtained from literature review. These skills were dully validated by various specialists and thus used to answer this research question. The mean ratings and standard deviations are presented in table 3 below.

Table 1: Mean Ratings and Standard Deviations of Responses of Technology Education Lecturers on their level of ICT skills.

S/No	Perceived level of skills possessed in:	$\bar{x}_{TE}$	SD R
1	Word processing	3.70	0.69 P
2	Use of integrated software	2.82	1.13NP
3	Spreadsheet	2.69	0.77NP
4	Data base management	2.60	0.87NP
5	Graphics application	2.67	1.00NP
6	Desktop publishing	2.44	0.93NP
7	Computer assisted instruction	2.81	0.99NP
8	Use electronic mail for instructional purposes	2.96	0.99NP
9	Exploring the internet for research and teaching materials	2.28	1.11NP
10	Deliver instructions to students online	2.56	1.17NP
11	Using multimedia presentation to deliver lessons	2.73	1.15NP
12	Demonstrate with the use of authoring software to deliver Instructions	2.62	1.17NP
13	Use instructional materials on CD-ROM to deliver instruction	2.68	1.13NP
14	Use the e-learning management software to assist students' learning	2.57	1.09NP
15	Demonstrating knowledge of current instructional software technologies related to technology education	2.58	1.16NP
16	Selecting criteria to evaluate multimedia materials for instructional purposes in technology education	2.56	1.17NP
17	Selecting criteria to evaluate internet resources for instructional purposes in technology education	2.72	1.11NP
18	Utilizing other e-learning devices such as television and tape recorders for demonstrating special topics in technology education	3.01	1.20P
19	Explaining the concept of input hardware	1.86	0.87NP
20	Explaining the concept of computer hard ware	2.35	1.22NP
21	Using the light pen to select information on the screen	1.81	1.05NP
22	Using the mouse to control motion of an on the screen pointer or cursor	2.26	0.94NP
23	Using the joy stick to navigate cursor	1.52	0.73NP
24	Using the key board to give command to the computer	2.73	1.22NP
25	Identifying different types of scanners	3.44	1.22P
26	Using the scanner to scan materials	1.57	0.69NP
27	Use modem to connect computers to television or telephone lines for demonstration	1.71	0.65NP
28	Explaining the concepts of output devices of the computer	3.47	1.50P
29	Selecting the right printer to print educational materials	2.97	0.93NP
30	Successfully install printer on the computer	2.24	1.30NP
31	Explaining the concepts of storage devices	2.52	1.33NP
32	Successfully install storage devices to store information	2.68	0.93NP
33	Save information on hard disk	3.21	1.04P
34	Explaining the concepts of computer software	2.60	1.09NP
35	Explaining the concepts of productivity software	2.29	0.93NP
36	Using the productivity software tools to enhance the delivery of instruction in technology education	2.32	0.88NP

37	Correctly install application software on the computer	2.37	1.31NP
38	Updating application software such as antivirus	2.47	1.45NP
39	Evaluating educational software to enhance instructional delivery	2.23	1.05NP
40	Making confident personal use of a range of software packages for teaching	2.43	1.25NP
41	Be fast and accurate in keyboarding	3.17	1.33P
42	Explaining the concepts of the internet as a worldwide interconnected computer networks	2.57	1.12NP
43	Identifying other equipment use for internet services such as computer aided telephone, telephone line and the modem	2.88	1.16NP
44	Locating the available internet service	2.44	1.10NP
45	Explaining the concepts of other internet technologies	2.70	1.31NP
46	Explaining the advantages of internet as a contemporary library	2.75	1.19NP
47	Knowing the roles of internet service providers	2.03	1.04NP
48	Explaining the concepts of website browser	2.99	1.29NP
49	Identifying search engines for exploring the internet	2.38	1.13NP
50	Applying data security to protect private information against unauthorized access such as the use of password	2.27	1.05NP
51	Design web pages for educational purposes	2.42	0.97NP
52	Explaining the popular use of the worldwide web	2.64	1.17NP
53	Effectively browse the web for educational materials	3.02	1.10P
54	Activating web multimedia for instructional purposes	1.76	0.79NP
55	Using slide show application to create multimedia presentation	2.93	1.17NP
56	Starting the browser to request for files on specific educational materials	2.90	1.20NP
57	Retrieving recently stored requested files from the computer for revision during instructional activity	3.14	1.14P
58	Using the browser to download files containing suitable teaching materials in technology education	2.72	1.21NP
59	Using the browser to provide various extra internet facilities for effective teaching in technology education	1.82	0.82NP
60	Using the browser to interpret a variety of file formats for multimedia presentation of lessons	1.58	0.61NP
61	Compose type and send a message using the e- mail address	3.16	1.10P
62	Using the transfer agents to transfer messages between machines on the connectivity	1.66	0.59NP
63	Explaining the concepts of Multipurpose Internet Mail Extension (MIME) to students	1.78	0.79NP
64	Demonstrating the use of the transfer protocols on the internet to students	1.63	0.53NP
65	Accessing web-based archives of educational materials for instructional purposes	2.79	1.15NP
66	Using the scavenger hunts to direct students' online explorations of different aspects of the curriculum of technology education	2.39	1.22NP
67	Conducting online research using data bases to explore the area of technology education	2.03	1.15NP
68	Conducting an internet based video phone session to link researchers in the area of technology education	2.05	1.13NP

KEY: $\bar{x}_{TE}$ = Mean rating by technology education lecturers; SD = Standard Deviation
P = Possessed; NP = Not Possessed; R = Remark

Form table 1 above it can be observed that only 8 out of the 68 items (i.e. items 1, 18, 25, 28, 33, 41, 53 and 57) had mean ratings of above 3.00. It can therefore be interpreted that technology education lecturers possessed skills in 8 out of the 68 items identified to answer this research question. The remaining 60 items had mean ratings of less than 3.00, implying that technology education lecturers do not possessed skills in all the sixty items. On the whole, the grand mean of this research question is $X_G = 2.56$. This implies that the level of ICT skills among technology education lecturers is low. This rating is further verified by the values of the deviation from the mean which is below 1.00. These low values for all the standard deviations indicate the closeness (skewdness to the right of the item) in the ratings by the individual respondents.

Research question 2: What are the specific ICT skills retraining needs perceived important by technology education lecturers for implementation of e-learning in Universities?

Technology education lecturers were asked to rate the same 68 ICT skills earlier administered to them in research question 1 based on the level of importance of each specific ICT skill for the implementation of e-learning in universities. The table below presents the results obtained for this research question.

Table 2: Mean ratings and standard deviations of responses of technology education lecturers on ICT skills retraining needs perceived important for e-learning

S/No	Perceived level of importance of:	$\bar{x}_{TE}$	SD	R
1	Word processing	4.00	0.84	I
2	Use of integrated software	4.33	0.76	I
3	Spreadsheet	4.24	0.75	I
4	Data base management	4.43	0.73	I
5	Graphics application	3.64	1.10	I
6	Desktop publishing	4.18	0.84	I
7	Computer assisted instruction	4.60	0.60	I
8	Use electronic mail for instructional purposes	4.26	0.74	I
9	Exploring the internet for research and teaching materials	4.06	0.68	I
10	Deliver instructions to students online	3.86	0.74	I
11	Using multimedia presentation to deliver lessons	3.92	0.91	I
12	Demonstrate with the use of authoring software to deliver Instructions	3.49	1.00	I

13	Use instructional materials on CD-ROM to deliver instruction	3.57	0.96	I
14	Use the e-learning management software to assist students' learning	4.07	0.90	I
15	Demonstrating knowledge of current instructional software technologies related to technology education	3.93	0.98	I
16	Selecting criteria to evaluate multimedia materials for instructional purposes in technology education	3.54	0.94	I
17	Selecting criteria to evaluate internet resources for instructional purposes in technology education	3.80	1.44	I
18	Utilizing other e-learning devices such as television and tape recorders for demonstrating special topics in technology education	3.70	1.19	I
19	Explaining the concept of input hardware	3.85	1.06	I
20	Explaining the concept of computer hard ware	3.88	0.98	I
21	Using the light pen to select information on the screen	2.75	0.82	NI
22	Using the mouse to control motion of an on the screen pointer or cursor	3.94	1.02	I
23	Using the joy stick to navigate cursor	2.81	0.92	NI
24	Using the key board to give command to the computer	4.30	0.70	I
25	Identifying different types of scanners	3.82	0.91	I
26	Using the scanner to scan materials	4.02	0.92	I
27	Use modem to connect to connect computers to television or telephone lines for demonstration	4.13	0.99	I
28	Explaining the concepts of output devices of the computer	4.26	0.75	I
29	Selecting the right printer to print educational materials	4.21	0.84	I
30	Successfully install printer on the computer	4.19	0.74	I
31	Explaining the concepts of storage devices	4.18	0.76	I
32	Successfully install storage devices to store information	4.29	0.64	I
33	Save information on hard disk	4.25	0.59	I
34	Explaining the concepts of computer software	4.25	0.65	I
35	Explaining the concepts of productivity software	4.10	0.69	I
36	Using the productivity software tools to enhance the delivery of instruction in technology education	4.11	0.71	I
37	Correctly install application software on the computer	4.16	0.72	I
38	Updating application software such as antivirus	4.16	0.74	I
39	Evaluating educational software to enhance instructional delivery	4.09	0.89	I
40	Making confident personal use of a range of software packages for teaching	4.00	0.94	I
41	Be fast and accurate in keyboarding	4.02	0.87	I
42	Explaining the concepts of the internet as a worldwide interconnected computer networks	3.97	0.82	I
43	Identifying other equipment use for internet services such as computer aided telephone, telephone line and the modem	4.09	0.98	I
44	Locating the available internet service	4.02	1.02	I
45	Explaining the concepts of other internet technologies	3.97	0.81	I
46	Explaining the advantages of internet as a contemporary library	4.04	0.91	I
47	Knowing the roles of internet service providers	4.07	0.96	I
48	Explaining the concepts of website browser	4.00	0.84	I
49	Identifying search engines for exploring the internet	4.10	0.94	I
50	Applying data security to protect private information against unauthorized access such as the use of password	3.66	1.10	I
51	Design web pages for educational purposes	3.80	1.04	I
52	Explaining the popular use of the worldwide web	3.77	1.03	I
53	Effectively browse the web for educational materials	3.98	1.02	I
54	Activating web multimedia for instructional purposes	3.96	0.94	I
55	Using slide show application to create multimedia presentation	3.83	0.93	I
56	Starting the browser to request for files on specific educational materials	3.85	0.94	I
57	Retrieving recently stored requested files for revision during instructional activity	3.93	0.90	I
58	Using the browser to download files containing suitable teaching materials in technology education	4.11	0.82	I
59	Using the browser to provide various extra internet facilities for effective teaching in technology education	4.00	0.74	I
60		4.02	0.69	I

61	Using the browser to interpret a variety of file formats for multimedia presentation of lessons	4.07	0.87	I
62	Compose type and send a message using the e- mail address	3.93	0.94	I
63	Using the transfer agents to transfer messages between machines on the connectivity	3.79	0.88	I
64	Explaining the concepts of Multipurpose Internet Mail Extension (MIME) to			
65	students	3.79	0.83	I
66	Demonstrating the use of the transfer protocols on the internet to students	3.96	0.84	I
67	Accessing web-based archives of educational materials for instructional purposes	3.87	0.92	I
68	Using the scavenger hunts to direct students' online explorations of different aspects of the curriculum of technology education	4.00	0.84	I
	Conducting online research using data bases to explore the area of technology education	3.82	0.86	I
	Conducting an internet based video phone session to link researchers in the area of technology education			

KEY: $\bar{x}_{TE}$ = Mean rating by technology education lecturers; I = Important; NI = Not Important

From table 2 above, out of the 68 items technology education lecturers rated only 2 (i.e. items 21 & 23) below 3.00 implying that they are not important specific ICT skills for retraining towards effective implementation of e-learning in Universities. However, 66 out of the 68 of these items were rated high (above 3.00), in fact the grand mean of this research question stood at $X_G = 3.88$. This means that all the ICT skills are perceived as important and specifically needed by technology education lecturers for retraining towards effective implementation of e-learning in Universities. The standard deviations range from 0.60-1.10. The smaller the value of the deviation from the mean the closer the raters agree among themselves in their respective ratings. Similarly, the larger the standard deviation, the wider the differences in the opinion of the raters in their respective ratings.

Research question 3:

What are the skills needed by Technology Education Lecturers that can facilitate the integration of ICT in their teaching?

Thirty four items obtained from the review of literature were developed by the researcher to answer this research question. These items were also dully validated by various experts in ICT and curriculum. The three categories of respondents responded to these items and the results are presented in table 8 below.

Table 3: Mean Ratings and Standard deviations of responses of Technology Education, Computer Science and Information Technology lecturers on skills needed to Integrate ICT into teaching.

S/N	Possession of skills to	$\bar{x}_{TE}$	SD	$\bar{x}_{CO}$	SD	$\bar{x}_{IT}$	SD
1	Evaluate related web-based materials for Educational Instruction in technology education	4.15	.81	4.37	.74	4.21	.62
2	Apply current instructional principles and appropriate assignment practices in technology education using the computer	4.00	.71	4.42	.82	4.26	.64
3	Evaluate Educational software for effective instruction in technology education	4.17	.86	4.08	1.11	3.95	.65
4	Create effective computer-based power presentation	4.14	.77	4.01	1.08	3.95	.76
5	Search the internet for suitable resources for teaching specific topics in technology education	4.25	.79	4.37	0.93	3.95	.89
6	Create multimedia documents to support effective instruction in technology education	4.02	.83	3.89	0.79	3.84	.94
7	Create hypertext documents to support learning in technology education	4.08	.74	3.68	0.93	3.73	.64
8	Demonstrate knowledge of ethics and equity issues related to the use of the internet.	4.15	.75	4.16	0.92	3.74	.72
9	Demonstrate a sound understanding of computer supported collaborative learning	4.23	.68	4.23	0.83	3.84	.75
10	Being kept up-to-date as far as ICT Educational tools are concerned.	4.27	.84	4.37	.88	3.91	.91
11	Plan effective learning environments supported by world wide web in technology education.	4.14	.80	4.11	.92	4.05	.83
12	Demonstrate sound knowledge of Learning Content	4.06	.82	3.92	1.05	3.82	.76

	Management System (LCMS)						
13	Demonstrate skills in web page development	4.00	.93	3.80	1.11	3.47	.89
14	Use live chat discussions in which students and teachers discuss problems they encounter in classroom settings	3.95	.89	4.27	1.03	3.42	.94
15	Implement curriculum plans that include methods and strategies for applying the internet and internet technologies to maximize students learning.	4.07	.89	4.32	.80	4.00	.73
16	Facilitate computer-based learning that addresses student technology standards in universities.	4.11	.79	4.11	.86	3.95	.69
17	Use the Computer-Aided Instruction to support learner-centered strategies that address the diverse needs of students	4.17	.79	4.23	.87	3.84	.67
18	Apply mathematical software to develop students' higher order skills and creativity in their area of specialization.	4.10	.88	3.86	.99	4.05	.76
19	Apply statistical software to facilitate variety of effective assessment and evaluation strategies in technology education.	4.03	.99	3.89	.92	4.00	.57
20	Apply Computer Aided Instruction to assess learning of subject matter using a variety of assessment technologies	4.05	1.04	4.26	.85	3.79	.90
21	Use instructional software to collect and analyze data, interpret results and communicate findings to improve instructional practice and maximize students' learning.	4.03	0.98	4.37	.88	3.84	1.10
22	Continually evaluate professional practices to make informed decision regarding the use of appropriate ICT to support students' learning	3.94	0.92	4.11	.79	3.95	1.06
23	Apply appropriate ICT tools to increase productivity and collaborate with peers in other universities in order to nurture students' learning.	4.02	.98	4.37	.81	4.05	1.06
24	Model and teach legal and ethical practices related to the use of technology.	3.77	.81	4.01	.84	3.63	1.04
25	Apply internet resources to empower technology education students with diverse backgrounds, characteristics and abilities.	4.04	.79	4.53	.76	3.84	.94
26	Promote safety and healthy use of ICT resources to facilitate equitable access to ICT learning tools for all students.	4.23	.84	4.32	.98	3.68	.93
27	Make confident personal use of a range of software packages appropriate to their subject area.	4.19	.72	4.32	.80	3.86	.93
28	Review critically the relevance of software packages and judge their potential value in classroom use.	4.05	.84	3.89	1.06	3.63	.99
29	Make constructive use of ICT devices in teaching putting into effect schemes of work for effective supervision of instructions in technology education	3.94	.92	4.05	1.00	3.95	.89
30	Choose teaching methods and integrate ICT into the whole curriculum in technology education	4.21	.81	4.14	.88	3.68	.98
31	Choose and recommend teaching methods integrating ICT tools appropriate to students' learning objectives in their special area in technology education	4.19	.75	4.14	1.01	3.84	.75
32	Plan a learning programme that allows a range of ICT tools to be used.	4.19	.69	4.16	.99	3.79	.84
33	Choose suitable teaching methods integrating ICT that allow the teachers and students to manage their own	4.23	.68	4.21	.96	3.89	.64
34	Assess the specific effects of ICT tools on individual student learning outcome in technology education.	4.27	.74	4.00	1.03	4.00	.80

The results as shown in table 3 above indicated that all the 34 items were rated high by Technology Education Lecturers as indicated by their means and standard deviations in columns 3 and 4 respectively in the table. Specifically the mean ratings range from $X_{TE} = 3.77$ to $X_{TE} = 4.25$ and the grand mean is $X_G = 4.06$. Also the standard deviations been relatively low ranging from $SD_{TE} = 0.68$ to $SD_{TE} = 1.03$, shows that Technology Education lecturers agree on a close level that acquisition of all the skills is essential for effective integration of ICT in teaching.

Similarly, Computer Science Lecturers' ratings were not quite different from their technology Education counter parts. The 34 skills were rated from $X_{CO} = 3.68$ to $X_{CO} = 4.42$ by this category of lecturers. The grand mean stood at $X_G = 4.16$. Also their standard deviations stood between $SD_{co} = 0.74$ to $SD_{co} = 1.11$. This result also shows that acquisition of these skills is indispensable for effective integration of ICT in teaching.

Finally, from table 8 above, it can be seen that Information Technology lecturers rated the 34 skills above 3.00. Slight differences occur in the mean ratings between Computer Science lecturers and Information Technology lecturers especially on items 3 -10 and items 12-37. With exception of items 15,18 and 19 all these items were rated below 4.00 by Information technology lecturers while their Computer Science and Technology Education Counter parts rated them above 4.00. The grand mean stood at 3.88. However, there is a close agreement in their ratings as indicated by the relatively low standard deviations.

H_{O1}: There is no significant difference in the mean ratings of Technology Education, Computer Science and Information Technology lecturers on the skills needed by Technology Education lecturers to Integrate ICT in teaching activity.

One-way Analysis of variance (ANOVA) was used to test this hypothesis at 0.05 level of significance. The table below presents the result.

Table 4: ANOVA Result comparing mean ratings of technology education, computer science and information technology lecturers on the skills needed by technology education lecturers to integrate ICT

Source of Variation	SS	Df	MS	F-Cal	F-Crit	Remark
Between groups	1.52	2	0.760	26.56	3.085	Reject H_{O6}
Within groups	2.92	102	0.028			
Totals	4.44	104				

From table 4 above, it can be observed that the calculated value of F was 26.562 while the table value of F at 2 and 102 degrees of freedom was 3.085. This indicated that F-calculated was greater than F-critical. Consequently, the null hypothesis was rejected and the alternative hypothesis was upheld. Therefore significant difference exists in the mean ratings of Technology Education, Computer Science and Information Technology lecturers on the skills needed by Technology Education to effectively integrate ICT in their teaching activity.

Since significant difference existed in the ratings of the three categories of the respondent, further analysis was carried to identify the group(s) responsible for the difference. A post hoc test using Scheffe's test was therefore used for pair wise comparison and the results are presented below.

The three groups were paired as follows and the result obtained were presented below

TE & CS: F calculated = 1.35 < 3.085
TE & IT: F calculated = 51.43* > 3.085
CS &IT: F calculated =54.22* > 3.085
*Indicates significant difference
TE = Technology Education lecturers
CS = Computer Science lecturers
IT = Information Technology lecturers

The results above indicated that pairing technology education lecturers and computer science lecturers recorded no significant difference. But pairing technology education lecturers and information technology lecturers yielded significant difference. Similarly, pairing computer science and information technology lecturers yielded significant difference. Therefore, it can be concluded that the group responsible for the significant difference is information technology lecturers

Findings of the study

1. Technology Education lecturers in Universities possessed only 8 out of the 68 skills identified in computer application, internet application and worldwide web.
2. All the 68 ICT skills retraining needs were rated high by computer science for e-learning in Universities, meaning all the 68 skills are perceived important.
3. All the three groups of the respondents rated all the thirty four items high as skills required by technology education lecturers to effectively integrate ICT in the teaching activities
4. Significant difference exists in the mean opinions of Technology Education lecturers, Computer Science and Information Technology Education lecturers on the skills required to effectively integrate ICT in teaching activity.
5. The Scheffe's test performed for this one-way ANOVA revealed that the ratings by Information Technology lecturers whose average mean was 3.78 was responsible for the significant differences in the one-way ANOVA.

Discussion of Findings

The findings of the study with regards to this research question one revealed that out of the 68 items made up of skills in Computer application, the use of the internet, electronic mail and the web technology, technology education lecturers possessed skills only in word processing and the use of television and tape recorders. Also technology education lecturers possessed skills in the identification of some hardware and the explanation of some basic concepts. On the general note, the grand mean of this research question indicates that there is a low

level of ICT skills among technology education lecturers in universities. This finding is in agreement with Chitana et al (2008) who discovered in their study that university lecturers in Zimbabwe lacked the requisite ICT skills for implementation of e-learning. The finding also confirms with Jegede (2009) who in his study discovered that teachers themselves do not understand what is needed mostly in ICT for their professional practices. Perhaps this finding was what prompted Nwachukwu (2004) to have said that teachers in universities are ICT Phobia.

It can also be explained that for the skills the technology education lecturers claimed to posses such as word processing, use of Television and tape recorders can be as a result of the day to day experience with these devices. Jegede (2009) believed that ICT training for teacher will build their training contents and curricular around skills that will strive to achieve what is actually needed.

The findings of this study in relation to this research question two as shown in the corresponding tables revealed that only 2 out of the 68 items were rated low (below 3.00) for e-learning by technology education lecturers. All the 68 skills were rated high (important) for effective implementation of e-learning by computer science lecturers. Similarly, information technology lectures, rated all the 68 items as important skills for e-learning. The findings of the study are in agreement with Dare and Leach (1999), WorLD (2001), International Standard for Technology in Education (2003), Public Instruction (2003), Tinio (2006) and Wuru (2008), among others. All these researchers have stressed the relevance of all these skills as basic requirement for effective implementation of e-learning. The ratings of these skills by computer science and information technology lecturers have only re-affirmed the importance of these skills for effective implementation of e-learning as outlined in UNESCO (2003).

The findings in relation to skills needed by technology education lecturers to integrate ICT in teaching activity as shown in the corresponding table revealed that all the categories of respondents – technology education lecturers, computer science lecturers and information technology lecturers rated all the 34 skills as required for effective implementation of e-learning by technology education lecturers in universities. These skills were developed from the review of related literature. Specifically UNESCO (2003), Adeyanji (2008) and Tinio (2008) stressed that for teachers to integrate ICT effectively in their teaching they must possess the skills outlined in table 8 above. The findings also agrees with Abolade and Yusuf (2005), Dare and Leach (1999) and Miller (1997) who in their separate findings observed that most of the skills outlined by UNESCO (2003) and Tinio (2008) were rated as required for the effective implementation of e-learning in universities.

Conclusion

The study made four major findings that need to be highlighted as a conclusion which the university authorities particularly technology education programme in Universities should consider as a matter of concern. The first is that technology education lecturers lack the ICT skills needed for effective utilization of e-learning. All the ICT skills with the exception of word processing skills in computer utilization, the level of ICT skills possessed by technology education lecturers were rated low.

The second essence is that due to the low level of ICT skills possessed by technology education lecturers, they do not integrate ICT to enhance teaching and learning in universities. All the 68 components of ICT duly validated by the various specialists were rated as highly needed to be included in the retraining programme of technology education lecturers if e-learning is to be effectively implemented. Finally, technology education lecturers require all the 34 skills for them to effectively integrate ICT in their teaching and learning in universities.

Recommendations

1. Technology education lecturers need to be retrained to make them relevant to contemporary knowledge age and then acquire skills in the area of ICT for them to be able to husband the potentials of ICT in their teaching tasks.
2. The retraining programme advocated for technology educators should incorporate the following guiding principles identified by Tinio (2008). These are: -
   i. Connecting ICT learning to professional knowledge
   ii. Connecting ICT to subject matter and pedagogical content.
3 It was also recommended that e-learning development and support team which will comprise of ICT experts' faculties and or department based staff be established in Nigerian universities

Acknowledgements

The authors are highly grateful to God to be part of this collaborative effort in global knowledge creation and sharing. The effort of the Management of the various universities in northern Nigeria where the study was conducted is highly appreciated. Sincere thanks also go to all the lecturers for their unbiased response to the instrument used for data collection. The authors also appreciate the role played by the research assistants in the

various universities. They were saddled with the responsibility of administering and retrieving the questionnaires from the respondents. Finally, to members of our immediate family we are grateful for your patience and reliance throughout the period of this research.

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