Journal of African Studies and Sustainable Development. ISSN: 2630-7065 (Print)
2630-7073 (e). Vol. 3 No. 12. 2020
Association for the Promotion of African Studies

ICT SKILLS REQUIRED BY TEACHERS FOR EFFECTIVE TEACHING OF BASIC ELECTRONICS TO STUDENTS IN SECONDARY SCHOOLS DURING AND AFTER COVID-19 PANDEMIC IN MAINLAND LGA OF LAGOS STATE

Emmanuel I. Onyebuchi, PhD
Electrical/Electronic Department
Federal College Of Education (T) Akoka Lagos
Doi:10.13140/RG.2.2.34534.86085

Abstract
This study was carried to determine the ICT skills required by teachers for effective teaching of basic electronics to students in secondary schools during and after covid-19 pandemic in mainland LGA of Lagos State. Three research questions guided the study. Descriptive research design was adopted for the study. The population for the study was 67 teachers purposively chosen from colleges, polytechnics and universities in Lagos State. A – 30 item questionnaire was developed for gathering data. The questionnaire was validated by three Experts. Cronbach alpha reliability method was used to determine the internal consistency of the instrument, reliability coefficient value of 0.85 was obtained. Sixty seven copies of the questionnaire were administered and retrieved from the respondents. Mean and standard deviation were used for data analysis. The result showed that; 13 ICT skills are required by Teachers to operate computer for the effective teaching of Basic Electronics, 8 ICT skills are required by Teachers to access internet for effective teaching of basic Electronics and 9 ICT skills are required by Teachers to solve some computer problems for effective teaching of basic Electronics. It was recommended that all the identified skills should be packaged into a training programme and be utilized in retraining the teachers of Basic Electronics through workshops and seminars.
Keywords: ICT, Skill Teachers, Basic Electronics, Covid-19

Introduction

Coronavirus also known as COVID-19 can be defined as an illness caused by a novel virus. It is severe and acute respiratory syndrome. It was first discovered as an outbreak amidst respiratory illness cases in Wuhan city, Hubei Province, China (CDC, 2019). WHO declared the outbreak the outbreak of COVID-19 a world health emergency on 30th of January, 2020 (Gallegos, 2020; Ramzy, 2020). Coronavirus disease is an infection which is as a result of a novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (Zhong, Luo, Li, Zhang, Liu and Li, 2020). Coronavirus has resulted to total shutting of schools in about 213

countries all over the world with 91.4% of the total enrolled learners in these countries momentarily mandatory out of school (UNESCO, 2020). It is reported that 1.6 billion students transversely the world which are presently obliged to stay out of schools as social distancing is being enforced around the world so as to enclose the extend of coronavirus. Lockdown of schools is important in some continents such as: Africa, South America and some parts of Europe (UNESCO, 2020). Africa is one of the continents which educational system have been typically affected by the deadly disease as more than 98% of teaching and learning cannot be possible due to lockdown of the country. In shutting of schools across sub-Sahara Africa, 91 percent of learners that are affected are primary and secondary school learners (Anifowoshe, Aborede, Ayodele, Akinjo, Iretiayo and Ogunjemilua, 2020). Ngogi (2020) said that long period of learning would be lost for as long as the closures lasted because more cases are recorded daily. Kekie and Miladinovie (2016) note that schools are losing long period of learning because of coronavirus outbreak. The temporal damage is disruption of curriculum which could take a long time to be recovered while the big problem is that some students may never resume to school even when the outbreak is no more.

UNESCO reported that 89% of students in sub Saharan do not have right to use home computers and 82% do not have access to internet. Digital Global Overview Report (2020) reported that about 60 percent of people from Nigeria do not have access to the internet. According to the report, around 169.2 million people, 83 percent of Nigeria have right of entry to mobile phone connections. Therefore Information and communication will play a vital role during and after covid 19. Information and Communication Technology (ICT) defined as a diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information (Gunton, 1993; Victoria, 2002). ICT as a means of sharing information is no simply a connection between people but a link in the chain of the developmental process itself (Hudson, 1999). According to UNESCO (2002) "ICT is a scientific, technological and engineering discipline and management technique used in handling information, its application and association with social, economic and cultural matters". Information Communication Technology (ICT) are enabling technologies which include both hardware and software's necessary for delivering of voice, audio, data, videos tax and internet service from one point and associated equipment's that are connected via internet proto cold (IP) and non-IP network (Aluko, 2011). It involves all

internet- based communications as well as the general use of computer or electronic devices in storing, processing, and sharing information. In education as applied to teaching and learning, ICT encompasses all computing and communicating facilities and features that variously support the teaching and learning process.

ICT is divided into two main approaches in education such as; ICT for education and ICT in education. ICT for education implies the development of information communication technology for learning and teaching purpose while ICT in education involves the adoption of general components of information and communication technology in practical use in teaching and learning processes (Voogt & Pelgrum, 2005; Watson, 2006). ICT (Information and Communication Technology) is referred to as a part of learning – teaching process through a teacher. A teacher is an individual who is trained in pedagogy and technical area of a particular subject to impart knowledge, skills and attitudes to students. Teacher according to Encarta (2009) is somebody who teaches especially as a profession. In the context of this study, a teacher is a person who has been trained professionally in the art of teaching technical courses in automobile technology, building technology, electrical/electronic technology and woodwork technology to students in schools and colleges.

Teaching is the process of assisting an individual to acquire knowledge, skill and attitude through instruction. Ogwo and Oranu (2006) viewed teaching as the science and art of assisting a person to learn. The authors stated further that the science of teaching involves the use of acquired knowledge from natural and behavioural sciences in order to help appreciate the circumstance and personality of the learner while the art aspect of teaching involves the use of creative and administrative skills in aiding delivery of instruction. Olaitan, Alaribe and Nwobu (2010) added that teaching is the process of helping an individual to learn through instruction. Teaching in the context of this study is the process of assisting students learns the content of technology curriculum in schools and colleges through instruction by the teacher with the aid of ICT. Linways (2017) expressed that Policy - makers accepts that ICT in education can help the students to compete in the global economy by being part of a skilled workforce and facilitate social mobility by Enhancing learning experiences and providing new sets of skills, Reaching more students with Massive Open Online Courses (MOOCs), Facilitating the training of

faculties, minimizing costs and saving time associated with information delivery and automating regular day-to-day tasks, improving the administration of institutions to enhance the quality and efficiency of service delivery among others. However, for optimum utilization of information and communication technology (ICT) the instructors must be equipped with vast knowledge and skills needed for implementation.

Skill is the ability to perform something well. Skill according to the business dictionary (2019) refers to the ability and capacity acquired through deliberate, systematic, and sustained effort to smoothly and adaptively carryout complex activities or job functions involving ideas (cognitive skills), things (technical skills), and/or people (interpersonal skills). It is the ability to carry out a task with determined results often within a given amount of time, energy, or both which requires special training and knowledge. Besides Allyson (2019), who defines skill as a particular category of knowledge, abilities, and experience necessary to perform a job; noted that skill can either be soft skill or hard skill. Soft skills are interpersonal or people skills. They are somewhat difficult to quantify and relate to someone's personality and ability to work with others. This in-demand skill includes good communication, listening, attention to detail, critical thinking, empathy, and conflict resolution abilities, among other skills.Hard skills are quantifiable and teachable: they include the specific technical knowledge and abilities required for the teaching of basic Electronics

Basic Electronics is one of the vocational courses offered at the upper level of the Nigerian secondary school system. It is a branch of science and technology which deals with the study of the flow and control of electrons in electrical circuits and their behaviour and effects in vacuums, gases, and semiconductors. The objectives of the curriculum are to: (i) support understanding of the basic electronic components in addition to circuits; (ii) lay a good foundation for communication and control systems; (iii) provide a foundation for creativity and technological development in electronics; and (iv) stimulate, develop and enhance entrepreneurial skills in electronics (Nigerian Educational Research and Development Council (NERDC, 2007). In order for these objectives to be realized, teachers of electronics, apart from being versed in the subject matter, needs to be skilled in the use and application of ICT for appropriate instructional delivery. changes in terms of quality have been achieved with regards to teachers' performance and classroom interactions. ICT, as an industrial revolution, has

brought about a new era of Information and Communications followed by information society, where ICT is among its main elements. Acquisition of ICT skills by teachers will enabled better and swifter communication, presentation of ideas in a more effective and relevant way. It is an effective tool for information acquiring-thus students are encouraged to look for information from multiple sources and they are now more informed them before. For effective implementation of certain student centric methodologies such as project-based learning which puts the students in the role of active researches, Information communication technology becomes the appropriate tool, Thus, training of Electrical/Electronic teachers in ICT skills is the way to go during and after covid 19.

Effective teaching can be defined in many ways including teacher behavior (warmth, civility, clarity), teacher knowledge (of subject matter, of students), teacher beliefs, and so forth. It is defined as the ability to improve student's achievement. Effective teaching should be considered only in relation to effective learning. Most studies emphasized that for an effective teaching, qualities such as knowledge of subject matter, skills in instruction and personal qualities are useful when they work with students. When more importance is given to personal qualities, effective teachers are described as energetic enthusiastic, imaginative, having a sense of humor etc. If the teaching skills and knowledge of subject matter are considered effective teachers, are viewed as being masters of subject they teach, having ability to clarify ideas, able to establish relationships, able to elicit maximum participation of students, creative, and reasonable among others. In the words of Akudolu in Igweh (2013) effective teaching is the deliberate effort by a mature or experienced person to impact information, knowledge, skill and so on to an immature or less experienced person through a process that is morally and pedagogically acceptable. However effective teaching requires a shift in the traditional or conventional method of instructional process to a technological inclined method which includes the use of information and communication technology (ICT).ICT is becoming a driving force for educational reforms and that information communication technologies have become an integrative part of national education policies and plans in Nigerian tertiary education. In the field of education, implementation of appropriate ICT skills can play an essential role for the effective teaching of basic electronics in senior secondary schools and learning of students. ICT play a role as a catalyst in education, to enhance the speed of teaching learning process among basic electronic teachers as well as students

offering the subject. Therefore, there a need to ascertain the ICT skills required byElectrical/ElectronicTeachers for effective teaching of basic electronic in senior secondary school in Lagos State

Statement of Problem

It is evident that most advanced countries invest more in the area of information communication technology(ICT) as a key instrument in the field of education more specifically in instructional process that is, from the stage of operation, access, to problem solving stage. Technology- based teaching and learning offers various interesting ways which includes educational videos, stimulation, storage of data, the usage of databases. Previous researches proved that use of ICT in teaching will enhance the learning process and maximizes the students' abilities in active learning. However, increasing implementation of ICT in schools does not ensure effective use of the tools by teachers to improve student outcome. Therefore, the skills in manipulating and using ICT tools for effective teaching should first be established. Result from past researches have shown that teachers have a keen desire to use ICT tools in teaching and they are aware of its existing potential in the field of education; but most teachers are facing difficulty on the knowhow and the required ICT skills needed for effective teaching and for implementation of methodologies which puts the students in the role of active learning, Information communication technology becomes the appropriate tool, Thus, training of basic Electronic teachers in ICT skills is the way to go during and after covid 19. Hence, this work is focused on determining the ICT skills required by teachers of electrical electronics for effective teaching of basic electronics in senior secondary schools in Lagos state. The purpose of this study was to determine the ICT skills required by teachers for effective teaching of basic electronics to students in secondary schools during and after covid-19 pandemic in mainland LGA of Lagos State. Specifically, the study sought to determine;

1. ICT skills required by Teachers to operate computer for effective teaching of basic electronics?
2. ICT skills required by Teachers to access Internet for effective teaching of basic electronics.
3. ICT skills required by Teachers to solve some computer problems for effective teaching of basic electronics.

Research Questions

The following questions guided the research study;

1. What are the ICT skills required by Electrical/Electronic Teachers to operate computer for effective teaching of basic electronics?
2. What are the ICT skills required by Electrical/Electronic Teachers to access Internet for effective teaching of basic electronics?
3. What are the ICT skills required by Electrical/Electronic Teachers to solve some computer problems for effective teaching of basic electronics?

Methodology

The study adopted survey research design. Ayoade (2013) described survey research design as type of design to get detailed information that describes the existing phenomena of identified problems which justifies current conditions and practices to determine what others are doing with similar problems or situations and benefit from the experience and to make future plans and decision. This design was suitable for this study since it's aimed at identifying Skills. This study was conducted in Lagos-State south-western Nigeria. There are 16 colleges in Lagos-State but only 5 are offering Basic Electronics courses.

The population for the study was 67 Teachers of electrical/electronic technology in Colleges, polytechnics, college of education (Technical), and universities in Lagos State. The entire Teachers were involved in the study because of the manageable size. Therefore there was no sampling. Structured questionnaire was used as the instrument to collect data from the respondents. The questionnaire contained 30 items structured in-line with research questions. The questionnaire was divided into five main sections. Section A was used to obtain personal information from respondents. This section covered items 1-3 with options and blank space to enable respondents to complete as appropriate. Section B of the instrument dealt with research questions

The instrument was subjected to face validation by three experts, Two experts from Department of Technology and vocational Education, Ebonyi State University, Abakaliki, Ebonyi State and one expert from Federal College of Education (Technical), Akoka Lagos State. Each expert was served with a copy of the instrument and was requested to identify ambiguities and ensure that items were clearly stated and appropriate for the research questions. In order to

determine the reliability of the instrument, 20 copies of the questionnaire were administered to teachers of electrical/electronic technology in Ogun State, South West, Nigeria. The internal consistency of the instrument was computed using Cronbach alpha. The overall reliability coefficient of the instrument was 0.85. Since reliability coefficient of above 0.60 was obtained, the instrument was considered reliable for use in the present study. This is because, according to Ogbazi and Okpala (1994), if the correlation coefficient obtained on an instrument is up to 0.60 and above, the instrument should be considered good enough to be used for a study.

Copies of the questionnaire were administered to 67 Electrical/electronic teachers in Lagos State with the help of five research assistants. The research assistants were selected within the State and instructed by the researcher on procedures for administering the instrument so as to ensure safe handling. The same research assistants went round after two weeks to collect the copies of the administered questionnaire from the respondents. Sixty seven copies of the questionnaire were administered, and all were retrieved back which represented hundred percent return rate.

The data collected for the study was analyzed using Mean and standard deviation to answer the research questions. In deciding on the items, any item with the mean value of 2.50 or above was considered as required. While any item with the mean value of less than 2.50 was considered as not required

Results

Results for this study were obtained from the research questions answered through data collected and analyzed.

Table 1: Responses of the Teachers on ICT Skills required by Electrical/Electronic Teachers to Operate Computer for Effective Teaching of Basic Electronics

S/NO	**Item Statements**	$\bar{x}$	**SD**	**Rmks**
1	Manipulate a mouse proficiently	3.22	0.79	Required

2	Demonstrate ability on computer, sign onto the network, restart, and shutdown	3.18	0.67	Required
3	Demonstrate ability to start and end a program	2.66	0.78	Required
4	Demonstrate ability to print student work	3.44	0.66	Required
5	Use the server to save and retrieve student work	3.27	0.60	Required
6	Use formal keyboarding skills with home keys and correct posture	2.74	0.61	Required
7	Type 10-15 words per minute	3.10	0.61	Required
8	Use paint or drawing tools changing colours, shapes, and size to create a graphic	2.73	0.75	Required
9	Demonstrates word processing skills	3.33	0.74	Required
10	Change the margins, line spacing and use bullets	3.29	0.74	Required
11	Create and use indents, tabs, change margins, line	3.19	0.79	Required
12	Create a short power pointpresentation using pictures, text, sound, and animation	3.28	0.67	Required
13	Introduction to basic charts and graphs in excel	2.77	0.78	Required

Keys; X= mean, SD=standard deviation, decision X≥ 2.50 Agree

The data presented in Table 1' revealed that all the I3 items had their mean values ranged from 3.44 to 2.73. This showed that the mean value of each item was above the cut-off point of 2.50, indicating that all skills are ICT skills required by Electrical/Electronic Teachers to operate computer for effective teaching of basic electronics. The Table also showed that the standard deviations are within the

range of 0.60 to 0.79. This indicated that the mean values of the respondents were not far from one another in their responses.

Table 2: Mean Responses of the Teachers on ICT skills required by Electrical/Electronic Teachers to access Internet for Effective Teaching of Basic Electronics

S/NO	Item Statements	$\bar{X}$	Sd	Rmks
1	Properly download files from internet to student's own folder	3.24	0.60	Required
2	Can save and organize files for various software applications	3.37	0.68	Required
3	Demonstrate an advanced ability to navigate between websites	3.45	0.48	Required
4	Understand basic ethics of computer and internet use	3.06	0.47	Required
5	Use the internet for basic research; citing electronic sources	3.43	0.46	Required
6	Evaluate the accuracy, relevance, appropriateness, and bias of electronic information sources	3.55	0.45	Required
7	Understand basic internet URL addresses and basic extensions	3.43	0.60	Required
8	Use Blogs and other forms of web communication; such as email, Polycom, online discussions.	3.35	0.68	Required

Keys; X= Mean, SD=standard deviation, decision X≥ 2.50 Agree

The data presented in Table 2 revealed that all the 8 items had their mean values ranged from 3.06to3.55. This showed that the mean value of each item was above the cut-off point of 2.50, indicating that all skills are ICT skills required by Electrical/Electronic Teachers to access Internet for effective teaching of basic electronics. The Table also showed that the standard deviations are within the range of 0.45 to 0.68. This indicated that the mean values of the respondents were not far from one another in their responses.

Table 3: Mean Responses of Teachers on ICT skills required by Electrical/Electronic Teachers to Solve Some Computer Problems for Effective Teaching of Basic Electronics

S/NO	Item Statements: ability to solve	$\bar{X}$	Sd	Rmk
1	Computer start up or shut down	3.58	0.62	Required
2	system reboot when app. Is hanging	3.47	0.72	Required
3	Connect System to electrical power	3.65	0.49	Required
4	Format computer problems	3.58	0.60	Required
5	Install Programs on your computer,	3.51	0.68	Required
6	Solve Technical hitches about computer programs' performance	3.65	0.48	Required
7	Ability to connect to the Internet	3.67	0.47	Required
8	Change computer faulty RAM	3.69	0.46	Required
9	Replace bad Hard disk	3.71	0.45	Required

Keys; X= Mean, SD=standard deviation, decision X≥ 2.50 Agree

The data presented in Table 3 revealed that all the 9 items had their mean values ranged from 3.71 to 3.47. This showed that the mean value of each item was above the cut-off point of 2.50, indicating that all skills are ICT skills required by Electrical/Electronic Teachers to solve computer problems for effective teaching of basic electronics. The Table also showed that the standard deviations are within the range of 0.60 to 0.79. This indicated that the mean values of the respondents were not far from one another in their responses.

Discussion of Results

It was found that teachers needed ICT skill in operating computer, using the computer to access the internet and solving problems arising from the use of the

computer and internet in teaching basic electronics. This result is in agreement with Miller, Bakare and Ikatule (2010) who conducted research on professional capacity building needs of teachers for effective teaching of basic technology curriculum to students in junior secondary schools in Lagos State. The authors found out that teachers of basic technology needed skills in teaching contents of basic technology curriculum to students in junior secondary schools.

The results of this study was also in agreement with the finding of Ellah (2007) who in a study carried out on competency improvement needs, The author found out that the teachers needed access and problem solving skills in their subject. The findings of the above authors help to validate to the finding of this study on ICT skills required by teachers for effective teaching of basic electronic in in secondary schools in Lagos state Nigeria.

Conclusion

From the results of this study it was discovered that teachers needed ICT skills in areas of computer operation, use of computer to access the internet and solving problems arising from the use of the computer and internet for effective teaching of basic electronics. The identified skills will help teachers to overcome some of the inadequacies they encounter in the teaching of basic electronics. It is therefore recommended that the identified skills should be packaged into a training programme and be utilized for retraining the teachers through workshops and seminars.

References

Akukwe, A. C. (2003). *Computer studies: An introduction*. Owerri: Career Publishers.

Alegbemi, R. (2010). *Computer.* Retrieved on 19/08/2010 from www.wikipediacomputer.com

Ann, D. (1996). *Capacity Building in Social Justice Organization, Ford Foundation.* Deborah Linneli Published by the Alliance for nonprofit management

CDC. (2019). *Coronavirus Disease 2019. (COVID-19): How COVID-19 spreads*. Accessed 27 January, 2020

Ebaye (2007). Competency Improvement Needs of Automobile Mechanics Teachers in Technical Colleges in Cross River and Akwa Ibom States.

An Unpublished M.Ed Project Submitted to the Departmentof Vocational Teacher Education, University of Nigeria, Nsukka

Ellah, B.I. (2007). Effectiveness of Quality Assurance Curriculum frame factors on Implementation of Agricultural Education Programme of Colleges of Education in Eastern Nigeria. *An Unpublished Ph.D Thesis, Department of Vocational Teacher Education, University of Nigeria, Nsukka*.

Miller, I.O. Bakare, J.A. & Ikatule, R.O. (2010). Professional Capacity Building Needs of Teachers for effective Teaching of Basic Technology Curriculum to Students in Junior Secondary Schools in Lagos State. *A Paper presented at the Annual National Conference of curriculum organization of Nigeria held at Ebonyi State University.*

Olaitan, S. O. & Dada, A (2009). Farm Tools, Equipment and Machines in the Tropics. *Unpublished Manuscripts.*

Olaitan, S. O., Ali A., Eyo E. O. & Sowande K. G. (2000) *Research Skills in Education and Social Science.* Owerri: Cape Publishers International Ltd.

Olaitan, S. O., Alaribe, M. O. & Nwobu, V.I. (2010). Capacity Building Needs of Teachers for Effective Teaching of Agriculture Curriculum in Upper basic schools in Abia state. *A Paper presented at the 12th Annual National Conference of Nigerian Association of Educational Researchers and Evaluators (NAERE) on Educational Reforms and Human Capital Development*

Ogwo, B. A. and Oranu, R.N. (2006). *Methodology in Formal and Non Formal Technical and Vocational Education.* Enugu: University of Nigeria, Nsukka.

Technoteachers Association.(2010). *What is Technoteachers*? Retrieved on 20/09/2010 from www.ieeexplore.ieee.org/xplore/login.jsp?url.

Ukonze, J. A. & Olaitan, S. O. (2009) *professional competency – capacity building needs of teachers for effective teaching of agricultural science in Anambra State.* Paper presented at the 11th Annual Conference of Nigerian Association of Educational Researchers and Evaluators on Educational Research and School Supervision. July 8th to 11th 2009