INSTRUCTIONAL MATERIALS AND UBIQUITOUS COMPUTER TECHNOLOGY: THE STRONG BOND TO EFFECTIVE LEARNING IN NIGERIAN SECONDARY EDUCATION

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Abstract.
Information technology as we have today resulted from technological efforts in ancient civilization which started thousands of years ago.
As civilization arose, the need to communicate, to document ideas and policies, and the need to keep track of figures became apparent. Ancient kingdoms were in desperate need of how to educate their princes and princesses in desired ways of acting and behaving. People were not able to communicate effectively across long distances greater high their voices could be hard and preservation of ideas were possible, were too crooked and cannot endure. It was not easy then for the society to spread its influence over others, not accumulate a rich cultural heritage. Thus, the social and cultural development of the community remained agonizingly slow. However with the recent development in science and technology the world as a whole as been reduced to a global village through the application of information communication technology.
Overtime learning had been made traditional in Nigerian Secondary Schools, interesting and convenient at this conventional state with the use of effective learning materials; but of recent, learning had become pervasive and ubiquitous with the use of common and everywhere electronics services, known as ubiquitous computing technology. Therefore combining learning materials such computers, overhead projectors, bulletin boards, radio, DVD and others with Ubiquitous Computing Technology such as PDAs, Smart

Phones, Laptops and other mobile devices have made the modern learning paradigm more effective and interesting than ever before. However, the concern of this paper is to expose us to the positive bong of instructional materials and Ubiquitous Computing Technology gad brought in making learning more effective in Nigerian Secondary Education. Some literature and theoretical framework are considered in discussing the relevance, combination of instructional technologies and ubiquitous technologies in realizing an effective learning environment. The paper concluded by suggesting how the proper utilization of instructional materials and ubiquitous technologies could be bound in order to ensure effective teaching and learning in Nigerian Secondary Schools, and the paper also recommends that frequent use of ICT and other device to aid teaching and learning could make learning more effective in Nigerian Secondary Schools.

KEY WORDS:- INSTRUCTION MATERIAL, UBIQUITOUS COMPUTER TECHNLOGY, STRONG BOND, EFFECTIVE LEARNING, SECONDARY EDUCATION.

Introduction

The integration of information and communication technology (ICT) has become a high priority across Nigeria schools, just as it has in schools internationally (UNESCO, 2002). Information and communication technology (ICT) is a force that has changed many aspects of human endeavours. The impact of ICT on various fields of human endeavour such as medicine, tourism, business, law, banking, engineering and architecture over two or three decades has been enormous. But when one looks at the field of education, there seems to have been an uncanny lack of influence of ICT and far less change than other fields have experienced. A number of scholars such as Soloway and Prior, (1996) have attempted to explore this lack of activity and influence of ICT on education and many others. In other words, though ICT has begun to have presence in education, its impact has not been as extensive as in other fields (Collis, 2002). Education is a very socially oriented activity and quality education has traditionally been associated with strong teachers having high degrees of personal contact with learners. With the world moving rapidly into digital media and information, the role of ICT in education is becoming more and more important.

It has been suggested that information and communication technologies (ICTs) can and play a number of roles in education such as developing the kind of graduates and citizens required in an information society; improving educational outcomes and enhancing and improving the quality of teaching and learning (Wagner, 2001; McCormick and Scrimshaw, 2001; Flecknoe, 2002). Garrison and Anderson (2003) argue that the application of ICTs in the teaching-learning process can enhance the quality of education in several ways such as increasing learner motivation and engagement, facilitating the acquisition of basic skills, and enhancing teacher training. All subjects being offered at all levels of education; that is the primary, secondary and tertiary institutions are very important for the usefulness of an individual in a community, Their relevance and sustenance in the 21st century requires the adequate application of ICTs like video tapes, television and multimedia computer software that combine text, sound and colorful moving images which can be used to provide challenging and authentic content that will not only engage the student in the learning process but as well make learning concrete.

Instructional materials and computer technologies have the potential to enhance access, quality and effectiveness in education and to enable better teaching and learning outcome. Teachers are expected to use a wide range of instructional materials for effective teaching and learning.

Computer education has come a long way since the foundation of IBM African education training centre at the university of Ibadan in 1963 for the training of computer personnel to operate, program, and service IBM

1461/1620 machines. Today there are fully fledged computer science department in all Nigeria universities (except some very Computer science few ones), and other tertiary institutions are teaching a range of subjects including computer organization, software engineering, programming and programming languages, numerical computations, and system analysis. All this studies lead to degrees, diplomas and certificates in computer science.

SOME TERTIARY INSTITUTIONS OFFERING COMPUTER EDUCATION INFORMATION TECHNOLOGY IN NIGERIA

Institutions	State	Course title	Award
Adamawa state university	Adamawa	Computer science	Degree
Federal university of technology	Ondo	Computer science	Degree
River state university of science	Rivers	Computer science	Degree
University of Benin	Edo	Computer science	Degree/ diploma
University of Ibadan	Oyo	Computer science	Degree
Abubakar Tafawa Balewa University	Bauchi	Computer science	Degree
University of Lagos	Lagos	Computer science	Degree/ certificate
University of Abuja	Abuja	Computer science	Degree
University of Calabar	Cross River	Computer science	Degree
University of Uyo	Akwa Ibom	Computer science	Degree
Imo state university, Owerri	Imo	Computer science	Degree
University of Ilorin	Kwara	Computer science	Degree
Usman Dan Fodio University	Sokoto	Computer science	Degree
Nnamdi Azikiwe university, Awka	Anambra	Computer science	Degree
University of Ado Ekiti	Ekiti	Computer science	Degree
Ambrose Alli University, Ekpoma	Edo	Computer science	Degree
Michael Okpara University of Agriculture, Umudike	Abia	Computer science	Degree
Babcock University, Ilishan-Remo	Ogun	Computer science And Information	Degree
Benson Idahosa University, Benin	Edo	Computer	Degree
Adekunle Ajasin university	Ondo	Computer science	Degree
Kano University of Technology	Kano	Computer science	Degree
Ahmadu Bello University, Zaria	Kaduna	Computer science	Degree
Nasarawa State University, Keffi	Nasarawa	Computer science	Degree
Madonna University, Okija	Anambra	Computer science	Degree
University of Jos	Plateau	Computer science	Degree
Ebonyin state University, Abakaliki	Ebonyin	Computer science	Degree
Federal University of Technology	Adamawa	Computer science	Degree
Benue State University, Makurdi	Benue	Computer science	Degree
Anambra State University of	Anambra	Computer science	Degree
Niger Delta University	Bayelsa	Computer science	Degree
Kogi State University, Anyigba	Kogi	Computer science	Degree

University of Port Harcourt, Port Harcourt	River	Computer science	Degree
Covenant University, Canaan Land,Otta	Ogun	Management information/Information	Degree
Bayero University, Kano	Kano	Computer science	Degree
Bowen, University, Iwo	Osun	Computer science	Degree
College of Technology, Calabar	Cross River	Computer science	Diploma
Ibadan Polytechnic	Oyo	Computer science	Diploma
Institute of Management and Technology	Enugu	Computer science	Diploma
Kaduna Polytechnic	Kaduna	Computer science	Certificate

In secondary education, governments have been showing considerable interests in the need for greater computer awareness in Nigeria with regards to computer training at this level. The federal ministry of Education in 1988 announced a program for the Unity schools in the country in which 20 million was to be spent to equip these schools with micro computers for the training of the students. Also the National Teachers Institute, Kaduna was equipped with 40 microcomputers for the training of teachers.Also, computer education and training were also offered by a number of private academics (some with government recognition), vendors, and consultants. These are done initially in scope and usually profit oriented.

It should be realized that basic education goes beyond literacy and numeracy but it involves all kinds of basic knowledge and skills necessary for an individual to live a useful and contented life. Therefore children must be encouraged to develop a scientific outlook and rudimentary understanding of the natural and social environment. It would now be seen that basic education in two folds which are, the need to educate young children on one hand, and promote adult literacy and continue education on the other hand to help develop their basic skills in various literacy areas.

However, governments at different levels have never given a serious thought to the application of information and communication technology to education in this area. Out of more than 43, 000 primary public schools in Nigeria today (precisely 41, 531 in 1999) less than one percent are using computer or teaching it to the children (FGN 1995). However, the efforts of private basic school proprietors are much in the area of applications of information technology to basic education. Most of the privately owned nursery and primary schools in Nigeria teach their children some basic areas in the use of computer. The situations actually seem to show that the government has actually left this area to the private sector in the basic education system.

This might be because information applications for education in the developing countries generally some weakness which make them to be unsuited to technological and organizational infrastructure of Nigeria, they have been over specified in terms of their technological sophistication which makes the community have the notion it cannot be applied in this area of education system, and they have been insufficiently focused on the problem solving environment. Much of the content and style of the materials produced in developed countries may be considered unsuitable to social and cultural traditions in less developed countries and may have the effect of excluding people who are already severely disadvantaged.

 At the very least, epistemological access to the educational goods of information technology requires student and their teachers to become electronically literate as well as conventionally literate and numerate. They should be able to handle information technology at a level appropriately to different fields of study and be equipped to employ it appropriately to further their cognitive development. All these may be considered unavailable or inadequate at these level of education hence the lack of encouragement to apply information technology at this level of education in full swing.

Instruction is designed to ensure that no one is left out or educationally disadvantaged and every students have equal right, opportunities, and chance to use their gifts to the fullness. Instructional materials and devices therefore, when properly used can facilitate the better result of the objectives. Hence, provide a concrete foundation for conceptual thinking and brings words responses to a halt and making learning more real and permanent, having high degree of interest for pupils and offering a reality of experience (Ogbondah 2008). Generally, instructional materials include training materials like texts, student guides, workbook, instructor guides, job and training aids, visual aids and training studies. However, growth in electronics technology has substantially increase the media options for the delivery of instructions. Media choices today include video, computer based training, interactive television, video conferencing, written correspondence, and on line training along with the usual classroom or workshop options.Choices may change from goal to goal and lesson to lesson to get the best instructional result from the available media. Many electronics media now provide delivery of instruction without trainees ever entering a traditional classroom. In this study, the instructional materials discussed are expected to add value to activity-based method which includes audio, visual, audiovisual materials and other hardware and software. The teachers who are to implement the curriculum are expected to use a wide range of instructional materials for effective teaching and learning. Instructional materials are concrete or physical objects which provides sound, visual or both to the sense organs during teaching (Adeyanju 2003), while computer technology can offer much benefit through the internet as teaching aids. It can equally play critical and important role in improving the quality and relevance in teaching. Delcourt&Kinzie (1993) found that learning about computers is aided by high levels of a positive attitude. Ropp (1999) says that here is a research to show that while many teachers have positive attitude to the use of technology in a classroom with students. For the goals of computer education to be accomplished in our country, and the citizenry to acquire computer skills. It is ideal that teachers be trained to implement computer in basic computer operations, basic application of software such as word processing, Data base, spreadsheets, and integrations of computers into teaching. Most of the computer facilities can equally be used on mobile e-resources called the Hand-Held Device (HHD). HHD are the small or portable device that can beheld in hand and carried about everywhere. Its provide opportunities for learner to learn anytime and anywhere which makes computer technology for ubiquitous- learning

Meanwhile, Ogunleye(2000) found out that in the era of technological advancement, technology has had minimum impact on Nigerian education. Because 80% of teachers in the country are used to chalkboard and textbook method (traditional method) in teaching. It is obvious that must schools does not possess the teaching requirement that is modern equipment and materials. While some that possess all the where without are valuable to use to use them effectively due to poor electricity supply and inability of teachers to put them in operation. However, persistence use of obsolete instructional material can contribute to poor academic performance (Ogunlade, 2011).

Consequently, another problem that should be looked into is retention of what has been learnt. This is often caused by too much theoretical expression by the teachers while learners remain passive listener. Students memorize and regurgitate facts and concept (Nworgu, 2000). Today, computer technology are used in the developed nations to solve instructional problem that are currently plaguing the developing nations. Computer technology can be used to diversify stress and forgetfulness (Sani 2012). Computer can be used to teach all subjects with the aids of projected media where large number of students can be taken care of without being bias and interference with students and space (oloweyeye&Ogunlade, 2015).

However, generation of todays teacher must be creative in sourcing for and using appropriate instructional materials from their environment. Before a teacher can select instructional materials for instructional purpose it should be based on specific criteria such as

- The nature of the audience i.e age, sex, social, cultural, environment and economic background of learners
- Entry level
- Motivation
- The physical abilities and disabilities of learners.
- Learners' long-established perception and cultural characteristics
- The objective to be achieved
- Nature of the Subject content (Dahiru, Inwelegbu, Saidu&Kallah-Hardware INSRUCTIONAL MATERIALS Saidu 2012).

In this category of hardware it is hard because the body is relatively hard material. Not that alone the way it works is complex that is why these equipment and appliance is called hardware: some of the instructional material termed hardware includes:

1. Magic lantem
2. Overhead projector
3. Radio
4. Tape recorder
5. Television
6. Closed circuit television
7. Motion pictures
8. Computer.

Magic lantern: This is an audio-visual equipment used for projecting from a transparency (slide) on a screen. It is useful in the class room when considering small figure, that everybody should see it distantly and clearly. Slide is placed into the carrier part of the magic lantern and the device projects it to the screen by increasing it sizes making the vision sharper and clearer.

Projectors: This is a very effective projective equipment. Its position in discharging instruction in various subjects cannot be;

1. Opaque projector
2. Overhead projector
3. Slide cum filmstrip projector.

Radio: it is an effective audio and equipment that id capable of given reliable information to teachers in the class room while presenting learning experience to large number of student. Radio broadcast can be general or educational.

General broadcast provides information about generality of issue that is current about the world, culture and reality of life, educational broadcast take care of the cause of education and pedagogical activities in form of radio lectures and lesson.

Tape Recorder: It is a recording device that is designed for recording and reproducing of the sound. This device is of three parts; microphone, amplifier and the reproducer.

Television: This is a very powerful medium of communication that encompasses auditory and visual sense of the learners when learning. Every word either spoken or written, picture, the sights and sound and every action can be transmitted at a large distance. Television can be used to advanced the development of the learner. A lots of educational programmes can be on the TV that can influence one for learning. There is a

micro level real arrangement limited to a single school close circuit using television for educational purpose (Moolley and Lowenstein, 1952).

Computer: is an educational instructional aid, it is the latest in it series. It is a multipurpose tool in the field of education. The goals of every educational institute is to make sure every child acquire this facility for their good.

SOFTWARE INSTRUCTIONAL MATERIALS

The devices, equipment, appliance and machines mentioned and described above is an 'hardware' which suffer limitation and limit function independently unless working laboratory with software. For instance, projector cannot give out result unless something like films, or slide and other teaching-learning material is used as projecting materials. Whereas tape recorder is not if cassettes is not fed into it to being out instructional output. Computer cannot play it parts except appropriate self-instructional programmed material is used. Therefore, instructional material may be films, cassettes, slides, graphics material like charts, pictures, diagrams, maps cartoons, posters and so on. It is ideal to note that it is not compulsory to always combine software with hardware or vis-verser. Most of these, for example graphics material and other improvised material can be used in teaching and learning without the service of hardware (kinder, 1959). Obviously, instructional materials in terms of software can be:

1. Black or chalkboard
2. Bulletin board
3. Flannel board
4. Pictures
5. Diagrams
6. Cartoons
7. Posters
8. Flash cards
9. Models
10. Dioramas
11. Slides
12. Filmstrips
13. Transparencies
14. Programmed learning packaged=s

Blackboard, as old as it is, it is the most commonest instructional material. It can be used as visual aid to display visual material in the classroom. Itsis useful in the process of teaching and learning as follows:

- It can be used as a source of motivation
- It can be used to teach all subjects of the school curriculum
- It can be used in all stages of teaching that is introductory, presentation, summarizing and evaluative stages of the lesson
- Teacher can wrote, draw, sketch and eraze at will.

Bulletin Board: this is the type of board to display bulletin related issue in terms of news item, announcements of forth coming events, rules and regulation, and other general information (Lloyd, 1997). The use of bulletin is more than visual display photographs, pictures, graphs, cartoons, posters, cutting of newspaper and magazines. But putting of three-dimensional objects, specimens and models.

Flannel Board is a particular board with flat surface covered with a special cloth named flannel. It is effectively used for visual display of the handwritten, printed, sketched or hand-drawing graphic material

which a lots of viewer can viewed at the same time. This can aid teaching and learning of the subject matter in all area of school curriculum.

Flash Card: is a visual material that can be used for teaching almost all topics related to various subject of the school curriculum. It can be used for teaching of facts, ideas and processes in an introduction.

Models: stands for the replica, imitation or copy of a thing, act or process. As a three dimensional aid. Model is used where real objects desired for learning is either large or small in that wise model can be used to cater for the size for proper observation.

Dioramas: are three dimensional visual aid that can be used to exhibit or display the reality in very small detailed, example of diorama can be activities in an industry or airport.

Ubiquitous Computer Technology for today's learning Appropriate and effective uses of Ubiquitous Computer in learning and selecting tools. This particular type of technology can be inform of;

- Smart Board
- Smart Phones
- Note book computers
- Tablet Pc
- Personal Digital Assistant
- Bluetooth
- Infrared Data Association (I<DA)
- Youth and Computer in the classroom
- Computer strong bond to learning tool
- Creativity through Computer

For effective learning to be taken placed in Nigerian Schools, technologies must be incorporated into teaching and learning, realizing that the potential of each technology varies according to how it is used.

Smart Boards: Technological revolution has replaced blackboard with interactive while board, it is a very powerful tool in the classroom using tourch technology to run various teaching activities. Internet can be searched, information and data can be saved, games of different kind can be accessed for learning of the entire learners.

Smart Phones: They are hybrid devices combine PDA with cellular phones. It is smaller than PDA and bigger than cellular phones. This device can recognized handwriting text if the keyboard is nit in place. With the internet browsers inbuilt in the system gives it potential to allow multi-media application into teaching and learning.

Next Book Computers: This particular Computer has the features of desktop personal computer. They are in smaller size with wireless communication. This computer is most idea for it portability and interactivity for learning.

Tablet Pc: This is a very new in mobile industry, it is able to perform creditably well like personal computer. Although some of them dies not have keyboard but possed software to recognized handwritten text and very expensive.

Personal Digital Assistant (PDA): They have recognizable processor power but small in size. The operating systems used in either palm or Microsoft pocket Pc and the models support more than 65,000 colour, recognize handwritten test and can play different types of media files.

Bluetooth: This is a wireless technology with a short range radio technology. It can transmit signal over short distance between telephones, computers and other devices.

Infrared Data Association (IrDA): This association defined a suite of protocols for infrared (IR) exchange of data between two devices; up to 1 or 2 meters apart (20 to 30cm for low power device)

Youth and the Computer in the Classroom:

It is pleasing to see the youth sitting behind computer system, obviously, this is a weapon to bring out the best out them. Youth should be encourage to have more exposure to the system in order to come out with the best in their academic performance. Those that contributed inversely in computer did it during their youthful time. *Linus Torvalds* created Linus, is a freely available operating system for Pc while *Bill Gate*invested Microsoft. Students who received briefly daily computer-aided instruction lessons as a supplement to instruction showed gains equivalent to one to eight months of instruction over their peers who received traditional instruction only (Jud Vanscoter&Debbieeilli, 2010).

Computer: Strong bond to learning Tools

Learners from different levels of education can recall exercise through available software to provide students with memory. This is applicable in all subjects such as Mathematics, English and science, using a computer to practice which most the learners spend more time with during physical exercise. Computer tutorial provides extra tutoring to support subject thought during classroom activities; as well as one-one assistance to slow learners. Many educational computer software programs are provided for them in a step-by-step method. There are simulation software programs encourage students to learn through discovery, make things to come alive, safely, right on the screen.

<u>Creativity through Computer.</u>

Student are no longer interesting in fine art as it used to be in those days. No matter how brilliant they are in using traditional tools doing the work. But today reversed is the case where computer can express better performance in painting or composing song. With computers student have access to new array of creativity tools ranges from painting, drawing and musical composition. These are the usefulness of computer, experts recommend that at the development stage of learners should be allowed to create and explore, compose and record music, write programs that can solve problem in word processing, games, and immediate feedback. These are the expectation and promises ahead of learners with instructional tools and ubiquitous technology.

Conclusion

Instructional materials that teachers employ in teaching subject at secondary school level have significant effects on students' performance. obviously, traditional ways of teaching does not prepare students for information age, rather modern development in computer technology trans tend the education challenges they are today. Studies point out how ubiquitous computer technology and other tools such as tape recorders, Smart board, Smart Phone, Note book Pc have strong bond in teaching and learning. It encompasses computer hardware and software, the network and several other device that can be useful in teaching-learning process in classroom, as it available anytime, anywhere to anyone in learning environment. Youth are recommended by experts to be encourage to create and explore in computer. Learners from different levels can recall teaching experience through computer software.

Recommendation

- Implementation of instructional materials policy should be made possible through supervision of ministry of education.
- Government should provide and equipped with training on how to use computer technology for instructional delivery
- Power failure should be address and solve b government and non-governmental organization.
- Ministry of education should periodically organize seminars and workshop for teachers to train them on latest in effective selection and uses of instructional materials.

- Government should subsidize the price of computer and other device so that teachers can use it at will for effective teaching-learning.
- Computer should be made as an integral part of the school's curriculum.

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