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Capacity Building Needs of Lecturers in E-Teaching for Effective Delivery of Computer and Electrical/Electronic Technology Courses in Tertiary Institutions in Southwestern, Nigeria

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Abstract

Teaching has been recognized as a best way to equip individuals with knowledge, skills and attitudes (competence) for doing things or performing a specific task or unique operations. The rate of acquiring this competence therefore depends majorly on mode of teaching, personality of lecturers or teaching methods adopted by lecturers. No method of teaching is important than other, but some of the electronic supported methods such as e-teaching are more efficient in teaching. However, it seems lecturers of electrical/electronic technology are still deficient in utilizing e-teaching to deliver their courses despites of its efficient nature. This study therefore aimed at determining capacity building needs of lecturers in e-teaching for effective delivery of computer and electrical/electronic technology courses in tertiary institutions in south western Nigeria. Five research questions guided the study while three null hypotheses formulated were tested at .05 level of significance. The study made use of descriptive survey design and was carried out in southwestern states. The participants for the study were 544 comprising of 190 lecturers of electrical/electronic technology and 354 computer Education/Science lecturers in 31 institutions. An 80-item questionnaire was used as instrument for data collection. The instrument was validated by three experts. Cronbach Alpha reliability method was used to determine the internal consistency of the questionnaire items and an overall reliability coefficient of 0.80 was obtained. Five hundred and forty four copies of the questionnaire were administered on lecturers by the researchers and three research assistants on one to one basis. Four hundred and thirty nine copies of the questionnaire were retrieved. The data collected were analyzed using mean, standard deviation and improvement need index (INI) to answer the five research questions while analysis of variance was employed to test the null hypotheses at .05 level of significance. Results revealed that majority of the lecturers of vocational electrical/electronic technology in colleges of education, polytechnics and universities needed capacity building for effective operation of computer for teaching, uploading text on internet and using teleconferencing for effective e-teaching. Furthermore, the results of the study revealed that the lecturers of electrical/electronic technology are interested and ready to receive training on e-teaching and utilizing e-teaching for instructional delivery in their various institutions. Similarly, majority of the participants agreed that frequent network failure, lack of skills and knowledge to operate e-teaching facilities, consistent power failure, poor internet access and connectivity and inadequate knowledge to prepare e-teaching lesson were among the prominent barriers to effective utilization of e-teaching approach. Hence, there is need to package the findings of the study into training programme and use it for building the capacities of lecturers of electrical/electronic technology in e-teaching for effective delivery in tertiary institutions in Nigeria

Keywords: Assessment, Perception, Capacity building, E-teaching, Teleconferencing, Lecturers of Vocational Electronic Technology, Instructional Delivery Systems

INTRODUCTION

Technological development in the workplace and industries has necessitated a need to equip students of vocational electrical/electronic technology with workplace and thinking skills which will make them adaptable to the present and envisaged future changes (Owoduni, 2011). This need requires a radical change from conventional methods/ approaches to modern approaches of which e-teaching is one. Carmona (2006) stated that e-teaching is the use of information and communication technologies (ICTs) to enhance the art of teaching. The current level of development of new technologies in the field of learning and teaching, and education offers opportunities for collaborative engagement, access to information, interaction with content, and individual empowerment (Benson and Brack, 2009). Tremendous changes from in information and communication technology in recent time therefore permit teachers to progress from traditional face-to-face classroom activities to online classrooms, or online activities in the traditional classroom that enable e-teaching (Mohammad, 2102). In e-teaching, teacher serves as interface between e-teaching facilities and the learners. To improve or enable learners to acquire workplace and thinking skills therefore depends on the capacity of teachers in e-teaching. Researches on the effectiveness of educational technology on students' outcomes have been monitored for more than 20 years (International Society for Technology Education, 2008). One convincing trend that emerged from the researches is that the integration of technology into instruction if appropriately implemented had strong and positive impact on student achievements

(Olelewe & Agomuo, 2016). In recent times, several countries of the world are utilizing instructionally sound strategies, one of which is the use of e-teaching in the integration of technology into classroom instruction in order to boost learning outcome.

Application of ICT related strategies in education helps inculcating lifelong and workplace skills for future challenges (Robert, 2014). Introducing technology into education improves teaching and learning but it cannot take the place of a teacher in developing nations like Nigeria (Ogbuanya & Bakare, 2016). The current trend of globalization requires that lecturers in tertiary institutions should be equipped to produce graduates with skills and competencies to cope in a digital work place (Institute of Education, University of Nigeria, Nsukka, 2013). According to Uwaifo (2005) education unlocks the door of modernization but it is the teacher who holds the key to the door. Teachers according to Uwaifo (2009) are the hub or pivot on which any successful educational programme revolves and if teachers perform their task dutifully, there will certainly be a myriad of new technologies in the future of vocational education. To perform successfully as teachers of vocational and technical education, constant training and capacity building programme is recommended to continually keep them abreast with the changing dynamics in teaching and learning modalities.

OVERVIEW OF E-TEACHING

E teaching and use of technology is an important paradigm change in teaching and learning environments around the world (Economy, Finance and Technology, 2009). The best way one can acquire 21st century skills or competence is through technology enhanced strategies. One of such strategies is e-teaching. E-teaching is an electronic teaching learning environment that requires the application of software and server making the transmission and registration of the given text possible (Bakare, Adesuyi & Salisu, 2016). E-teaching involves the use of computer, internet and other electronic machines to transfer knowledge and skills from a teacher to a learner(s). Carmona (1996) stated that e-teaching involves the use of information communication technologies (ICT) to enhance the art of teaching. It involves harnessing the potential of digital technology in presenting a concept, placing the concept in various contexts, creating links with existing knowledge and leading discussion that probe students understanding of the concept and its context (Nakajima & Hori, 2016). E-teaching is a platforms that enables teachers and students to collaborate in a real time (synchronous) and asynchronous modes (Economy, Finance, Technology, 2009). E-teaching in higher education covers multiple possibilities, including the interactions between the learners, teacher and a growing range of technologies available (Donnelley & McSweeney, 2009).

E-teaching enables students to take their learning in personally relevant directions. In the view of Naidu (2006), e-teaching is commonly referred to as intentional use of networked information and communication technology for teaching by the teacher. It incorporates all educational activities carried out by a teacher(s) online or offline via networked or standalone computers and other electronic devices to enhance teaching to students. Lee and Boyler (2003) stated that e-teaching as a new and evolving concept, involves teachers managing a convergence of digital information from a wide range of sources and devices when presenting, discussing and reflecting upon a concept with a class group. Lee and Boyle contended that e-teaching differs from the conventional approach of teaching. These authors stated that in e-teaching, technology devices are left to extending the reach information from individual to entire groups either large or small. For example computers, electronic white boards among other are essential tools in transition of e-teaching. These devices are effective medium for the teacher presenting information to the whole class. Glover and Miller (2002) stated that the important feature of e-teaching is its similarity to the multi-media, sensory and faceted styles which makes it a multi-literacy teaching and learning environment standard. McCormick and Scrimshaw (2001) observed that teaching makes teaching available everywhere and every time. It makes teaching cheaper and authenticated. According to the McCormick and Scrimshaw, e-teaching is modifiable, enhanceable and can be in embedded resources such as e-text books. It is fun and intention holding especially when used among children. Allen and Seaman (2008) said the e-teaching enables a lecturer to repeat a lesson to different groups of students at different times and locations. It reduces delivery cycle for lecturers and lowers expenses incurred at each period of their service delivery. In the view of Nagy (2008), e-teaching enables a teacher to reach students in different schools at their locations in his teaching and practice using relevant technology devices. E-teaching is for teachers to teach effectively and happily and is meant to motivate and direct teachers to teach willingly (Nakajima & Hori, 2016). In this study, e-teaching refers to the activities carried out by a lecturer(s) in harnessing the potential of information communication technologies for implementing instruction for students to take their learning in relevant direction. E-teaching process and application include web-based teaching, computer-based teaching, video conferencing, teleconferencing and digital collaboration. It could be delivered via internet; audio-tape; satellite television and CD Rom.

E-teaching could be adopted by lecturers of vocational electrical/electronic technology in tertiary institutions. The Organization for Economic Co-operation and Development (OECD) (2013) stated that by adopting e-teaching in various tertiary institutions, it will assist the students to acquire 21st century skills as we all know that individuals with poor 21st century skills are more likely to find themselves at risk of unemployment and social exclusion. Robyler and Doering (2010) therefore listed a variety of learning theories and how they apply to the expanded use of technology in the classroom (e-teaching). For example, five of the most relevant theories are: 1) behaviorist theory—developed by B.F. Skinner—which posits learning as a stimulus-response. Behaviorism is a worldview that assumes a learner is essentially passive, responding to environmental stimuli (Wallace, 2000); 2) information-processing theory (Atkinson & Shiffrin) which suggests that the mind is a computer that registers sensory stimulus; 3) cognitive behaviorist theory (Robert Gagne)

which holds specific events of instruction as key for providing the conditions for learning; 4) social activism theory (John Dewey), which advocates learning as a social experience—and from which comes Constructivism; and 5) scaffolding theory (Lev Vygotsky), which conceives learning as a cognitive building process (Robyler & Doering, 2010).

LECTURERS AND ELECTRICAL/ELECTRONIC TECHNOLOGY AND COMPUTER EDUCATION"

A lecturer is person who works at tertiary institution as an academic staff. A lecturer is an academic staff within the programme with minimum qualification of first degree not below second class lower division (Bakare, 2014). A lecturer, in the statement of Encarta (2009) is a teacher in a college or university that teaches students and carries out research activities to solve identified problems. In Nigeria, a lecturer is a person who interacts with students in colleges of education, polytechnics and universities for the purpose of learning. Lecturer as the pivot of the educational process is expected to employ measures that would impact favourably on classroom activities. Teacher is also expected to create a conducive atmosphere for meaningful interaction between students, between the students and himself in the teaching and learning process (Mkpanang, 2016). Tertiary institutions in Nigeria are owned by individuals, group of individuals or religious homes, state and federal government. Some of the lecturers in these institutions are at the early stages of their career. The duties of a lecturer also include teaching as well as researching (Pediaa, 2016). Some of the lecturers also perform community development. Unlike a teacher's, lecturer's students are mostly adults. Therefore, the students are more capable of modifying their behavior, taking responsibilities and finding extra resources (Pediaa, 2016). A lecturer holds postgraduate qualifications (Master degree and PH.Ds) as well as possesses research experience. This is because lecturers are involved in tertiary education. A lecturer, in this context, is an individual who teaches students and carries out research activities in electrical/electronic technology. The lecturer is expected to adopt e-teaching for delivery components of electrical/electronic technology to students which are power and machines, electronic/telecommunication, mobile communication technologies and acoustic systems.

lectrical/electronic technology and computer is an aspect of vocational education (Bakare, 2009). Electrical/Electronic technology (EET) is the largest branch of engineering technology and includes a diverse range of sub-disciplines, such as applied design, electronics, embedded systems, control systems, instrumentation, telecommunications, and power systems *(*Sloan Career Cornerstone Center, 2010). EET deals with the design, application, installation, manufacturing, operation and maintenance of electrical/electronic(s) systems (ABET, 2012*)*. However, EET is a specialized discipline that has more focus on application, theory, and applied design, and implementation (ABET, 2012). Students who specialized in EET are expected to acquire knowledge, skills and attitudes to design, apply, install, manufacture, construct, operate and maintain all kinds of electrical/electronic(s) systems (Bakare, 2009). In the area of the study, lecturers teach these components to students individually within their tertiary institutions based on their competence; therefore, sharing of knowledge, meaning and practices from lecturers by students other than those from their institutions are only possible through printed journals and text books.

This practice gave rise to a variety of students with different standards in electrical/electronic technology. The difference in standard calls for a compelling alternative that will help to minimize variation in the level of knowledge and competence of graduates of electrical/electronic technology. The use of e-teaching could be a good alternative but the lecturers must be competent in operating e-teaching facilities. Competency, in the explanation of Ely (1989) means essential knowledge and skills obtained in a profession and those which the professionals in the field must possess and be able to demonstrate at optimal level of acquisition and functioning. Olaitan (2003) referred to competency as knowledge, skill and attitude that are required for successful performance of a task. Competence is the combination of training, skills, experience and knowledge that a person has and his ability to apply them to perform a task safely (Health and Safety Executives, 2017). Factors such as attitude and physical ability, can also affect lecturer's competence. Competency as applied in this study is the knowledge, skills and attitude or training that lecturers of electrical/electronic technology must possess to operate e-teaching facilities for effective delivery to students.

CAPACITY BUILDING AND ASSESSMENT OF LECTURERS

Capacity building (or capacity development), in the submission of Stavrons (1998) is the process of developing competencies and capabilities in individuals, groups, organization sectors or countries which leads to sustainable and self-generating performance improvement. The organization further stated that the fundamental goal of capacity building is to enhance the ability of individuals based on perceived needs. Corporation for National Community Service (CNCS, 2012) explained capacity building as a set of activities that expand the scale, reach, efficiency or effectiveness of an individual, organization or a programme. These activities may expand services, enhance delivery of services, or generate additional resources for the individual or organization. The Canadian International Development Agency (CIDA, 2013) also viewed capacity building as the activities, approaches, strategies, and methodologies which help organizations, groups and individuals to improve their performance, generate development benefits and achieve their objectives. Therefore capacity building refers to the set of activities directed towards improving competencies and capacities of lecturers of electrical/electronic technology in operating e-teaching facilities for effective delivery in universities. In order to improve the capacity of the lecturers, the skills they posses in operating e-teaching facilities must be identified through assessment.

Assessment is a form of evaluation that uses collected data for estimating the work quality or effectiveness of a programme or project. Assessment involves the use of empirical data on student learning to refine programs and improve student

learning (Allen, 2004). Assessment according to Great Schools Partnership (2014) is the wide variety of methods or tools that educators use to evaluate, measure, and document the academic readiness, learning progress, skill acquisition, or educational needs of students. Valid assessment of people helps someone to pass judgment correctly. With reference to this study, assessment is the process of evaluating lecturers of electrical/electronic technology in tertiary institutions through collection of data from them to determine the level of competencies they possess in operating computer, uploading materials on internet and operating computer for video conferencing for effective delivery. The level of competencies they posses in the aforementioned e-teaching facilities can be identified through need gap. Need gap, as explained by Chuta (1992) is what one requires in order to meet at a target standard. Roselt and Sheldon (2001) explained need gap as the difference between the perceived need and actual need. A need gap as stated by Gall, Gall and Borg (2007) is a discrepancy between an existing set of conditions and a desired set of conditions. In this study, the difference between the perceived level of competencies possessed by lecturers and what they required to meet standard of acceptable performance constitute the need gap which is meant be to filled.

STATEMENT OF THE PROBLEM

Teachers are known as powerful stakeholders that help in the development of society through learners. They teach implement prepared curricula in various tertiary institutions for the betterment of the society. Most of these lecturers in institutions in South Western Nigeria still prefer to use other types of face to face (F2F) teaching methods/strategies for implementing their school courses despites of the e-teaching facilities made available by school authorities. This inability of these lecturers to use e-teaching facilities could be attributed to inadequate experiences or competences in e-teaching. Some researches also showed that Lecturers of ecturers of electrical/electronic technology and computer education could not operate e-teaching facilities such as computer for typing and editing of materials, uploading materials into internet and teleconferencing (video and audio conferencing). They only manage to use projector to teach their students.

A research conducted by Asogwa (2011) revealed that Lecturers in Universities were not as skilled enough and thorough in the understanding operation and application of ICT packages as they were supposed to be. According to the Asogwa, many lecturers are still not good at booting their laptops, preparing power points presentation, typing fast, installing some useful apps, composing and sending e-mails, accessing mails, attaching files and other peripheral issues. This implies that for lecturers of electrical/electronic technology to be able to utilize e-teaching effectively, they need capacity building. It is therefore pertinent to determine the capacity building needs of lecturers of electrical/electronic technology in e-teaching for effective delivery in tertiary institutions. In view of this, the researchers developed five research questions aimed at addressing the purpose of the study:

1. What is the perception of lecturers in tertiary institutions toward building their capacity in e-teaching?
2. What are the competencies in operating computer where lecturers of electrical/electronic technology need capacity building for e-teaching?
3. What are the competencies in uploading text on internet where lecturers of electrical/electronic technology need capacity building for e-teaching?
4. What are the competencies in teleconferencing (audio and video conferencing) where lecturers of electrical/electronic technology need capacity building for e-teaching in universities?
5. What are the possible barriers to effective utilization of e-teaching approach for instructional delivery in tertiary institutions in south western Nigeria?

HYPOTHESES

The following null hypotheses were tested at 0.05level of significance:

1. There is no significant difference ($p< 0.05$) in the mean responses of electrical/electronic technology lecturers in colleges of education, polytechnics and universities on the competencies in uploading text on internet where they need capacity building for e-teaching
2. There is no significant difference ($p< 0.05$) in the mean responses of electrical/electronic technology lecturers in colleges of education, polytechnics and universities on the competencies in video and teleconferencing where they need capacity building for e-teaching
3. There is no significant difference ($p< 0.05$) in the mean responses of electrical/electronic technology lecturers in colleges of education, polytechnics and universities on possible barriers to effective utilization of e-teaching approach for instructional delivery in tertiary institutions in south western Nigeria

METHODOLOGY

Design

The study adopted survey research design. Olaitan, Ali, Eyo and Sowande (2000) stated that survey research design is the plan, structure and strategy that the investigator wants to adopt in order to obtain solution to research problems using questionnaire in collecting analyzing and interpreting the data. Survey research design was adopted based on the fact that data were elicited from lecturers of electrical/electronic technology. Questionnaire was used to collect data from lecturers of electrical/electronic technology

in order to determine their capacity building needs in using e-teaching.

Area of the study

The study was carried out in South Western States (Lagos, Oyo, Ogun, Osun, Ondo and Ekiti States) of Nigeria covering Federal and State Tertiary Institutions such as Colleges of Education, Polytechnics and Universities. The tertiary institutions include: Federal College of Education (Technical) Akoka, Adeniran Ogunsanya College of Education, Yaba College of Technology, Lagos State Polytechnic, University of Lagos, Akoka, Lagos State University Ojo, in Lagos State; Colleges of Education, Omu, Moshood Abiola Polytechnic Abeokuta, Ogun State University Ago Iwoye, Federal University of Agriculture and Tai Solarin University of Education, Ijebu Ode, in Ogun State; Federal College of Education (Special), Oyo, The Polytechnic Ibadan, University of Ibadan, and Ladoke Akintola University of Technology Ogbomoso in Oyo State; College of Education, Ila Orangun, College of Education, Ilesha, Federal Polytechnic Ede, Osun State Polytechnic Ire, College of Technology, Esaoke, Obafemi Awolowo University Ile Ife and Osun State University Osogbo in Osun State; Rufus Giwa Polytechnic, Adeyemi College of Education, Adekunle Ajasin University Akungba, Ondo State University of Science and Technology and Federal University of Technology Akure, Ondo in Ondo State; College of Education Ikere, Federal Polytechnic Ado Ekiti, and Ekiti State University Ado Ekiti and Federal University Oye Ekiti in Ekiti State. Southwestern Nigeria is chosen because of the presence of tertiary institutions that offer computer and electrical/electronic technology as one of the vocational/technical education programmes with qualified human and relevant material resources such as e-teaching and e-learning centers to facilitate the study

Participants

The participants for the study were all the 544 lecturers made up of 190 lecturers of electrical/electronics technology and 354 lecturers of computer education/science in the institutions mentioned above. The more detailed information of participants is shown in Appendix I. Appendix I also shows those institutions that offer vocational electrical/electronic technology. There was no sampling due to the manageable size of the population (Data from Office of the Registrar of various Institutions, 2016).

Instrument

An 80-item questionnaire titled: E-teaching Capacity Building Needs of Lecturers of Electrical/electronic technology (ECBNLEET) was developed by the researchers based on the literature reviewed and functions of the industry (Hadly and Sheingnold 1993; Williams 1995; Pelgrum 2001; Khan, Hasan & Clement 2012; Chen, Tan, & Lim 2012; Wood, Specht, Willoughby, & Mueller 2008; Uzoagulu 2011; Olelewe and Okwor, 2017). The instrument was subdivided into Parts A and B. Part A is an introduction that contains open-ended questions that sought information on the demographic data of respondents. The part B was further divided into sections five sections which contained items based on research questions developed to guide the study. The part B, sections 2, 3 and 4 of the questionnaire were divided into two components of needed and performance. The needed component was assigned four point response options of Highly Needed (4), Average Needed (3), Slightly Needed (2) and Not Needed (1), while the Performance Component was assigned a four point response options of Highly Performance (HP), Average Performance (AV), Low performance (LP) and No Performance (NP) with corresponding values of 4, 3, 2, and 1 respectively. Each item in part B, section 1 and 5 of the questionnaire was assigned a four point Scale response of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD) with corresponding numerical values 4, 3, 2 and 1. According to Lozano, Garcı´a-Cueto and Mun˜iz (2008), an instrument can be considered good for validity and reliability if it has between four (4) and seven (7) alternative responses. However, fewer options are acceptable depending on the purpose and scope of the study (Bendig 1954; Mattell and Jacoby 1971; Jones and Scott, 2013). The lecturers of Electrical/Electronic Technology responded to performance component while Lecturers of Computer Education responded to needed Component.

Validation

The ECBNLEET was subjected to face validity by three Experts, two from Department of Industrial Technical Education and one from Computer and Robotic Education Department, Faculty of Vocational and Technical Education, University of Nigeria, Nsukka. For experts to effectively validate the instrument, the researchers attached introductory letter that reflects the purpose of the study, the research questions and the hypotheses formulated for the study. They were requested to use their expertise in determining the suitability of the instrument items for data collection. Their observations, corrections and suggestions were used to develop the final copy of the instrument.

Reliability

The internal consistency of the questionnaire items was established using Cronbach Alpha Reliability method. A total of 30 lecturers of electrical/electronic technology and computer education were from tertiary institutions in South-eastern Nigeria which is outside the study area were used for the pilot study. The closer the cronbach's alpha is to 1, the higher the internal consistency (Olelewe and Agomuo, 2016). The data collected from these lecturers were analysed for internal consistency using Cronbach Alpha Reliability method. The reliability coefficient (Cronbach alpha) value of 0.78 was obtained for section A of the questionnaire which contained items on perception of lecturers in tertiary institutions toward building their capacities in e-teaching, 0.72 for competencies in operating computer where lecturers of electrical/electronic technology need capacity building for e-

teaching, 0.77 for competencies in uploading text on internet where lecturers of electrical/electronic technology need capacity building for e-teaching, 0.87 for competencies in teleconferencing (audio and video conferencing) where lecturers of electrical/electronic technology need capacity building for e-teaching in universities, 0.74 for barriers to effective utilization of e-teaching approach for instructional delivery in tertiary institutions while 0.80 was obtained as the overall reliability coefficient value for the entire questionnaire items. The statistical Packages for Social Sciences (SPSS) 22 versions (Scale) was employed to analyse the data collected from the respondents.

Method of Data Collection

Five hundred and forty four copies of the questionnaire were administered on lecturers of electrical/electronic technology and computer education/science lecturers in aforementioned tertiary institutions in South Western, Nigeria with the help of three Research Assistants (RAs). These RAs were selected from Ekiti State University, Adekunle Ajasin University, Akungba and Osun State polytechnic Ire all in South Western Nigeria. Orientation was given to all Research Assistants (RAs) on how the administration of the copies of the questionnaire should be done. Three research assistants were deployed to administer copies of the questionnaire on Lecturers in tertiary institutions in Ekiti, Ondo and Osun States while the three researchers administered the copies of the questionnaire on lecturers in tertiary institutions in Oyo, Ogun and Lagos States. Lagos State was used as collation Centre. The activities of the RAs were coordinated by the researchers. Two weeks later, the researchers and research assistants went round and collected the copies of the questionnaire from the respondents and collated them for further actions. Four hundred and seventy three copies of the questionnaire were collected representing 86.58 percent return rate. The researchers and assistant researchers could not retrieve copies of the questionnaire administered on lecturers at Ladoke Akintola University Ogbomoso and Federal University Oye Ekiti due to strike actions. This also lowered the return rate. This is an acceptable response rate according to a study by Baruch (1999) who recommended a standard of 60 +/-20% for surveys in managerial and behavioural sciences.

Method of data analysis

Mean and standard deviation were used to answer research question one and five. Any item with a Mean value of 2.50 or above was regarded as Agree while any item with a Mean value of less than 2.50 was regarded as Disagree. Weighted Mean and Improvement Need Index (INI) was used to answer the research questions two, three and four. To determine the performance gap of the lecturers, the following steps were taken:

1. The weighted mean of each item under the need component which is Xn was calculated
2. The weighted mean of each items under the performance component which is Xp was calculated
3. The difference between the two weighted mean for each item (Xn-Xp =PG) was determined.
4. Where the difference (Need/Performance Gap) was zero (0) for each item, there was no need for capacity building of lecturers because the level at which the competency item was needed was equal to the level at which the lecturers could perform the competency
5. Where the difference (Need/Performance Gap) was negative (-) for each item, there was no need for capacity building because the level at which the competency item was needed was lower than the level at which the lecturers could perform the competency.
6. Where the difference (Need/Performance Gap) was positive (+) for each item the lecturers needed capacity building because the level at which the competency item was needed was higher than the level at which the lecturers could perform the competency

For testing hypotheses**,** analysis of variance (ANOVA) was employed for testing the three null hypotheses at 0.05 and relevant degrees of freedom. The null hypothesis of no significant difference was accepted for any item whose P- value was greater than the 0.05, but it was rejected for any item whose P-value was less than 0.05. The analysis was done by the researchers with the help of Statistical Package for Social Science (SPSS) 22 Versions

RESULTS

Table 1. Mean and Standard Deviation of the Perceptions of Lecturers in Tertiary Institutions toward Building their Capacity in E-teaching

S/N	Item Statements	Mean	S.D	Rem.
1	I need essential knowledge and skills about e-teaching	2.69	0.67	Agree
2	I will be happy if my capacity can be built in e-teaching	2.51	0.72	Agree
3	I am ready for e-teaching capacity building programme	2.57	0.66	Agree
4	I am ready to buy some e-teaching facilities on my own to facilitate	2.61	0.59	Agree

S/N	Item Statements	Mean	S.D	Rem.
	teaching			
5	I am ready to go a long way to improve myself after my e-teaching capacity has been built	2.56	0.61	Agree
6	I am ready to use whatever knowledge and skills I acquired from e-teaching capacity building to improve my teaching	2.60	0.58	Agree
7	I consider e-teaching as an efficient tool for teaching and learning	2.59	0.64	Agree
8	E-teaching is relevant to my teaching profession	2.55	0.72	Agree
9	I love using electronic supported approach for teaching	2.72	0.66	Agree
10	I do not have basic computer knowledge and skills required to employ e-teaching	2.65	0.58	Agree
11	I depend on other lecturers to use electronic supported approach	2.67	0.78	Agree
12	Acquired computer knowledge and skills are not enough for me to embark on e-teaching	2.53	0.61	Agree
13	I encourage other lecturers to use e-teaching for their lesson	2.58	0.64	Agree
14	E-teaching is an enhancement to my classroom activities	2.79	0.61	Agree
15	E-teaching is critical to academic achievement	2.54	0.58	Agree
16	I will always use the e-teaching if I have the adequate knowledge and skills	2.52	0.62	Agree
17	I am always happy to use e-teaching approach for instructional delivery	2.66	0.75	Agree
18	I am incapable of operating e-teaching tools independently	2.52	0.62	Agree
19	My institution has been supportive in training lecturers on how to use e-teaching approach for instruction delivery	2.63	0.76	Agree
20	The training I attended in the past was not enough for me to embark on e-teaching	2.65	0.55	Agree

Key: *S.D – Standard deviation; Rem.- Remark*

Researchers investigated the perceptions of lecturers of electrical/electronic technology inform of interest and readiness to use e-teaching approach/platform. Data in Table 1 revealed that all the items have their mean value ranged from 2.51 to 2.79. This shows that the mean value of each item was above cutoff point of 2.50, indicating that lecturers of electrical/electronic technology are interested and ready to utilize e-teaching for instructional delivery in their various institutions. Similarly, the standard deviation of these items ranged from .55 to .72 indicating that the respondents were close to one another in their opinion.

Table 2. Performance Gap-Analysis of Mean Ratings of the responses of Lecturers of Electrical/Electronic Technology and Computer Education on Competencies in Operating Computer where Lecturers of Electrical/electronic technology need Capacity Building for E-Teaching

S/N	Item Statements	Xn	Xp	Xn-Xp (PG)	Remark
1	Ability to position computer and its accessories on a comfortable platform	3.19	3.24	-0.02	**CBNN**
2	Ability to connect computer to the accessories with cables appropriately	3.62	3.12	0.50	**CBN**
3	Ability to connect computer and accessories to power supply	3.47	2.32	1.15	**CBN**
4	Ability to boot on the computer, smart phone and switch on the accessories	3.61	2.90	0.71	**CBN**
5	Ability to take a comfortable sitting position for e-teaching	3.56	3.19	0.37	**CBN**
6	Ability to take cursor to the start menu	3.62	2.51	1.11	**CBN**
7	Ability to open programs from the start menu	3.73	3.45	0.30	**CBN**

S/N	Item Statements	Xn	Xp	Xn-Xp (PG)	Remark
8	Ability to extend hand straight to the keyboard and let fingers lightly touch the home row and keys	3.55	3.01	0.54	**CBN**
9	Ability to create a document from the Microsoft office	3.78	3.38	0.40	**CBN**
10	Ability to stroke the keys and the space bar with finger tips to type alphabet	3.65	2.05	1.60	**CBN**
11	Ability to edit text using cursor movement, key page up and down, alpha numerical	3.76	2.23	1.53	**CBN**
12	Ability to create new files or folders	3.51	3.12	0.39	**CBN**
13	Ability to save the text in a file or folder	3.56	2.88	0.68	**CBN**
14	Ability to insert CD or flash drive in the appropriate opening	3.79	3.50	0.28	**CBN**
15	Format CD plate or flash drive	3.67	3.34	0.30	**CBN**
16	Ability to save/transfer text from the folder to the storage facility	3.67	3.34	0.33	**CBN**
17	Ability to close the file or folder after use	3.56	3.32	0.24	**CBN**
18	Ability to short down computer after use	3.76	3.44	0.30	**CBN**
19	Ability to switch off all the accessories	3.55	3.22	0.33	**CBN**
20	Ability to disengage computer and accessories from power supply	3.89	2.79	1.10	**CBN**

Keys: *Xn = Mean of Needed; Xp =Mean of Performance; CBN = Capacity Building Needed, CBNN = Capacity Building Not Needed*

Second, sought to determine the competencies in operating computer where lecturers of electrical/electronic technology need capacity building for e-teaching in tertiary institutions. The data presented in Table 2 reveal that the performance gap values of 19 out of 20 items ranged from 0.24 to 1.60 and were positive. This indicates that the lecturers needed capacity building in the 19 competency items in operating computer for e-teaching in tertiary institutions. One out of the 20 items had a performance gap value of -0.02, indicating that the lecturers do not need capacity building on the item because the level at which the item is needed was lower than the level at which the lecturers could perform the item for e-teaching in tertiary institutions.

Table 3. Performance Gap-Analysis of mean ratings of the responses of lecturers of Electrical/Electronic Technology and Computer Education on Competencies in Uploading Text on Internet where Lecturers of Electrical/Electronic Technology need Capacity Building for E-teaching

S/N	Competency Items	Xn	Xp	Xn-Xp (PG)	Rem.	P-Value	Level of Sig.	Rem.
1	Ability to connect all necessary cables to computer including source of power supply	2.50	2.98	0.62	**CBN**	0.11	.05	**NS**
2	Ability to start the computer or smart phone for e-teaching correctly	3.98	3.60	0.38	**CBN**	0.21	.05	**NS**
3	Ability to organize materials to reflect title, subject matter, logical, numerical among others	3.60	3.11	0.49	**CBN**	0.13	.05	**NS**
4	Ability to create temporary files/ folder by opening window explorer	3.60	3.02	0.65	**CBN**	0.09	.05	**NS**
5	Ability to file the text pages in a folder appropriately	3.74	2.89	0.57	**CBN**	0.10	.05	**NS**
6	Ability to connect computer/smart phone to internet service provider	3.80	3.24	0.56	**CBN**	0.22	.05	**NS**
7	Ability to design web page for entering and formatting text, images, table and other features	3.94	3.31	0.63	**CBN**	0.11	.05	**NS**
8	Ability to search for a good navigation system (search engine) that users can easily get from place to place.	3.56	3.45	0.54	**CBN**	0.32	.05	**NS**
9	Ability to create a document from the Microsoft office	3.78	3.38	0.25	**CBN**	0.12	.05	**NS**
10	Ability to log on a programme on the internet to File Transfer Protocol (FTP) address and login permission	3.78	3.00	0.78	**CBN**	0.11	.05	**NS**
11	Ability to send transfer/text from folder to on line	3.66	3.05	0.06	**CBN**	0.23	.05	**NS**

S/N	Competency Items	Xn	Xp	Xn-Xp (PG)	Rem.	P-Value	Level of Sig.	Rem.
	location using identified search engine.							
12	Ability to down load the text to ensure accurate and effective uploading	3.54	3.25	0.29	**CBN**	0.11	.05	**NS**
13	Ability to edit configuration of local site if needed	3.78	2.28	0.50	**CBN**	0.12	.05	**NS**
14	Ability to disconnect from search engine on the internet.	3.67	3.21	0.40	**CBN**	0.10	.05	**NS**

Keys: *Rem.- Remark; Xn - Mean of Needed; Xp -Mean of Performance; CBN - Capacity Building Needed; CBNN - Capacity Building Not Needed; Rem.- Remark; Sig.- Significant*

Furthermore, the researchers determined the competencies in uploading text on internet where lecturers of electrical/electronic technology need capacity building for e-teaching in tertiary institutions. The data in Table 3 show that the performance gap values for all the 14 items ranged from 0.25 to 0.78 and were positive. This indicates that the lecturers of Electrical/electronic technology need capacity building in all the competency items on uploading text into internet for effective e-teaching in tertiary institutions in South Western Nigeria

Furthermore, results in Table 3 show the ANOVA of the mean responses of lecturers in Colleges of Education and Polytechnics on the competencies in uploading text on internet where they need capacity building for e-teaching. The one-way ANOVA presented in Table 3 shows the item analysis. The one-way ANOVA presented in Table 3 shows that all the 14 competencies in uploading had their P-values (0.09-0.32) greater than 0.05 level of significance and at relevant degree of freedom. The null hypothesis formulated was therefore accepted. Hence, there was no significant difference in the mean responses of electrical/electronic technology lecturers in colleges of education, polytechnics and universities on the on the competencies in uploading text on internet where they need capacity building for e-teaching

Table 4. Performance Gap Analysis of mean responses of Lecturers of Electrical/electronic Technology and Computer Education on Competencies in Teleconferencing where Lecturers of Electrical/Electronic Technology need Capacity Building for E-teaching Tertiary Institutions

S/N	Competency items	Xn	Xp	Xn-Xp (PG)	Rem.	P-value	Rem.
1	Ability to choose software programme for the video conferencing such as Logitech Quick Cam Camera software, Microsoft or Microsoft instant messenger friends finders.	3.59	3.23	0.36	**CBN**	0.12	**NS**
2	Ability to install video conferencing programme appropriately	3.66	2.06	0.60	**CBN**	0.10	**NS**
3	Ability to connect computer to internet/on line	3.86	2.23	0.63	**CBN**	0.12	**NS**
4	Ability to locate the installed programme via menu	3.56	2.05	0.50	**CBN**	0.21	**NS**
5	Ability to start the instant messenger (installed video conferencing programme)	3.56	3.04	0.52	**CBN**	0.23	**NS**
6	Ability to search for friends online to connect for testing	3.61	2.97	0.64	**CBN**	0.15	**NS**
7	Ability to schedule time table for video conferencing with students/learners	3.50	3.02	0.48	**CBN**	0.28	**NS**
8	Ability to start video conferencing at the appropriate time as scheduled	3.45	2.65	0.80	**CBN**	0.31	**NS**
9	Ability to close programme at the end of the conference	2.56	3.21	0.35	**CBN**	0.42	**NS**
10	Ability to disconnect from the internet service provider after teaching	3.65	3.10	0.55	**CBN**	0.11	**NS**
11	Ability to short down computer and disengage from power supply	3.78	3.03	0.75	**CBN**	0.22	**NS**

Keys: *Rem. – remark; Xn - Mean of Needed; Xp-Mean of Performance; CBN- Capacity Building Needed, CBNN- Capacity Building Not Needed, Rem.- Remark; Sig.- Significant*

Also, the researchers determined the competencies in teleconferencing (audio and video conferencing) where lecturers of electrical/electronic technology need capacity building for e-teaching in tertiary institutions. The data presented by researchers in Table 4 show that the performance gap values for all the 11 Items ranged from 0.35 to 0.80 and were positive. This indicates that the lecturers of electrical/electronic technology need capacity building in the entire competency items in audio and video conferencing for effective e-teaching in tertiary institutions in southwestern Nigeria.

Furthermore, results in Table 4 show the ANOVA of the mean ratings of lecturers in Colleges of Education, Polytechnics and Universities on the competencies in video and teleconferencing where they need capacity building for e-teaching. The one-way ANOVA presented in Table 4 shows the item analysis. The one-way ANOVA presented in Table 4 shows that all the 15 barriers had their P-values (0.10-0.42) greater than 0.05 level of significance and at relevant degree of freedom. The null hypothesis formulated was therefore accepted. Hence, there is no significant difference in the mean responses of electrical/electronic technology lecturers in colleges of education, polytechnics and universities on the competencies in video and teleconferencing where they need capacity building for e-teaching

Table 5. Mean, Standard Deviation and ANOVA results on the Barriers to effective Utilization of e-teaching approach in Instructional Delivery by Lecturers

S/N	Barriers	Mean	SD	Rem.	P-value	Level of Sig.	Rem.
1	Consistent power failure	2.92	0.71	**A**	0.10	.05	NS
2	Lack of crop of technicians to maintain e-teaching gadgets	2.59	0.63	**A**	0.21	.05	NS
3	Lack of alternative power supply	2.71	0.61	**A**	0.09	.05	NS
4	High cost of maintenance of e-teaching equipment	2.63	0.59	**A**	0.21	.05	NS
5	Acute shortage of ICT specialists	2.86	0.68	**A**	0.13	.05	NS
6	Frequent network failure	2.62	0.61	**A**	0.23	.05	NS
7	Lack skills and knowledge to operate e-teaching facilities	2.58	0.64	**A**	0.14	.05	NS
8	Inadequate e-teaching facilities in my institution	2.55	0.72	**A**	0.25	.05	NS
9	Lack of confidence in using e-teaching facilities	2.71	0.62	**A**	0.22	.05	NS
10	Lack of technical support required to setup e-teaching facilities for instructional delivery	2.65	0.59	A	0.10	.05	NS
11	Inadequate computer skills for use of e-teaching	2.67	0.78	A	0.12	.05	NS
12	Poor internet access and connectivity and in my institution	2.53	0.61	A	0.19	.05	NS
13	Fear of damaging the e-teaching system during usage	2.08	0.64	D	0.26	.05	NS
14	Lack of knowledge to prepare e-teaching lesson	2.63	0.74	A	0.22	.05	NS
15	Insufficient time for e-teaching lesson preparation	2.24	0.73	D	0.11	.05	NS

Key: *Rem.- Remark, SD - Standard Deviation, A- Agree, D- Disagree, Sig.- Significance, P-value, NS- Not Significant; Sig.- Significant*

Lastly, the researchers found out possible barriers to effective utilization of e-teaching approach in instructional delivery by lecturers in various institutions. Data in Table 5 shows the mean, standard deviation and ANOVA results on possible barriers to effective utilization of e-teaching approach in instructional delivery by lecturers in various institutions. Out of the 15 barrier items presented, 13 items had their Means above the cut-off point of 2.50 indicating that these items

constitute major barriers to effective utilization of e-teaching by lecturers in tertiary institutions in south western Nigeria, while 2 items as shown in Table 5 had their means below the cut-off point of 2.50, thus, indicating that the respondents disagreed on these items as not barriers to utilization of e-teaching in instructional delivery. Similarly, the standard deviation of these barriers ranged from .59 to .78 indicating that the respondents were close to one another in their opinion.

Furthermore, results in Table 5 show the ANOVA of the mean ratings of Universities, Polytechnics, and Colleges of Education lecturers on the possible barriers to effective utilization of e-teaching approach for instructional delivery. The one-way ANOVA presented in Table 5 shows the item analysis. The one-way ANOVA presented in Table 5 shows that all the 15 barriers had their P-values (0.09-0.26) greater than 0.05 level of significance and at relevant degree of freedom. The null hypothesis formulated was therefore accepted. Hence, there is no significant difference in the mean responses of electrical/electronic technology lecturers in colleges of education, polytechnics and universities on possible barriers to effective utilization of e-teaching approach for instructional delivery in tertiary institutions in south western Nigeria

DISCUSSION

The results of the study revealed that the lecturers of electrical/electronic technology are interested and ready to receive training on e-teaching and utilizing e-teaching for instructional delivery in their various institutions. Majority of lecturers of electrical/electronic technology in colleges of education, polytechnics and universities perceived e-teaching to be an essential teaching and learning tool which if appropriately utilized has the capacity of enhancing learning of students in various subjects. They also considered it as a special enhancement tool which can make teachers and learners active participants in the classroom setting. These findings agree with the finding of Olelewe and Okwor (2017) that using ICT supported strategies for teaching improves learning outcome of students and make the teaching easier for teachers.

The results of this study show that majority of the lecturers of electrical/electronic technology in colleges of education, polytechnics and universities needed capacity building for effective operation of computer, uploading text on internet and using teleconferencing for effective e-teaching. The implication of this finding is that lecturers of electrical/electronic technology are deficient in using e-teaching approach and relevant facilities that could support e-teaching of vocational electrical/electronic technology courses to students in tertiary institutions. These findings of the study could be attributed to the fact that lecturers of electrical/electronic technology not regularly trained in using ICTs such as laptops, Ipads, smart phones, internet, electronic interactive boards, email and digital projectors for teaching and learning purposes. This low level of ICT skills possessed by lecturers could be attributed to the perceived inadequate ICT training and orientation given to faculty members on ICT related equipment such as interactive whiteboard, starboards, computer among others (Ertmer 1999; Jegede 2009). The findings of the study also agree with the finding of Olelewe and Okwor (2017) that majority of the lecturers in tertiary institution possess low ICT skills required for effective utilization of IWB in their teaching and learning practices. Furthermore, the findings support Ogwo and Oranu (2006) who stated that teachers of vocational educations must be continuous learners through improvement programmes. This will enhance the effectiveness of lecturers in performing specific teaching activities. These findings also in line with the finding of Adirika and Alike (2008) that technologies such as computer, email, cell phones, e-teaching facilities, Ipads among others are yet to be used for teaching of school subjects due to inadequate skill possessed by the lecturers. The finding of this study also in agreement with the findings Olaitan, Osinem, Honyonyon and Akeju (2008) that lecturers required performance competencies in using computer for teaching, operating computer and in applying computer to agriculture through the internet, e-mail and Microsoft power point.

Furthermore, the results of hypotheses one and two show that there were no significant differences in the mean responses of lecturers of electrical/electronic technology in Colleges of Education, Polytechnics and Universities on the competencies in uploading text on internet and using teleconferencing for effective e-teaching. This means that the lecturers of electrical/electronic technology in Colleges of Education, Polytechnics and Universities had similar perceptions on the competencies in uploading text on the internet and using teleconferencing for effective e-teaching. That is, they have the same opinions on most of the tasks in operating computer, uploading text and using teleconferencing for teaching and learning. The lecturers have the same abilities in operating computer, uploading text and using teleconferencing.

Similarly, the results presented in Table 5 indicate that majority of the lecturers agree with most of the possible barriers to effective utilization of e-teaching for instructional delivery in tertiary institutions in south western Nigeria. Majority of the participants agreed that frequent network failure, lack skills and knowledge to operate e-teaching facilities, consistent power failure, poor internet access and connectivity and inadequate knowledge to prepare e-teaching lesson were among the prominent barriers to effective utilization of e-teaching approach. These findings agree with the finding of Igbokwe and Eze (2008) that instability of power supply is one of the major problems facing the users of various information and communication technologies in Nigeria. Frequent power failure is a major constraint to effective application of information and communication technology (Issa, Ayodele, Abubakar, & Aliyu, 2011). The findings of the study also support Olelewe and Okwor (2017) that poor power supply, poor internet connectivity and lack of technical support staff are major barriers facing the use of electronic such as IWB. The result of hypothesis three tested shows that there was no significant difference in the mean responses of electrical/electronic technology lecturers in colleges of education, polytechnics and universities on possible barriers to effective utilization of e-teaching approach

for instructional delivery in tertiary institutions in south western Nigeria.

CONCLUSION

The purpose of this study was to determine the capacity building needs of lecturers of electrical/electronic technology in e-teaching for effective delivery in tertiary institutions in south western Nigeria. Five research questions were answered: one was to determine the perception of lecturers in tertiary institutions toward building their capacity in e-teaching; the second was to identify the competencies in operating computer where lecturers of electrical/electronic technology need capacity building for e-teaching; third was to identify the competencies in uploading text on internet where lecturers of electrical/electronic technology need capacity building for e-teaching; fourth was to identify the competencies in teleconferencing (audio and video conferencing) where lecturers of electrical/electronic technology need capacity building for e-teaching in universities and the fifth was to identify the possible barriers to effective utilization of e-teaching approach for instructional delivery in tertiary institutions in south western Nigeria. In order to answer these questions, an 80-item self-structured questionnaire was adopted as the research instrument for data collection, and was administered to 544 participating lecturers from the tertiary institutions in south western Nigeria.

In conclusion, the lecturers of electrical/electronic technology have interest and ready to be using e-teaching because they perceived it as a vital tool for instructional delivery in tertiary institutions. However, the lecturers of electrical/electronic technology possessed low or lack competencies in utilizing e-teaching platform for educational purposes. Some of the e-teaching facilities in schools in the study area could not be utilized for teaching due to barriers such as frequent power failure, lack of alternative power supply, inadequate or lack of technical support staff, poor access to network, fluctuating or weak network services and insufficient computer skills for adopting e-teaching in tertiary institutions. It is therefore imperative to determine the capacity building needs of lecturers of electrical/electronic technology in e-teaching for effective delivery as this could be used to improve the utilization of e-teaching in tertiary institutions

RECOMMENDATIONS

Based on the findings of this study, the researchers presented the following recommendations for consideration:

1. The identified competency items be packaged into a retraining programme and use it to organize seminars or workshops for lecturers of electrical/electronic technology in tertiary institutions in Nigeria and other developing nations
2. Governments at all levels, religious institutions and individuals with enabling abilities should donate facilities or equipment that could help implementing e-teaching in schools and colleges
3. The management of each college of education, polytechnic and university should embark regular capacity building programmes in ICT-related areas to enable lecturers acquire necessary knowledge, skills and attitudes for effective utilization of e-teaching in for educational purposes

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