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RESEARCH ARTICLE

Information and Communications Technology (ICT) Training in Secondary Schools

Ochei, Charles U. and Opara, Uzoma P.

Department of Computer Science
Abia State University

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ABSTRACT

This paper discusses the method and challenges of teaching Information and Communications Technology (ICT) in Secondary Schools. From everyday observation as well as from research results, there are peculiar problems and setback with these computers and related devices. For instance, internet has a problem of low penetration in Nigeria owing to its high cost of acquisition, computer sets are no readily available because of the high costs. Also there is deficit in qualified personnel for manning and maintaining these computer/ICT facilities in schools. Other studies indicated that there is dearth of trained teachers for ICT, lack of facilities, infrastructures and equipment.

Keywords: *Information and Communications Technology, (ICT) Training, Secondary Schools, Computer Science*

1. Introduction

Education has been identified as a vital tool for any form of development either economical, social or political, adaptation and survival which emanate from teaching and learning that gears towards the actualization of curriculum goals (Okekeokosisi, Anaekwe & Okigbo, 2016). It is a factor that determines the state of prosperity substance of welfare and security of people. The yearnings, needs, aspirations as well as the cultural heritage and environment of any society determine to a large extent the kind of knowledge and skills to be acquired (Adeobosin, 2004). This leads to the introduction of National Policy on Education (NPE).

The National Policy on Education (NPE) depicts that there is need for functional and effective ICT Education application for promotion of a progressive, and united Nigeria. The school program therefore needs to be relevant, practical and comprehensive (NPE, 2013). An effective application of computer and ICT (Information and Communications Technology) generally for classroom curriculum delivery in Nigeria can be achieved when the educational system is tailored towards the actualization of goals of selfrealization, better human relationship, individual and natural efficiency, effective citizenship, national consciousness, national unity, as well as towards social, cultural, economic political, scientific and technological progress (NPE, 2008). ICT promotes acquisition of knowledge and career development for self reliance when used effectively, it equally uplifts educational qualities for real life situation (Ezegbe, Idu and Mezieobi, 2013). This is even more succinct when teaching subjects like basic technology to secondary school students.

Basic Technology as a subject in junior secondary school, encompasses a wide range of practical life that is done at the junior secondary school (upper basic school) level. Introductory Technology now termed Basic Technology is one of the pre -vocational subjects providing students with a process of orientation in production and consumption through experiences in planning, producing, testing, servicing and evaluating types of consumer and industrial goods (Uwameiye & Onyewadume, 2009).

Basic Technology is an integrated subject comprising of Woodwork, metalwork, building technology, automobile mechanics, electrical, electronics and technical drawing at their basic level (Opoola and Adeniyi, 2013). It is obvious from the above that the basic technology as a subject encompasses the use of computer. In other words, to be able to sufficiently teach the subject, computer must be integrated as a requirement for the practical course content.

Today, the use of computer gadgets to teach contents in Basic Technology has even proved to be a better teaching aid (Dike, 2014). This claim is supported by UNESCO's Information and Communication Technology Competency Framework for Teachers (ICT CFT) (2011) which highlighted gains in using ICT to teach students. Some of the gains include; the fact that use of computer or ICT gadgets to teach students makes the content taught more interesting to the students and sustains their attention as new technological device is used to learn and this makes contents taught to appear interesting and fun.

Evaluating the integration of identified computer gadgets to the teaching and learning of basic technology in Nigerian secondary schools is the major focus of the present study, as effective use of these gadgets is believed to translate into better performances in the subject and generally add to achieving the goals of the Nigerian Education Policy.

Statement of the Problem

Evidences abound that computer can be used to effectively facilitate learning. Report on effective use of computers or ICT facilities in teaching Basic Technology in secondary schools in Enugu State however remains unknown but it is obvious that it is grossly low.

The call for application of computers in secondary education is to infuse and inject efficiency and effectiveness in curriculum implementation. However, in developing countries like Nigeria, e-learning is challenged with the problem of material devices such as computer, computer laboratories, internet and e-mail facilities, videophone

systems and teleconferencing devices, fax and wireless applications, digital library, digital classrooms, multimedia systems and the problem of multimedia courseware development among others (Global Information Technology Report, 2005) . Furthermore, the level of availability of these computer devices is one of the greatest challenges to their application in the education system in Nigeria.

From everyday observation as well as from research results, there are peculiar problems and setback with these computers and related devices. For instance, internet has a problem of low penetration in Nigeria owing to its high cost of acquisition, computer sets are no readily available because of the high costs. Also, there is deficit in qualified personnel for manning and maintaining these computer/ICT facilities in schools. Other studies indicated that there is dearth of trained teachers for ICT, lack of facilities, infrastructures and equipment (Ikemenjima, 2005; and Jegede & Owolabi, 2008).

It is against this background that the present study is carried out to evaluate the use of computers in teaching and learning of Basic Technology in secondary schools in Enugu East Local Government Area of Enugu State.

Purpose of the Study

The purpose of this study is to evaluate the use of computer in teaching and learning of Basic Technology in secondary school, a case study of Enugu East Local Government Area of Enugu State. The specific objectives are:

(1) To determine the availability of computers/ICT devices for teaching and learning Basic Technology in Junior Secondary Schools in Enugu East Local Government Area;
(2) To ascertain the extent to which trained/qualified personnel are integrated into the teaching and learning of Basic Technology in Junior Secondary Schools in Enugu East Local Government Area;
(3) To examine the extent of application of available computers and computer related facilities in teaching and learning Basic Technology in Junior Secondary Schools in Enugu East LGA;
(4) To determine strategies for improving computer application in the teaching and learning of Basic Technology in Junior Secondary Schools in Enugu East LGA.

Research Questions

The following questions guided the study:

(1) What are the available computers/ICT devices for teaching and learning Basic Technology in Junior Secondary Schools in Enugu East Local Government Area?
(2) To what extent are trained/qualified personnel integrated into the teaching and learning of Basic Technology in Junior Secondary Schools in Enugu East Local Government Area?
(3) To what extent are the available computers and computer related facilities applied in teaching and learning Basic Technology in Junior Secondary Schools in Enugu East LGA?
(4) What are the strategies for improving computer application in the teaching and learning of Basic Technology in Junior Secondary Schools in Enugu East LGA?

2. Review of Related Literature

Conceptual Framework

Computer or Information and Communication Technology (ICT)

The concept of information and communication technology is used to describe an array of technological gadgets ranging from computer to modern media gadgets which are primarily used to share and communicate information. Information and communication technology' (ICT) is the catch – phrase used to describe a range of technologies for gathering storing retrieving processing analyzing and transmitting instruction (Uroko, 2016). The term Information according to Obiakor M. I. (2018) can be viewed as crude data that are processed into meaningful form: she further

stressed that it is a vital result from data. Thomas & Ballard (2005) cited in Uroko (2016) stated that information is never valuable unless it is communicated in the right way to the user.
Communication on the other hand is a process of information dissemination. This information may be fact told, heard or discussed. Communication covers a wider spectrum than information. Communication according to Laudon (2017) is the process of transmitting information and understanding from one individual to another. In the view of Hadiza (2009) as cited by Uroko (2016), it is an interpretive medium of self – expression. The material are just like tools with which the communicator expression his or her creative ideas. Also communication is a transaction: symbolic process which gives people the opportunity to relate and manage the environment by establishing human contact, exchanging information, reinforcing the attitude and behaviors of others (Ike, 2009). On the same line communication is a process of information exchange between two or more individuals or organization. Thus communication is a two – way process which involves imparting information to people (Danape, 2010).
Technology is the systematic application of scientific or other organized knowledge to practical tasks in schools and industries (Okeke, 2016). It is a complete integrated process for analyzing problems controlling and evaluating those problems. Teaching using technology is seen as a complex integrated organization of men and machines ideas procedure and management. It also includes process system management and control mechanism involving human and non – human (Imogie, 2008). Communication technologies include all media employed in transmitting audio, video, data and multimedia messages through hosts such as cable satellite wireless radio, infra-red, Bluetooth and Wi-Fi. Network technologies include personal Area Network (PAN), Campus Area Network (CAN), internets extranets Location Area Networks (LANs), Wireless Area Networks (WANs) and the internet (Danape, 2000). Computer technologies include all removable media such as optical disk (a rigid computer storage disk with data stored as tiny pits in the plastic coating, readable by laser beam), disk flash memories, video books, multimedia projectors, interactive electronic board and continuously emerging state of-the-art personal computer Mobile technologies comprising mobile phones, personal digital assistance (PDAs) and palmtops. These technologies have made global information easily accessible.

Vincent & Vincent (2005) cited in Uroko (2006), defined information technology as new way of storing, processing and transmitting information which was brought about by rapid development in electronic computing. Information and communication technology (ICT) also is seen as the study of concepts skills processes and applications of designs for representing hypothetical or human relationships created, collected, stored, retrieved, manipulated, protected and presented electronically. It refers to a whole range of technologies involved in information processing and electronic communications.

French (2006) defines ICT as “a broad based technology including methods management and application that supports the creation, storage, manipulation and communication of information. Information and communication technology can also be seen as a modern way of making information easily accessible to most people. According to Nworgu (2006), ICT originated as information technology but it later became obvious that the communication component ought to be highlighted because of its significance. It was then that the concept transformed to information and communication technology (ICT).

Four major approaches according to the UNESCO-ICT framework; have been identified for effectively employing ICT in education. They are the Emerging, Applying, Infusing and Transforming approaches that constitute ICT optimization stages in education. These approaches are simultaneous and depend on each other for maximum benefit from ICT application to teaching. Information and communication technology (ICT) for this study is an electronic based technology generally used to collect, store, process and package information as well as providing access to knowledge. More also, it includes various technologies and their application such as the use of computer micro – electronic devices and satellite and communication technology. It is the processing, maintenance and the use of all forms of computer communication network and mobile technologies to mediate information.

Basic Technology as a Subject

Basic Technology, formerly known as Introductory Technology was structured to assist learners to develop interest in technology. The aim is that by the end of the junior secondary school, presently known as basic 9, technological

appreciation would have been activated and sustained, and foundation laid for students' entrance into a vocation of their choice (Uwaifo and Edigin, 2011).

For Daluba and Ekeyi (2013), introductory technology is one of the pre-vocational subjects offered at the junior secondary schools in Nigeria. It is a preparatory core subject of vocational and technical education. It comprises of areas such as carpentary, joinery, masonry, machine fitting, metal fabrication, motor mechanics, automobile and general works etc.

Similarly, Ogbuagu, Eyibe and Okoli (2014) explained that Basic Technology is a subject that introduces students at the junior secondary level of education in Nigeria, to the fundamental tips in technology. The title Introductory technology as a subject, came with the introduction of the now defunct 6.3.3.4 system of education, (this means six years of primaryeducation, three years of junior secondary education, another three years of senior secondary education and of course, four years of tertiary education.) However, with the current 9.3.4 system of education, (this means nine years of basic education, three years of senior secondary and four years of the tertiary education), the title changed to Basic Technology. Noteworthy in the curriculum for the new system, is the subsuming or a technical of primary science and integrated science to form a formidable unity known as Basic science and Technology. This synthesis helps to prepare a child adequately to undergo studies in the mainline science. The National Policy on Education (NPE: 2004) defines Basic Technology as the aspect of education which leads to acquisition of practical and applied skills as well as basic scientific knowledge. It is also a subject that deals with the fundamentals of engineering and technology. In order to reduce ignorance in relation to technology and help lay a solid foundation for true national development, Basic Technology has been accorded a place in theschool curriculum as a core subject like English and Mathematics.

According to the Federal Ministry of Education, Science and Technology (FMST) (1985) as adopted in the National Education Policy (NPE, 2004), the objectives of introductory technology as one of the pre-vocational subjects are;

i. to provide pre-vocational orientation for further training in technology;

ii. to provide basic technological literacy for everyday living ,

iii. to stimulate creativity.

The above is in consonance with the statement in the National Curriculum for Junior Secondary Schools (1998), which states amongst others, that in order to reduce ignorance about technology, help lay a solid foundation for national development and for increase in skill acquisition, the subject of Basic technology is to be offered in junior secondary schools.

The management of Basic technology workshop should be such that at the end of the programme, the products would appreciate technology and practice it. The implication of management of Basic technology workshop is that more than anything and anywhere else, the management of Basic technology programme should be directed toward achieving alteration of human conception of literal education towards technology, which is the new world orientation. This can take place in no other place than in the effectively managed and organised workshops (Uwaifo and Edigin, 2011).

Computer Facilities for Effective Teaching and Learning Basic Technology

The ICT facilities which can be used in the teaching and learning of Basic Technology are of two components:

1. Hardware components

2. Software components

The hardware components comprise of all the necessary physical (tangible) materials or equipments used as an information and communication technology component like monitor, projector, microphone, central processing unit or a computer (CPU), keyboard, mouse, camera machine etc. According to Eya (2009), the hardware components of ICT which could be used to facilitate learning can be broadly divided into three categories;

1. The projected media materials (equipment)

2. The non – projected media materials

3. Audio materials (equipment).

According to him, the projected media are those equipments through which images of all sorts are displayed by the means of light and electrical waves made visible on screens or monitors. Examples include personal computer system, lap tops, televisions, projectors, phones etc. These media materials can be used during teaching learning situation to project and display both life and animated images of various concepts and topics in Basic Technology showing step by step written analogies of teachings and research discoveries in Basic Technology available to the teacher.

The non–projected media are those equipment that can be used to produce illustrative or graphic materials like flat pictures, charts, maps, graphs, Journals, Cameras, digital and analogue scanning machines, printing machines and so on. Pictures of various stages of economic development and industrialization can be used by the teacher during the teaching and learning processes by the use of these non–projected media of ICT. The audio equipment are those ICT equipments that are used in transmitting and recording of audio (sound) contents e.g. Radios speakers, amplified public address systems, CDs, diskettes, micro phone recorder etc. They are used extensively especially in teaching large classes.

The software dimension on the other hand. Refers to the virtual or in most case the immaterial part of the ICT component which works in an integrative way with the hardware to collect, Analyze, Process and transmit the output for users' consumption. It comprises of the electronically or otherwise integrated artificial intelligence into the hardware which controls their activities in producing the desired media effect from them. They can be in form of programmes installed into computer system. Film strips in projector, Films in cameras; without them, the hardware will be useless in teaching and communicating Basic Technology instructional materials to the teacher and the learner. They also include the power point spreadsheets, database, coral draw, etc. These software packages are of great relevance to teaching; for instance, the introduction of Statistical Packages for Social Sciences (SPSS) have made the hitherto cumbersome task of estimating the reliability coefficient of research instruments, and running factor analysis for instruments containing items measuring constructs. These software and many others are used both at the local and international level to input, analyze and process Basic Technology theories and principles for the purpose of interactive teaching of the subject in a quite engaging atmosphere.

Other ways through which ICT can be used to improve teaching and learning of Basic Technology in our secondary schools include the use of print and the non-print media and through the electronic and non-electronic media in processing, analyzing, storing, retrieval and transferring of Basic Technology information and studies from the teacher to the learner. DVDs, diskettes, scanning machines, printers, phone and satellites etc can also be used as instructional materials in aiding the teacher electronically demonstrate content he or she is teaching.

Through the use of ICT facilities as instructional materials for teaching Basic Technology, learners are developed beyond the boundaries of the four – walls of the classroom to be global challengers and competitors. According to Ofoefuna, (2001), information can now be generated stored retrieved and transmitted at lightning speed in the privacy of people's bedrooms; people can now see and hear any part of the world. The introduction of satellite and computer technology into educational has placed knowledge at every ones doorstep. Distance learning and teaching have therefore developed more than ever before. The psychological and philosophical base of learning

and teaching have been explored expanded and emphasized so also are the media sharp instruments have been used to evaluate the objectified instruction.

Furthermore the knowledge and the skill of the teacher as the main implementer of the Basic Technology curriculum can be improved upon by this major role of information and communication technology in the teaching methodology of the subject using ICT facilities. The illiterate of the century will no longer be those who cannot read and write but those that do not adapt themselves to the current trend of the ICT in their applications in so many areas of life argued Alvin (2002). The other non-ICT methodologies of teaching Basic Technology are fast fading out both in relevance and effectiveness which points out the indispensability of ICT facilities and strategies in teaching Basic Technology in consonance with the digital information age which is the main feature of the 21st century.

Relevance of Computer in the Teaching of Basic Technology

The roles of information and communication technology in the teaching of Basic Technology can be divided into electronic and non-electronic dimension. The electronic means involves equipment that make use of the passage and conduction of electric current to operate while the non-electronic ICT does not require the passage of electric current to operate like the cameras and some print media facilities like type-writer and even handsets. ICT is an instructional material in education and has number of roles it plays in the teaching of Basic Technology. The roles played by information and communication technology can be organized into three major categories:

1. The role of ICT in storing and retrieving information. This role entails the use of ICT in storing information taught in the classroom over a long period of time, to be retrieved when needed. ICT materials which may be used to perform this role of ICT in teaching of Basic Technology include; the tape recorder, video tapes, CDs and DVDs, diskettes, flash drives, film strips and papers (print media).

2. The role of ICT in manipulating and analyzing data in the course of teaching and learning of Basic Technology. This role of ICT entails the use of ICT facilities like the monitors, projectors, and some software packages like Microsoft excel in displaying, enlarging, projecting, processing and organizing data and information while teaching is going on. According to Ofoefuna & Eya, (2009), this property enables us to have vicarious experiences. Media can give us near concrete experiences in some situation where we could have been left with only abstract experiences.

3. The third role played by ICT in teaching and learning of Basic Technology is the distributive role in which ICT facilities can help the teacher to reach out to many learners in different locations at same time. ICT equipment which can be used to perform this task are facilities like the Cable television networks, radio, news papers, magazines and the internet etc. These ICT facilities can be used to form teaching pedagogies and the teacher needs to be competent in using them effectively in teaching.

According to Nwosu (2003) the utilization of ICTs in education could lead to cost-effectiveness in learning, bridging the gap between teachers-students' ratio, and improve the overall quality of learning. However other benefits of I CTs in education, according to Bam and Orwig (1995), as follows:

1. **Multiple Sensory Deliveries:** ICTs in teaching home Basic Technology will provide multiple sensory channels, thereby allowing students with various learning preferences to assimilate and apply the knowledge.

2. **Motivation**: Motivating students is a constant challenge to home Basic Technology lessons. Multimedia instructions could inspire students and ho me Basic Technology teachers by making learning exciting, relevant and rewarding.

3. **Increased Self expression and Active learning:** ICTs provide stimulating environments that encourage students' involvement in the learning process

4. **Promoting Critical Thinking**: Both the structure and the use of technology could promote higher level of thinking.

5. **Enhanced Communication Skill:** The communication skills of students are enhanced when appropriate technologies are utilized in home Basic Technology lessons.

6. **Multicultural Education:** Telecommunications, internet, teleconferencing and telecommuting make it possible to expand classroom "walls " and to link students and international interactive exchanges.

7. **Individualization**: ICTs offer students broad and self paced learning by allowing them to progress at their own rate in a non threatening environment. This is vital especially in home Basic Technology programmes w here individualized assignment is highly encouraged.

Computer Skills Requirements of Basic Technology Students

Several authors have come out with different ICT skills required to fit into the technologically driven society. McDonald (2004) highlighted the following ICT skills in using computer-based technologies to manipulate, create, store and retrieve information to express ideas and communicate with others as: ability to type sentences, change text alignments, change margins and line spacing; understand cut, copy and paste. Others are, the understanding of the database, spreadsheet etc., he further states the basic computer skills required to include: knowing various computer operations such as turning computer on, opening a folder, copying a file from one drive to another, scanning. He also mentioned the use of software such as creating a new word processor document, modifying an existing word processor document, printing out documents among others. Therefore, the following ICT skills are very essential for a business studies teacher for effective instruction: computer appreciation skill, word processing skills, internet skills and data processing skills.

(1) Computer Appreciation Skills: A computer basic skill involves the use of computers efficiently. Skills on the other hand can simply be put as the ability to do things well. Computer appreciation skill can be regarded as the potentials one acquires that makes him or her capable of operating and using the computer efficiently. Performing basic operations like starting a computer, using the mouse, managing various windows, etc, may seem like a puzzle to one who has never seen a computer. Allison (2015) stated that skills such as turning computer on and off, copying, deleting and renaming files are required in performing basic operations. The author further stressed that a computer literate must be familiar with computer terms; know how computers work; be able to enter and retrieve data; know the uses of computers; able to programme a computer; know the future general direction of computers; artificial intelligence, and robotics and understand the abuse and misuse of the computer so that students will realize that such problems exists. Acquisition of these skills will enable the business studies teacher impart instructions on computer appreciation effectively.

(2) Word Processing Skills: Word processing is the application of computer for manipulating text-based documents; the electronic equivalent of paper, pen, typewriter, eraser, and most likely, dictionary and thesaurus (Encarta, 2009). Hu Chun (2005) pointed out that word processing is the application of computer technology to the input, editing, merging, sorting, formatting and printing of text. The word processor is a special-purpose computer expressly designed for and solely devoted to the preparation, storage and printing of documents. The system includes a display unit, keyboard, floppy disk drives and a letter-quality print head. Harison (2005) stated that word processing have been developed from typewriting, using computer technology to automate many of the procedures in the production of documents. The computer can be used to perform multiple word processing activities such as editing text, inserting new text, deleting text, and performing search and replace functions within the text. Other area where the computer is most useful in daily activities in offices is in the use of the internet and data processing

(3) The Internet Skills: The internet is a computer-based global information system (Comer, 2008). It is composed of many interconnected computer networks. Each network may link tens, hundreds, or even thousands of computers, enabling them to share information and processing power. The Internet has made it possible for people all over the world to communicate with one another effectively, inexpensively and to have free access to useful data for further processing. Okwuanaso and Obayi (2003) described internet as the interconnection of

large and small network around the globe. The internet is an international network through which users all over the world can communicate or exchange information. The skills required for effective operation of e-mail services as stated by Ibegwam (2002) includes: understanding of the general structure of an e-mail address; ability to interpret features of an in box example, owner, to, CC, subject; interpret features of a retrieved message from date sent, reply, forward; other skills as maintained by him are the ability to retrieve and reply to an email, forward an e-mail and to send an attachment with the e-mail. The e-mail is another important basic skill a Business studies teacher need to know.

(4) Data Processing Skills: Wu (2009) defined data as raw facts or observations typically about physical phenomena or business transactions that are processed into finished information products. The author further describes data processing as a process where raw data is subjected to a value- added process where its form is aggregated and organized; its content is analyzed and evaluated; and it is placed in a proper context for a human user. Data processing deals with the analysis and organization of data by the repeated use of one or more computer programmes (Kogge, 2009). Data processing is used extensively in business, engineering, science and to an increasing extent in nearly all areas in which computers are used such as education, to process data educationally by the teachers and other education administrators. The aforementioned importance makes it necessary for the students of secondary schools to possess the required skills in these areas. This will make them to be more efficient in their exhibition of ICT skills.

Factors Militating Against Effective Use of Computer in Teaching or Learning of Basic Technology

Although Hennessy and Bridley (2004) established that Schools worldwide are preoccupied with technology integration over the years, yet most schools in Nigeria have not been able to utilize ICTs due to the following problems:

1. **Teachers lack ICT skills:** Some Basic Technology teachers lack proficiency in the use of ICTs, they prefer to use obsolete materials they were taught with and are reluctant to take off sometimes to acquire ICTs skills.

2. **Erratic and unstable power supply:** The epileptic nature of power supply in Nigeria has made it difficult to initialize computers. For instance, schools that purchase some computers are unable to operate high cost of alternative power generators. That hinders schools from utilizing such computers to the benefit of students.

3. **Limited access to Internet facilities:** This makes inter and intra networking exchange impossible in schools. According to Mundy and Sultan, (1999) only one of every 9,000 Africans outside South Africa have access to internet compared to 138 of the rest of the world.

4. **Lack of Adequate funds:** Subventions sent to schools are grossly inadequate to purchase ICTs equipment. Even the equipping of HEC laboratories has remained a major problems let alone purchasing ICTs materials for schools.

5. **Inadequate Trained Support Staff:** Lack of adequately trained educational technologists in schools has also hindered the deployment of ICT in ho me Basic Technology laboratories; such staff could complement the effort of Basic Technology teachers with the use of ICTs.

6. **Poor Funding:** Inadequate financing, no doubt, in Nigeria educational system is a problem that has lingered for ages. The United Nations Educational, Scientific and Cultural Organization (UNESCO) have set a bench for funding of education across the world. It stated that a basic standard of education to be met, governments across the world must allocate at least 26% of their national budgets to education. But this is not the case in Nigeria. of the over N6 Trillion million estimate for 2016, only_N369.6b representing about 8% is allocated for education (FGN, 2016). This is grossly inadequate for overall growth of the traditional education sector, much less the integration of information and communication technology it.

7. **Corruption:** Corruption is so endemic in Nigeria that the world rating of most corrupt nations have placed us, often times, between the 1st and 3rd most corrupt nation in the world. Every sector of the Nigerian society, education inclusive, has been soaked in the waters of corruption. No doubt, monies allocated to provide ICT equipment and personnel in the education sector – though inadequate – are grossly mismanaged and allegedly embezzled. In many public schools, ICT labs and centres are poorly equipped. Cases abound where newly installed equipments are transferred (allegedly sold) to private individuals. In other cases, government allocations are made on paper to supply ICT equipments to schools and such equipments are never supplied. The students of Basic Technology and other subjects, who need such equipments turn out to be the losers/sufferers of such corrupt practices.

Theoretical Framework

Theories reviewed which have practical implication to the study were the behaviorists' theory and the constructivists' theory.

The Behaviourists Theory

This theory have numerous proponents and prominent amongst them is Edward Thorndike, who pioneered the law of effect, a process that involved strengthening behavior through the use of reinforcement, in 1898. The behaviorists believed that human behaviors can be learnt and quantitatively assessed. Amongst the proponents of this theory is the American psychologist B.F. skinner of whose work has directs influence to the present study. Skinner believes that people can learn more effectively if their environment is carefully controlled. He developed the principles of operant (behavior) conditioning which basically stated that; If the occurrence of an operant (stimulus) is followed by the presentation of a reinforcing stimulus, the strength is increased (Skinner, 1983).

This provides the simple way of reinforcing the correct behavior through reward and no action being taken for a wrong behavior. Therefore, the study, which encourages use of computer to teach Basic Technology, is upholding the theory. In the words of Skinner, (1983), positive reinforcements had encouraged the use of computers as teaching machines. Today for many educational programs, especially those that have to do with practice skills, to be learnt effectively there have to be set of positive stimuli which are more often than not multimedia in nature followed by the measurement of a response. However, these programs often move away from being purely Skinnerian in nature by not only rewarding correct responses but also attempting to correct the wrong responses. There are many examples where operant conditioning is still used especially in the use of ICT with disruptive or low attaining students. His vision of computers being used in education has proved very influential especially against the constructivistPapert's view of the importance of the motivational engagement of the learner which contrasts sharply with Skinner who although recognizing this influence considered it unnecessary for instruction.

The Constructivist Theory

In the constructivist view the learner as an active participant is involved in structuring their own learning experiences. The importance of how the learner relates new experiences to existing knowledge becomes paramount. A prominent scholar in the constructivist theory is Papert. Papert used the Logo programming language with its screen turtle as a way of enabling learners to make the transition from concrete experiences such as body positioning and movement to more formal abstract ways of thinking i.e. writing Logo geometry program which emphasize the role of the educator for setting up the learning experiences but they both see learning as able to take place without teacher intervention once the learning resource has been constructed. Another criticism of both learning theories is that they concentrate on the individual. Collaboration and group work using computers has been studied extensively in recent years. They stressed the importance of the teacher student relationship and the importance of research needing to be a collaborative exercise with practicing teachers. Jones (2003), provided evidence to suggest that cooperative learning rather than competitive or individualistic learning produced greater learning gains. They concluded that cooperative organization of groups to carry out tasks has a central role to play in computer-based learning. These views are linked to the need for the assessment of teacher computer competency to ensure their

effectiveness in the use of computer for teaching. The findings of this study will help to validate the views of these theorists or otherwise question them.

Empirical Review

Ochuko, Amakaino and Chamberlain (2013) carried out a study to find out the extent of utilization of elearning technologies for instructional delivery in Colleges in Delta State Nigeria. The study adopted a survey design and sampled a group of 98 teachers of computer science in Delta State. The authors found out that various e-learning technologies and applications are available for utilization in education for instructional delivery but were little utilized. They identified some constraints to effective utilization of ICT especially the elearning technologies to include poor perception and conservative attitude of lecturers on the use of e-learning technologies for instructional delivery, shortage of qualified staff with capacity in e-learning applications, lack of training and retraining of staff and students in e-learning technologies and applications and inadequate time allocated to e-learning instruction and applications among others. This study is related to the present study as it examined e-learning technologies, which are functions of Information and Communication Technology. However, it differs from the present study as it was carried out in Delta State whereas the present study is carried out in Enugu State. Moreso, the sampled subjects were teachers while the subjects of the present study are economics teachers and students.

Nwangwu, Obi and Ogwu (2014) conducted research on "Integration of Information Communication Technology (ICT) in the Curriculum of Federal Unity Schools (FUS) in Nigeria: Implications for Learning". The research focused on Junior Secondary School students from four Federal Unity Schools (FUS) in South Eastern Nigeria. Their findings indicate that except for computer studies, ICT was not integrated into other school subjects in the curriculum and that although ICT is seldom used, the level of ICT integration into the curriculum has no significant influence on the level of ICT utilization. Alternatively, students' access to ICT package has a significant influence on ICT utilization; majority (66%) never had access to ICT usage.

Nwana (2012) carried out a study on "challenges in the application of e-learning by secondary school teachers in Anambra state, Nigeria. It is an empirical investigation done in secondary schools in Onitsha North LGA, Anambra State, Nigeria. It used a self-developed instrument (TIUELM) on the availability and use of e-learning materials. The findings revealed: acute shortage of e-learning materials such as on-line/internet-connected computers, e-mail facilities, multimedia television, multimedia computer and digital library. It was also revealed that the few available ones such as off-line/ordinary computers, scanner, printer and ready-made courseware are not utilized because the teachers lack the knowledge and skills of computer application. The only material identified as available and in use is the telephone.

Chukwuma (2016) in his work "the effect of computer in teaching and learning of Integrated Science" identified the causes of low rate of ICT adoption and application in Nigerian secondary schools to include: Limited/poor information infrastructure, lack of/inadequate inadequate ICT facilities in schools, frequent electricity interruption, inadequate ICT manpower in the schools, high cost of ICT facilities/components, limited school budget, lack of/limited ICT skills among teachers, inadequate educational software, poor management on the parts of school administrators and government, lack of maintenance culture, lack of interest in ICT application/use on the part of students, lack of/poor perception of ICTs among teachers and administrators, among others.
On the strategies to be adopted for intensified integration of ICT into school, Dike (2014) in his work "assessment of economics teachers' perception of their information and communication technology competencies using UNESCO ICT competency framework for teachers" advocated that teachers seminars on use of ICT facilities in teaching and learning should be intensified by both state governments and private individuals; teachers can be given in-service training on how to use ICT facilities in teaching and learning; younger teachers should be employed by the state government as they are more comfortable and conversant with the computer age; provision of ICT facilities in various secondary schools should be seriously considered and undertaken by both the state government and private stakeholders; teachers should make conceited effort in improving their skills on use of ICT

facilities by either enrolling in private lessons or any other means which will help them raise their ICT compete level.

3. Research Methodology

This chapter discusses the design of the study, sample and sampling techniques, instruments for data collection, reliability of the instrument and method of the data analysis.

Research Design

The researcher adopted a survey research design for this study. Nworgu (2006) stated that the design of a study can be classified as a survey if it involves the study of samples drawn from chosen population which is considered to be representative of the entire population. The survey research design is suitable for this study as a group of teachers and students were selected for the survey in order to evaluate the use of computers in teaching and learning of basic technology in junior secondary schools in Enugu East Local Government Area

Sample and Sampling Techniques

For effective sampling, the researcher used 5 secondary schools out of the nine of them. The schools are as follow:

S/N	Name Of School in Enugu North LGA	No. Of Teachers	No. Of Students
1.	Annunciation Secondary School Nike	1	20
2.	Community High School Emene	1	20
3.	Community Secondary School Ugwuogo Nike	1	20
4.	Girls' Secondary School, Abakpa Nike	1	20
5.	Girls' Secondary School, Emene	1	20
	Total	5	100
	Grand total	**105**	

Therefore, the sample size for this study is 105. Simple random sampling technique was used

Method of Data Analysis

Data collected was analyzed using mean. A Likert four point scale was used and values attached. Hence

Very Great Extent (VGE) – 4
Great Extent (GE) – 3
Little Extent (LE) – 2
Very Little Extent (VLE) – 1

To reach decision the mean of the response categories was calculated thus:

$$\frac{4+3+2+1}{4} = 2.50$$

The formula used is

$$\overline{x} = \frac{\sum fx}{N}$$

Where $\overline{x}$ = Mean

Decision Rule: To determine the mean score of agreeing and disagreeing on an item, mean score of 2.50 and above was regarded as great extent while score below 2.50 was indicated as little extent.

4. Data Presentation and Analysis

The data collected for this study were organised and analysed in this according to the research questions. The data are presented in tables.

Research Question 1

What are the available computers/ICT devices for teaching and learning Basic Technology in Junior Secondary Schools in Enugu East Local Government Area?

Table 4.1: Mean Responses to Research Question Two

S/N	Questionnaire Items	VGE 4	GE 3	LE 2	VLE 1	N	Σfx	$\bar{X}$	Decision
1	Computers	31	36	18	20	105	282	2.68	Great extent
2	Radio/video/television	33	38	17	17	105	297	2.83	Great extent
3	Internet connected laptops	29	36	15	25	105	279	2.66	Great extent
4	Telephones	28	32	19	26	105	272	2.59	Great extent
5	World wide web	39	29	18	19	105	298	2.84	Great Extent
6	CD-ROM Data base	21	39	18	27	105	264	2.51	Great Extent
7	Smart board	22	23	25	35	105	242	2.30	Little Extent
8	Teleconferencing	20	25	22	37	105	236	2.25	Little Extent
9	Video conferencing	21	19	29	36	105	225	2.14	Little Extent
	Grand Mean							**2.53**	**Great Extent**

From table 4.1, items 1, 2, 3, 4 and 6 have mean scores above 2.50 indicating that respondents agree that, to a great extent, these items are available computer/ICT materials in their schools in Enugu East Local Government Area of Enugu State. On the other hand, items 5, 7, 8 and 9 have mean scores below the 2.50 cut off point indicating that they are available only to a little extent. Going by simple majority, this implies that item 1 (computers), item 2 (radio/video/television), item 3 (electronics mail), item 4 telephones and item 6 (CD-ROM Data base) are the ICT materials that are available in schools in Enugu East Local Government Area.

Research Question 2

To what extent are trained/qualified personnel integrated into the teaching and learning of Basic Technology in Junior Secondary Schools in Enugu-East Local Government Area?

Table 4.2: Mean Responses to Research Question Two

S/N	Questionnaire Items	VGE 4	GE 3	LE 2	VLE 1	N	Σfx	$\bar{X}$	Decision
1	Teachers with basic teaching qualification in technology are engaged	29	36	15	25	105	279	2.66	Agree
2	Technology teachers must have practical skills in computer usage before they are employed	19	23	35	28	105	243	2.31	Disagree
3	Technology teachers are sometimes subjected to refresher courses on information technology	37	46	12	10	105	320	3.05	Agree
4	ICT seminars and workshops are conducted for technology teachers	32	38	14	21	105	291	2.77	Agree
5	Technology teachers are made to attend national and internal conferences on ICT	28	34	19	24	105	276	2.63	Agree
	Grand Mean							**2.68**	**Agree**

Table 4.2 shows that, except item 2, all items have mean scores above the cut off 2.50 margin. This implies that trained and qualified personnel are integrated into the teaching and learning process of Basic Technology in secondary schools in Enugu East Local Government. However, item 2 indicated that technology teachers must not have practical skills in computer usage before they are employed.

Research Question 3

To what extent are the available computers and computer related facilities applied in teaching and learning Basic Technology in Junior Secondary Schools in Enugu East LGA?

Table 4.3: Mean Responses to Research Question Three

S/N	Questionnaire Items	VGE 4	GE 3	LE 2	VLE 1	N	Σfx	$\overline{X}$	Decision
1	Computers are used stimulate students interest on some aspect of Basic Technology	46	37	11	11	105	328	3.12	Agree
2	Radio and televisions provides information on current issues in the technological world	28	39	22	16	105	289	2.75	Agree
3	Telephones especially smart mobile phones are modern equipments that inspire young students to learning	33	31	19	22	105	285	2.71	Agree
4	The internet (world wide web) provides a large platform for data gathering in basic technology class	39	29	18	19	105	298	2.84	Agree
5	The internet encourage group learning among technology students after class	26	31	20	28	105	265	2.52	Agree
6	technology teachers use computer and internet service to guide students after class, if need be	21	39	18	27	105	264	2.51	Agree
	Grand Mean							**2.74**	**Agree**

The responses of respondents to the research question, as shown in table 3 all listed items have mean scores above the cut off point of 2.50. This implies that the available computer-related facilities are applied for the teaching and learning of Basic Technology to a great extent in Junior Secondary Schools, in Enugu East Local Government Area.

Research Question 4

What are the strategies for improving computer application in the teaching and learning of Basic Technology in Junior Secondary Schools in Enugu East LGA?

Table 4.4: Mean Responses to Research Question 4

S/N	Questionnaire Items	VGE	GE	LE	VLE	N	Σfx	$\overline{X}$	Decision
1	Increase in budgetary allocation for education	33	38	17	17	105	297	2.83	Great Extent

2	Mobilization of funds from alumni associations	29	36	15	25	105	279	2.66	Great Extent
3	Parents provision of computer sets and peripherals for their wards	28	32	19	26	105	272	2.59	Great Extent
4	Engaging teachers that are practically inclined with computer usage	39	29	18	19	105	298	2.84	Great Extent
5	**Making computer studies compulsory for all students**	22	23	25	35	105	242	2.30	Little Extent
6	**Installing user-friendly applications to heighten students interests in computer studies**	21	39	18	27	105	264	2.51	Great Extent
	Grand Mean							2.61	**Great Extent**

Table 4.4 revealed that items 1,2,3,4 and 6 have mean scores of 2.86, 2.66, 2.59 2.84 and 2.51 respectively. These mean scores are above the cut off point of 2.50, which implies that the respondents agree that these items are strategies for providing computers and increasing students access to computers in basic technology classes in secondary schools in Enugu East Local Government Area. However, item 5 has mean score of 2.30, which is below the mean cut off point and implies that it is not a strategy for providing computers and increasing students access to computers in the study area.

Summary of Findings:

From the above data presented and analysed, the following findings were made:

(1) That in Junior Secondary Schools in Enugu East Local Government Area, the computer/ICT devices available for teaching Basic Technology include: computers, radio/video/television, internet connected laptops, telephones, and the world wide web. Other computer-related devices/services such Smart board, Teleconferencing and video conferencing are available but less rapidly

(2) That for the teaching and learning of Basic Technology in Junior Secondary Schools: teachers with basic teaching qualification in technology are engaged, technology teachers must have practical skills in computer usage before they are employed, technology teachers are sometimes subjected to refresher courses on information technology, ICT seminars and workshops are conducted for technology teachers; and that technology teachers are made to attend national and internal conferences on ICT

(3) That the available computer devices available are used for the teaching of Basic Technology to a great extent. Precisely, available computers are used stimulate students interest on some aspect of Basic Technology; radio and televisions provides information on current issues in the technological world; telephones especially smart mobile phones are modern equipments that inspire young students to learning; the internet (world wide web) provides a large platform for data gathering in basic technology class; the internet encourage group learning among technology students after class; and technology teachers use computer and internet service to guide students after class, if need be.

(4) That increase in budgetary allocation for education, mobilization of funds from alumni associations, parents provision of computer sets and peripherals for their wards, engaging teachers that are practically inclined with computer usage, **i**nstalling user-friendly applications to heighten students interests in basic technology are some of the strategies for providing computers and increasing students access to computers in junior secondary schools in Enugu East Local Government Area of Enugu State.

Discussion of Findings

Research question one inquired into the available computers/ICT devices for teaching and learning Basic Technology in Junior Secondary Schools in Enugu East Local Government Area. It was found that in Junior Secondary Schools in Enugu East Local Government Area, the computer/ICT devices available for teaching Basic Technology include: computers, radio/video/television, internet connected laptops, telephones, and the world wide web. Other computer-related devices/services such Smart board, Teleconferencing and video conferencing are available but less rapidly. This finding is in line with those of several other researches like Omebe (2012) and Ojie (2002). In fact, Omebe (2012), even suggested other ICT materials, which are very important to teaching and learning process to include: smartboard, teleconferencing and video conferencing apparatus.

Research question sought to know the extent to which trained/qualified personnel integrated into the teaching and learning of Basic Technology in Junior Secondary Schools in Enugu East Local Government Area. It was revealed that teachers with basic teaching qualification in technology are engaged, technology teachers must have practical skills in computer usage before they are employed, technology teachers are sometimes subjected to refresher courses on information technology, ICT seminars and workshops are conducted for technology teachers; and that technology teachers are made to attend national and internal conferences on ICT. These findings are similar to those of Waziri (2006); Ogwu and Ogwu (2010) and Nwangwu, Obi, and Ogwu (2014).

Research question three sought the extent are the available computers and computer related facilities applied in teaching and learning Basic Technology in Junior Secondary Schools in Enugu East LGA. The study revealed that the available computer devices available are used for the teaching of Basic Technology to a great extent. Precisely, available computers are used stimulate students interest on some aspect of Basic Technology; radio and televisions provides information on current issues in the technological world; telephones especially smart mobile phones are modern equipments that inspire young students to learning; the internet (world wide web) provides a large platform for data gathering in basic technology class; the internet encourage group learning among technology students after class; and technology teachers use computer and internet service to guide students after class, if need be. Similarly, Ndoku (2013) noted that smartphones and other information and communications technology devices inspires learning interest among students and drags to school or classes where those facilities are provided.

Research question 4 inquired into the strategies for improving computer application in the teaching and learning of Basic Technology in Junior Secondary Schools in Enugu East LGA. It was found that increase in budgetary allocation for education, mobilization of funds from alumni associations, parents provision of computer sets and peripherals for their wards, engaging teachers that are practically inclined with computer usage**, i**nstalling user-friendly applications to heighten students interests in basic technology are some of the strategies for improving computer application in the teaching and learning of Basic Technology in junior secondary schools in Enugu East Local Government Area of Enugu State. Other authors like Oduroye (2009), Ochuku, Amakaino and Chamberlain (2013) made similar recommendations in their study.

5. Conclusion

Based on the following research findings, the researcher arrived at the following conclusions: that enough computer devices are not available for basic technology teachers in Enugu state form teaching pedagogy, hwoever, the few available ones are utilized to maximally when teachers and students have access to them. Ultimately, a lot needs to be done to integrate the use of computer into the teaching and learning of basic technology in secondary schools in Enugu East Local Government Area

Recommendations

Sequel to the findings, the following recommendations are hereby made:

(1) The Enugu State Government should integrate ICT in teacher preparation curriculum.

(2) Improve students' access to ICT by providing adequate state-of-the-art ICT facilities such as: LCD monitors, multimedia projectors, interactive whiteboards, speakers, desktop and laptop computers, UPS systems, internet facilities, among others for usage.

(3) Problems deterring ICT usage should be addressed such as poor electricity supply, to encourage the frequent use of ICT in the teaching and learning process.

(4) Monitoring of the state of ICT facilities in secondary schools should be carried out to determine those facilities that need to be replaced or upgraded for effective instructional delivery.

(5) Teachers seminars on use of ICT facilities in teaching and learning should be intensified by both state governments and private individuals. Teachers can be given in-service training on how to use ICT facilities in teaching and learning. Younger teachers should be employed by the state government as they are more comfortable and conversant with the computer age.

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