

Assessing the Extent of e-Learning Utilization by Industrial Technical Education Lecturers for Effective Teaching and Learning in Universities

Hyginus Osita Omeje, Chibueze Tobias Orji and Godwin Keres Okereke
Department of Industrial Technical Education, University of Nigeria, Nsukka, Enugu State, Nigeria

Abstract: The extent of e-Learning utilization in Nigeria is generally increasing. However while there is a great deal of knowledge in the literature about how e-Learning is being used in developed countries, there is not much information on its usage by industrial technical education lecturers in developing countries like Nigeria. Hence, this research is aimed at assessing the extent of e-Learning utilization by technical education lecturer's for effective teaching and learning in universities. Four research questions in line with the purpose guided this study. The study adopted a descriptive survey research design. A structured questionnaire was used for data collection. The questionnaire was face validated by three experts from the Department of Computer and Robotics Education and Industrial Technical Education University of Nigeria, Nsukka. A total population of 140 comprising of 92 lecturers and 48 technical instructors were used for the study and 100% of the questionnaires were returned and used to obtain information for the study. The reliability coefficient of the instrument was established using Cronbach alpha with a value of 0.88. Percentages, mean and standard deviation were used to answer the research questions. The results revealed that the e-Learning tools available are not utilized for teaching and learning. Likewise, findings show that poor funding and poor electric power supply in and around the university as well as resistance to change are the major constraints to the provision and use of e-Learning infrastructures for teaching and learning while strategies for improving the utilization of these e-Learning tools were ascertained. It was recommended that training of industrial technical education lecturers should be appraised to emphasize the acquisition of basic skills required for utilizing e-Learning in their teaching and learning of industrial technical education courses.

Key words: e-Learning, technical education, ICT, teaching, learning, industrial technical education

INTRODUCTION

An effective information delivery system development is a fundamental element of every university teaching and learning and modern technology greatly enhances the process. To this end, the 3rd declaration of the Association of African Universities (AAU) charged member universities to attach great significance to effective and positive participation in global formation, exchange and application of knowledge. It further urged universities to adventure into the potentials of the Information and Communication Technology (ICT) revolution to improve teaching, learning, research and management; stressing that urgent consideration be given to recent developments in teaching, applications, networking and opportunities for lifelong learning (Simon and Ogom, 2015). Teaching and learning in tertiary institutions globally has experienced remarkable revolution, particularly, since, the dawn of Information and Communication Technology (ICT). There is a shift

from the traditional teacher centered approach to modern method where computer technology plays a significant role. ICT has elevated teaching and learning such that students can stay in their homes or classrooms and receive lectures without seeing the lecturer (Obara and Abulokwe, 2012). The ICT mechanism that has made this revolution in student's learning possible is e-Learning.

Electronic learning (e-Learning) has been defined in different ways by different authors based on recent technological developments. e-Learning according to Welsh *et al.* (2003) is the use of computer network technology, primarily over an intranet or through the internet to deliver information and instruction to individuals. In the opinion of Hedge and Hayward (2004) e-Learning is an innovative approach to delivering electronically mediated well-designed, learner-centred and interactive learning environment to anyone, anytime and anyplace by utilizing the internet and digital technologies in connection with instructional design principles. Also, Tongsakul refer to e-Learning as comprising the

combination, implementation and relationship of teaching and learning via different ICT media such as computer, internet, multimedia projector, video tapes and CD ROM. Likewise, Nwokike (2011) defined e-Learning as the use of computer as a key component of the education environment. For Asha and Chellappan (2011) e-Learning is the use of Information and Communication Technology (ICT) which include computer networks, communication and mobile technologies to enhance and extend learning. Based on this study, e-Learning is the application of a range of electronic technologies and devices involved in information processing and communications (such as computers, internet, e-mail, computer software, satellite, mobile communication gadgets) for supporting teaching and learning and provides learners with the opportunities for personalized, just-in-time, up-to date and user-centered educational activities anytime and anywhere.

Importance of e-Learning resources in teaching and learning cannot be over emphasized. According to Ngwoke and Numonde (2011) the huge growth of e-Learning resources has provided global opportunities for education, especially for learning. e-Learning resources constitute powerful tools for the development of quality teaching and learning of technical education as well as catalysts for radical change in existing school practices and vehicle for service delivery in tertiary institutions (Mmeremikwu-Fiac and Onwukwe, 2018). It is in recognition of the importance of art e-Learning that the Federal Government of Nigeria has directed the resource personnel of the National Policy on Education to set its standards, regulate framework for the deployment of ICT infrastructure at all levels of education in Nigeria (FRN., 2013). Therefore, the universities are challenged to become more innovative in preparing and producing individuals that are adequately and sufficiently equipped to function in the rapidly changing demands of the global job market. Technical education programmes are the bedrock of employability; hence, it requires an effective information delivery system with modern technologies to greatly enhance its teaching and learning process.

Technical education is one of the major programmes offered in Nigerian universities under Technical Vocational Education and Training (TVET). In some universities in Nigeria, the departmental name may differ from Industrial Technical Education (ITE), Vocational and Technical Education (VTE) to even, Technical and Vocational Education (TVE) yet, they offer similar courses like auto mechanic technology education, building construction technology education, electrical/electronic technology education, metal work technology education and wood work technology education. The aim of

technical education programme is to provide both theoretical and hands-on knowledge of current and emerging issues as well as provides students the fundamental competencies necessary for them to earn a living in the auto mechanic, building construction, electrical/electronic, metal work and wood work (Orji and Ogbuanya, 2018). The traditional method with no little or no e-Learning integration is preponderant methods used by technical education teachers. According to Garba (2010), Eke (2011), Kennedy (2011) this method do not facilitate the acquisition of effective skills that can make them perform well in their exams and to stand on their own after their training. Hence, there is need for technical education lecturers to utilize e-Learning in their teaching and learning.

Previous studies Kasse and Balunywa (2013), Amedu (2014), Adelabu *et al.* (2014), Denis (2014), Omoni and Ifeanyiichukwu (2015), Mmeremikwu-Fiac and Onwukwe (2018) have revealed that the use of e-Learning tools can enhance teaching and learning by providing a good learning environment with opportunities for students to practice and analyze teaching and learning materials. In addition, Kasse and Balunywa (2013); Mmeremikwu-Fiac and Onwukwe (2018) suggests that e-Learning system is used for an open, flexible and diverse e-Learning environment. Moreover, e-Learning system can be analyzed as an inventive approach for delivering learner-centered, interactive and facilitated learning environment by utilizing the features and resources of different digital technologies along with other types of learning materials suited for an open, distributed and flexible learning environment (Rosenberg, 2000). Despite the enormous benefits of e-Learning tools in teaching and learning, less is known about the extent of e-Learning utilization by industrial technical education lecturers for effective teaching and learning in universities. Therefore, this study was envisioned to fill this gap in the literature.

Purpose of the study: The general purpose of this study is to assess industrial technical education lecturer's e-Learning skills for effective teaching and learning in tertiary institutions in Enugu State:

- . Specifically, the study will seek to
- . Determine the level of awareness of e-Learning tools by industrial technical education lecturers for teaching and learning
- . Determine the extent of utilization of e-Learning tools by lecturers
- . Determine the challenges associated with the utilization of e-Learning by lecturers

- Determine the strategies for improving e-Learning tools usage among the lecturers

Research questions: The study was guided by the following research questions:

- What is the level of awareness of e-Learning tools by industrial technical education lecturers for teaching and learning?
- To what extent is the e-Learning tools utilized by lecturers?
- What are the challenges associated with the utilization of e-Learning by lecturers?
- What are the strategies for improving e-Learning utilization among the lecturers?

MATERIALS AND METHODS

Descriptive survey research design was adopted for this study. The design is appropriate for this study because it provided the researcher with the opportunity of eliciting opinions from the respondents in the areas of the study using questionnaire. The population for this study comprised all the 92 industrial technical education lecturers and 48 technical instructor from the industrial technical education departments that teach automobile, metalwork, building technology, woodwork, and electrical/electronic technology in universities in South-East Nigeria. There was no sampling, since, the target population is relatively small, hence, all the population would be used for the study. A questionnaire made up of 44 structured items developed from literature was used for data collection. The instrument is divided into three sections A-D and each section dealt with one of the four research questions developed. The experts were requested to proffer suggestions for improving the instrument in meeting the purpose of the study. The corrections suggested were effected and integrated into the modified copy of the instrument which was used for data collection. A Cronbach alpha reliability technique was adopted for determining the internal consistency of the instrument. A reliability coefficient of 0.88 was obtained. This indicated a high positive relationship between the opinions of the respondents. The questionnaire was administered to the respondents by the researcher through personal contact with the help of five research assistants. The data collected from the questionnaire were analyzed using three statistical tools; percentage, mean score (X) and Standard Deviation (SD). The arithmetic mean value of 2.5 obtained from the arithmetic mean was used as the cut-off point for decision

making, hence, any response with a mean of 2.5 or above was accepted to be agreed while if below the average mean was taken as disagreed.

RESULTS AND DISCUSSION

First, the researchers examined the demographic information of participating lecturers in the study. Table 1 shows that male lecturers were 86 (61.4%) while female lecturers were 54 (38.6%) indicating that a great number of both genders are represented in the study, thus, equity and gender equality was assured. Similarly with respect to academic rank, 26 (18.6%) of the participating lecturers are professors, 67 (47.9%) are senior lecturers, 34 (24.3%) are lecturer 1 and 2 while 13 (9.2%) are assistant and graduate lecturers. Regarding work experience, 19 (13.6%) of participants have <10 years lecturing experience, 38 (27.1%) of the participants have 11-20 years lecturing experience, 52 (37.1%) have up to 30 years lecturing experience while 31 (22.2%) of the participants have more than 30 years of lecturing experience. This also indicated that majority of the participants are experienced lecturers. With regard to the educational level of participants, 93 (66.4%) of the lecturers have doctoral degrees while masters and bachelor’s degree holders were 41 (29.3%) and 6 (4.3%), respectively. With respect to the subject the lecturers teach, 32 (22.9%) are teaching auto mechanic technology, 42 (30%) are teaching building and Woodwork technology, 51 (36.4%) are teaching electrical and electronic technology while 15 (10.7%) are teaching metal work technology.

Table 1: Descriptive statistics on the demographic information of the participating lecturers

Class	N	Percentage
Gender		
Male	86	61.4
Female	54	38.6
Academic rank		
Professor	26	18.6
Senior lecturer	67	47.9
Lecturer 1 and 2	34	24.3
Assistant and graduate lecturer	13	9.2
Working experiences		
0-9	19	13.6
10-20	38	27.1
21-30	52	37.1
Above 30	31	22.2
Educational level		
PhD	93	66.4
Masters	41	29.3
Bachelor (honors)	6	4.3
Teaching subjects		
Auto mechanic technology	32	22.9
Building/woodwork technology	42	30.0
Electrical/electronic technology	51	36.4
Metal work technology	15	10.7

Table 2: Mean and standard deviation of respondents on the extent of utilization of the e-Learning tools by lecturers

e-Learning tools	\bar{x}	SD	Decision
Blackboard	1.41	0.72	Very low extent
Moodle	1.34	0.55	Very low extent
Google drive	2.99	0.97	Moderate extent
Google doc	3.05	0.82	Moderate extent
Google sheet	3.24	0.92	Moderate extent
Google slide	2.95	0.81	Moderate extent
Grammarly	1.89	0.95	Low extent
Multimedia tools: audio, video, animation and simulations	4.29	0.78	High extent
Microsoft Office Suit: MS word, Excel, PowerPoint etc.	4.64	0.66	Very high extent
YouTube	3.08	0.87	Moderate extent
Interactive Whiteboard (IWB)	1.96	0.89	Low extent
Adobe capture	1.35	0.52	Very low extent
Multimedia flash	1.38	0.76	Very low extent
Learning object	2.16	0.86	Low extent

\bar{x} mean, SD = Standard Deviation

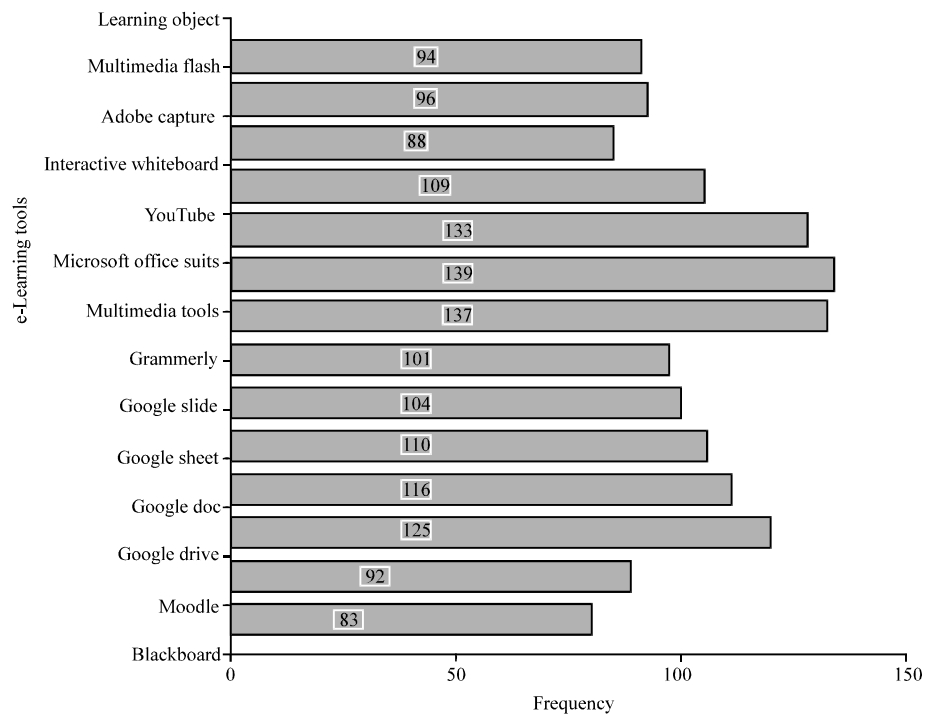


Fig. 1: A bar chart showing the level of awareness of the availability of e-Learning tools by industrial technical education lecturers for teaching and learning

Research question 1: What percentage of industrial technical education lecturers are aware of the existence of e-Learning tools to utilize in teaching and learning? the data for answering the research question one is presented in Table 2.

The data on Fig. 1 shows the level of awareness of the respondents on the available e-Learning tools. 83 respondents (58.0%) know about blackboard, 92 respondents (64.3%) know about moodle, 125 respondents (87.4%) know about Google drive, 116 respondents (81.1%) know about Google doc, 110 respondents (77.6%) know about Google sheet, 104

respondents (73.4%) know about Goggle slide, 101 respondents (70.6%) know about grammarly, 137 respondents (95.8%) know about multimedia tools such as audio, video, animation and simulation, 139 respondents (97.2%) know about Microsoft office suits such as Microsoft Word, Microsoft Excel, Microsoft PowerPoint etc., 133 respondents (93.0%) know about YouTube, 109 respondents (76.2%) know about Interactive Whiteboard (IWB), 88 respondents (61.5%) know about Adobe capture, 96 respondents (67.1%) know about Multimedia Flash while 94 respondents (65.7%) know about digital learning objects.

Table 3: Mean and standard deviation of respondents on the barriers to effective utilization of e-Learning for teaching and learning

Challenges associated with the utilization of e-Learning	\bar{x}	SD	Decision
The cost of maintaining electronic devices is very high	3.54	0.96	Agree
High cost of internet deter lecturers from using it	3.71	1.09	Agree
Too many restrictions in accessing relevant educational materials	3.69	0.98	Agree
Lecturer's preference of the 'talk and chalk' method over e-Learning	3.55	0.83	Agree
Lack of technical support from ICT experts	3.99	0.88	Agree
Inadequate training on how to use e-Learning tools	3.92	0.93	Agree
Inadequate ICT infrastructure, e.g., computer software and other computer accessories	3.66	0.77	Agree
Inadequate power supply affects the use of e-Learning tools	3.89	0.91	Agree
Lack of time to spend in utilizing e-Learning tools due to teaching workload	3.73	1.07	Agree
Insufficient bandwidth limits access to internet	3.76	1.09	Agree

Table 4: Mean and standard deviation of respondents on the strategies for improving e-Learning utilization among the lecturers

Strategies for improving e-Learning	\bar{x}	SD	Decision
Training workshop and seminars should be organized for training and retraining for teachers on the use of e-Learning tools	3.81	0.88	Agree
Use of internet facilities for internal communication should be encouraged	3.79	0.84	Agree
Encouraging teachers and students to keep pace with e-Learning devices	3.83	0.80	Agree
Provision of incentives for the use of e-Learning tools to motivate teachers	3.73	0.91	Agree
e-Learning should be integrated into the school curriculum	3.99	0.89	Agree
Problem of erratic power supply to be addressed	3.78	0.77	Agree

\bar{x} = mean, SD = Standard Deviation

Research question 2: To what extent is the e-Learning tools utilized by lecturers? The data for answering the research question one is presented in Table 3. The result in Table 2 shows responses of lecturers regarding the extent of utilization of e-Learning tools. In all items 1, 2, 12 and 13 were to a very low extent ranging from (1.34-1.41), items 7, 12 and 14 were to a low extent ranging from (1.89-2.16), items 3, 4, 5, 6 and 10 were to a moderate extent, ranging from (2.95- 3.08) while item 8 and 9 were to a high extent and very high extent, respectively.

Research question 3: What are the challenges associated with the utilization of e-Learning by lecturers? The data for answering the research question one is presented in Table 4.

As shown in Table 3, all the items had mean values above cut-off point of 3.00 showing that the respondents agreed that all the items suggested are the challenges associated with the utilization of e-Learning by lecturers.

Research question 4: What are the strategies for improving e-Learning utilization among lecturers? The data for answering the research question one is presented in Table 5.

All the items in Table 4 above had mean values above cut-off point of 3.00 showing that the respondents agreed that all the items suggested are possible strategies for improving e-Learning utilization among industrial technical education lecturers in Nigerian universities.

The main objective of this study was to investigate the extent of e-Learning utilization by industrial technical education lecturer's for effective teaching and learning in universities. Our findings revealed that the industrial technical education lecturers are aware of the existence of

the following e-Learning tools: blackboard, moodle, Google drive, Google doc, Google sheet, Google slide, Grammarly, Microsoft Office Suit: MS word, Excel, PowerPoint etc. YouTube, Interactive Whiteboard (IWB), ... , and learning object for use in teaching and learning. These findings are agreement with Ezeahurukwe and Johnson (2011) that e-Learning is generally used as part of teaching and learning to deliver lessons, effectively communicate and it has provided teachers and students with new teaching and learning tools. In addition, Anderson (2002) and Pirani (2009) are of the view that instructors need to know when, how and where to use ICT to enhance knowledge acquisition.

The results also, showed that to an extent the industrial technical education lecturers despite being aware of these e-Learning tools are not utilizing majority of them in the teaching and learning process. These findings are agreement with previous studies such as Nbina and Vikoo (2011) who found that lecturers have no knowledge of ICT facilities and so shy away from utilizing them for teaching. The findings are also in line with the results of Adelabu *et al.* (2014) who ascertained that lecturers are aware of the internet and can surf the web. But they cannot use it in facilitating the teaching and learning.

Research question three was designed to identify the challenges associated with the utilization of e-Learning by industrial technical education lecturers. The results revealed that such challenges as high cost of maintaining electronic devices, restrictions in accessing relevant educational materials, preference of the 'talk and chalk' method, lack of technical support from ICT experts, inadequate ICT infrastructure, e.g., computer software and other computer accessories, inadequate power supply

affects the use of e-Learning tools among others. These outcome in alliance with Ozoji who stated that lack of fund affects the use of ICT in teaching as many schools lack ICT materials even those that have them cannot properly maintain them due to lack of money. Again the findings agreed with the opinion of Asogwa that corruption is another major challenge of optimizing e-Learning, the data entry operator might already be making business, selling grades. Also, Ilechukwu also states that poor e-Learning technology designed environment is another challenges to the implementation of e-Learning technology in religious studies. All these hamper proper utilization of e-Learning in Nigerian Tertiary Institutions.

Results in Table 4 revealed that strategies to be adopted to improve the use of e-Learning in teaching includes training workshop and seminar of teachers on the use of e-Learning tools, government to allocate fund to improve the use of ICT, problem of poor power supply to be addressed among others. This result is in line with Okeke who stated that there is a compelling need for training and retraining of teachers in the effective use of information and communication technology. Also, Akinnuwesi *et al.* (2007) are of the view that implementation of e-Learning will require major commitment of resources and the support of stakeholders in the public and private sectors. Moreover, sufficient funds are needed to establish and maintain e-Learning facilities in schools.

CONCLUSION

The recent shift of paradigm to learner's outcome as the major aim of teaching and learning and the entry into the new information age has made it mandatory for technology to be infused and integrated into teaching and learning. This study assessed the extent of e-Learning utilization by technical education lecturer's for effective teaching and learning in Nigerian universities and The study revealed some of the e-Learning tools and the extent of utilization by industrial technical education lecturers. Furthermore, it revealed that most of the lecturers do not utilize the e-Learning tools their teaching and learning and hence were not quite knowledgeable about how to use them in teaching and learning. A vital pre-requirement to the effective utilization of e-Learning is the identification of the perceived challenges or barriers and this study did justice to that by identifying the bottlenecks to the successful utilization of e-Learning to include; cost of maintaining electronic devices, high cost of internet, preference of the 'talk and chalk' method over e-Learning, lack of technical support from ICT experts,

inadequate ICT infrastructure among others. In addition, possible solutions were proffered as strategies for improving e-Learning utilization among lecturers.

RECOMMENDATIONS

Based on the research findings, the following recommendations were made. The different school authorities should ensure that the e-Learning infrastructures are adequate and functional for industrial technical lecturers to utilize during the teaching and learning process. Professional development training programmes on e-Learning should be organized for industrial technical education lecturers enable them to acquire the basic computer skills and also methods in which they could utilize the electronic devices for e-Learning. A new curricular should be developed for teaching that will inculcate the use of e-Learning infrastructures and also proper orientation should be organized on how to use these devices to promote e-Learning. The government should allocate adequate fund for the development of e-Learning in our schools starting from the primary education through the tertiary institutions.

REFERENCES

- Adelabu, O.A., E.O. Adu and S.J. Adjogri, 2014. The availability and utilization of e-Learning infrastructures for teaching and learning. *Mediterr. J. Soc. Sci.*, 5: 1348-1355.
- Akinnuwesi, B., A.A. Adedoyin and M.A. Adegoke, 2007. A framework of Information and Communications Technology (ICT) for education in Nigeria. *Intl. J. Sci. Technol.*, 3: 34-47.
- Amedu, S.O., 2014. Assessment of the use of e-Learning facilities by home economics teachers in Delta State, Nigeria. *Assess.*, 5: 207-212.
- Anderson, J.E., 2002. Information and communication technology in education: A curriculum for schools and programme of teacher development. UNESCO, Paris, France. <https://ci.nii.ac.jp/naid/10020199258/>
- Asha, S. and C. Chellappan, 2011. Voice activated e-Learning system for the visually impaired. *Intl. J. Comput. Appl.*, 14: 42-51.
- Denis, N.F., 2014. e-Learning for university effectiveness in the developing world. *Global J. Hum. Soc. Sci. Res.*, 14: 1-9.
- Eke, F.C., 2011. Preparing today's youth for the changing world of technology: The role of technical education teachers. *Mediterr. J. Soc. Sci.*, 2: 71-74.

- Ezeahurukwe, J.N. and O.A. Johnson, 2011. The Nigerian Teachers and the Challenges of Utilization of Elearning for Instruction in Tertiary Institutions. In: Optimizing e-Learning Opportunities for Effective Education Service Delivery, Onyegegbu, N. and U. Eze (Eds.). Timex Enterprises, Enugu East, pp: 73-85.
- FRN., 2013. National Policy on Education. 6th Edn. NERDC, Abuja, Nigeria, Pages: 56.
- Garba, A.S., 2010. Refocusing education system towards entrepreneurship development in Nigeria: A tool for poverty eradication. *Eur. J. Soc. Sci.*, 15: 140-150.
- Hedge, N. and L. Hayward, 2004. Redefining Roles: University e-Learning contributing to lifelong learning in a networked world? *e-learning Digital Media*, 1: 128-145.
- Kasse, J.P. and W. Balunywa, 2013. An assessment of e-Learning utilization by a section of Ugandan Universities: Challenges, success factors and way forward. Proceedings of the International Conference on ICT for Africa, February 20-23, 2013, Harare, Zimbabwe, pp: 1-15.
- Kennedy, O.O., 2011. Reappraising the work skill requirements for building technology education in senior secondary school for optimum performance in Nigeria. *Intl. J. Acad. Res. Bus. Soc. Sci.*, 1: 24-37.
- Mmeremikwu-Fiac, C. and V.E. Onwukwe, 2018. Assessment of the extent of utilization of elearning opportunities for effective teaching and learning in business education. *Nigerian J. Bus. Educ.*, 3: 227-237.
- Nbina, J.B. and B. Vikoo, 2011. Utilization of information and communication technology for quality instruction in Rivers State University of Education, Port Harcourt: An assessment. *J. Emerging Trends Educ. Res. Policy Stud.*, 2: 74-80.
- Obara, J.K. and A.C. Abulokwe, 2012. Utilization of e-Learning for effective teaching of vocational education courses in Nigeria. *Intl. J. Res. Dev. Global Acad. Group*, 7: 1-8.
- Omoni, B.G. and N.G. Ifeanyichukwu, 2015. Business education students utilization of e-Learning in Anambra state tertiary institutions. *Intl. J. Sci. Res. Innovative Technol.*, 2: 120-125.
- Orji, C.T. and T.C. Ogbuanya, 2018. Assessing the effectiveness of problem-based and lecture-based learning environments on students achievements in electronic works. *Intl. J. Electr. Eng. Educ.*, 55: 334-353.
- Pirani, A.J., 2009. Supporting e-Learning in higher education: Road map, tools for navigating complex decisions. EDUCAUSE Centre for Applied Research, California, USA.
- Rosenberg, M., 2000. *e-Learning: Strategies for Delivering Knowledge in the Digital Age*. McGraw-Hill, New York, USA., ISBN:9780071362689, Pages: 344.
- Simon, B.R. and O. Ogom, 2015. Evaluation of the extent of utilization of electronic library resources and services by undergraduate students in university of calabar library, calabar-Nigeria. *Educ. J.*, 4: 82-89.
- Welsh, E.T., C.R. Wanberg, K.G. Brown and M.J. Simmering, 2003. e-Learning: Emerging uses, empirical results and future directions. *Intl. J. Training Dev.*, 7: 245-258.