Computer Technology in Nigerian Secondary School Education: Problems and Prospects

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Abstract

Computer technology is an integral part of modern life and contemporary education. The need to use Computer Technology in education in this era of globalization where free flow of information via satellite and the internet hold sway in global information dissemination of knowledge was identified and discussed. Already, Nigeria is on the wrong side of the international digital divide, as it has not made significant effort to integrate Computer technology into secondary school curriculum especially in state owned secondary schools. Great deals of instructional and administrative work in secondary schools in Nigeria are still being carried out manually. This paper, therefore, examines the major obstacles militating against the use of Computer technology in secondary school education in Nigeria. It identifies the high cost of computer hardware and software; weak infrastructure; lack of human skills and knowledge in computer technology as the major stumbling block to the adoption of computer technology in secondary school education in Nigeria. The study recommends that efforts should be made by government to post and provide teachers skilled in Computer technology to each school to impact computer skills on the students and government also should stabilize electricity supply in Nigeria.

Keywords: Computer Technology, Digital divide, Secondary School Education,

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There is growing awareness in Nigeria that looking at the future of education is important and necessary in order to better grasp the opportunities that will arise as societies move towards an increasingly digitalized, networked and knowledge-based society. The relevance of education to the growth and development of any nation cannot be over emphasized. Education is so crucial to economic growth that any nation that genuinely hopes to develop must vehemently and consistently appropriate a large chunk of the budget to developing its educational sector. This is because without education, no nation would attain meaningful economic and socio-political development. A new vision of “computer technology in education” is needed that takes into account the shifts and trends (e.g. e-learning, web based learning, virtual library, globalization, migration, demographics, technological progress) that are transforming the way people work, learn, transact business, enjoy themselves and make sense of their world (Adomi and Anie, 2006).

A number of statements have been made by renowned experts in educational disciplines and systems, which call for revolutionary changes in the way we learn and teach at the moment. There is no doubt that the role of computer technology as an enabler of these changes is stronger nowadays than ever. Today, computer technology in schools is one of the most far-reaching and fast growing developments in education. Like maize in a plantation during a storm, countries all over the world are bending towards the fad of computer education (Joseph, 1990; Macaulay, 1993). Development in science and technology has brought into lime light the indispensable roles of computer technology in education.

Computer technology is the design and construction of computers and related resources to better help people in different professions, discipline, businesses, at work, school, homes etc. An example of computer technology is the development of a software that gives the computer flexibility and versatility that allows people to accomplish work at their convenience (Bright, 2013). Computer technology encompasses a host of ideas involving the design, construction and use of information-processing equipment. As computers have evolved from ancient mechanisms such as the abacus to today's electronic systems, the concepts behind them such as Education, Communication, Banking Engineering, etc have also evolved (Barett, 2010).

Computer technology in secondary school can either be used for education process or for administration purpose. Hadded and Draxler (2010) identified at least five levels of computer technology used as instructional aids in education process as presentation, demonstration, drill and practice, interaction and collaboration. Computers can help in the running of the school administration such as admission process, clerical work, storing of official and students’ records, fiscal accountability etc. Computers can also be used in educational planning and decision-making,
controlling, assisting instruction and simulation. Computers are helpful in administering aptitude tests and achievement tests at the time of entrance, holding of the student's examination, preparing scheme of examination, printing of papers and question papers, evaluation of answer sheets, preparing marks sheets, certificates etc. A computer software can process performance of the functions related with teacher's and employee's promotion avenues and prepare payroll for payment of salary. Nowadays, the computer and specialized software are playing a vital role in library management too. Books, articles, magazines etc. of the library can be searched through computer maintained catalogues. Thus, digital library is a new concept in the field of school administration.

The growth of the computer industry has sky-rocketed over the past few years and has been quiet remarkable. Today, it is the fastest growing industry in our economy. Few schools are now equipped with computers for educating their students thereby making computers an integral part of education system. Teachers use computer technology tools for teaching and other academic processes to prepare students with the reality and integrity to have a competitive edge in the global job market.

The world has witnessed a rapid increase in technological innovations. This era ushered in the advent of the computer technology which has revolutionized teaching and learning in a big way. This work aims to discuss the components of this technology such as computer system (hardware and software), Networking (Internet, e-mail, www), its applications in Nigerian secondary school system, administrative and management purposes, benefits to students and teachers. Certain recommendations are made to support the implementation of National computer policy (1988) and ICT policy statement by the federal government of Nigeria and National council on Education (2004).

Computer Technology for Administrative and Management Purpose in School

It is not uncommon to find that 90% of Nigerian secondary schools are still keeping records in files and tucking them away in filling cabinets where they accumulate dust. Many of these files are often eaten up by rodents and cockroaches thus rendering them irretrievable. A great deal of routine administrative work in schools is still done manually with the state and the Federal government showing little or no interest in embracing computer technology. Educational administrative functions which include keeping both students and staff records, admission/registration process, planning and decision making by the management, accounting, personnel selection etc can be done efficiently and effectively with computer system (Thomas, 1987). The official administrative drudgery in educational institutions can be better managed through computer technology. Thomas (1987), orally, that “Computers bring great
speed and accuracy to each of these administrative tasks, along with the convenience of storing large quantities of information on a compact disk.

The prevailing condition in school administration and management in Nigeria is disheartening and discouraging. The country seems to be living in prehistoric times in the educational administration and management while even developing countries in Africa such as South Africa, Kenya, Uganda and Tanzania are far ahead of Nigeria in ICT applications. Despite its huge material resources and population endowment, Nigeria cannot be counted among progressive nations using computer technology in educational administration and management, as technology has become a critical tool for achieving success in education.

Benefits of Computer Technology to Students
Technology has invaded every aspect of our lives, including the school. Many educators incorporate technology into the classroom any way they can, and classrooms often include a computer for students to share. Students who learn in a classroom with computer access gain a number of educational advantages. From expanding their world views to engaging in projects with their peers, students with computer access stay well connected with the following benefits (Carpenter, 2011).

1. **Access to More Information**
   Students who use a computer in the classroom have access to more information to propel their learning. They can research a topic the teacher talks about in the classroom, using the Internet. Many textbooks come with computer CDs to supplement classroom learning. Educational software programs, as well as online-based games, promote learning as well. All of these resources become quickly accessible with a computer in the classroom.

2. **Increased Likelihood to Write**
   Working on a computer can encourage students to write more, which can improve their writing skills. Students are more willing to write using the computer than with paper and pencil. The ease of typing makes writing less of a physical challenge, and students can focus more on content than the physical process of writing.

3. **Improved Technology Skills**
   Students who access computers in the classroom will build their computer skills, which are invaluable in a technologically sophisticated society. By the time computer use becomes mandatory at the high school and college levels, students will be well-versed in using basic word processing programs, doing computer-based research and typing. Building these skills at a younger age by
way of classroom computers can pay dividends as the student advances through middle school, high school and perhaps beyond. Students also learn to work with the computer programs, such as word processors and Web browsers.

4 Collaborative/Group Learning
Today's classrooms often feature group work, which promotes teamwork, collaboration and compromise. Classroom computers help facilitate this group work. Groups of students take turns working on a single, computer-based document, which is easier than combining multiple written documents. Groups also can conduct research together on computers. Thus, computers in the classroom facilitate collaboration and group work.

5 Learning Enhancement
Students might explore the Internet to find illustrations related to subjects they are studying. Science students might browse scientific magazines or websites. Students also use computers to perform research for their assignments. The 3-D models and interactive games in classrooms have always enhanced the learning process, as interactivity brings students a more thorough understanding of course material. These "extras" are limited and not always possible for many subjects; however, with the power of a computer, online extras are easily accessible. Computers allow students and teachers to access additional pictures, videos, 3-D images and many other educational tools.

Computer Technology as Instructional Aids
One of the most revolutionary technologies that have affected many facets of our lives; including education is the personal computer. Computers are versatile tools that can relate to many aspects of life, from communication, research to problem solving. This versatility makes computer technology a useful tool in teaching and learning (Johnson, 2010). A computer can play the role of tutor in nearly any classroom. Many lessons, instructions and problem-solving materials are available on CD-ROM and the web. Computers can pick up where teachers leave off, tutoring students who fall behind. Computer technology in school is not only beneficial to students but also to teachers in the following ways:
1. Teachers can use the Internet to connect and interact with students via social networking sites and class blogs, share resources, expertise and advice.
2. Computer technology offers flexibility in when and where tasks are carried out
3. Gains in Computer technology literacy skills, confidence and enthusiasm.
4. Easier planning and preparation of lessons and designing materials
5. Access to up-to-date pupil and school data, anytime and anywhere.
Types of Computer Technology in the School and Their Uses

Teachers use computer technology to display information, create charts, monitor students and engage students. Students use technology for learning, practicing and expanding what they have learned. In order to be competitive in the world, students must have access to technology (Leary, 2013). With the rise in educational technology, many school districts are training and preparing teachers and students to work with several new technologies to facilitate learning and student engagement. Tonarely (2013) pointed out that, many of these technologies work particularly well with students, as they're familiar with current technologies and will appreciate a classroom that uses multimedia platforms. Below are some of the computer technology components and their uses:

Software

Computer technology represents such a versatile technology, the potential risks and benefits are highly dependent on the availability of different types of software and the patterns of actual use. Computer technology allows students to use different software that enhance learning such as Word processing that help students with typing and publishing papers, spreadsheet for calculation and data analysis and projection. Graphic software for drawing and painting. Educational software such as interactive educational software that uses drill- and practice, Encarta kids, Typing tutor, computer assisted learning (CAL) etc, enable students to learn course material, attempt school assignments and other educational process at their own pace. Many students need more than just the traditional direct teaching method in order to be successful in the classroom. There are a variety of software that help students practice skills, review material and test specific skills.

Interactive Whiteboards

Many school districts now use interactive whiteboards instead of, or in addition to, chalkboards. A popular choice is the SmartBoard by SMART Technologies. These boards allow teachers to connect to their computers and share files and presentations with students. In addition, students and teachers can control the board, move objects and write text with their fingertips.

Internet Technology

The use of computers also includes the use of internet which has widened the education system to even more possibilities. The internet provides a great deal of access through various information on any subject or research and any other technical information with ease. The Internet is a computer-based global information system and has made it possible for people all over the world to communicate with one another effectively and inexpensively (Chijoke, 2010). Use of Internet among students has grown tremendously since its inception. Most students used the Internet to do research
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work for school-related work, “down-load up –to-date research results from around the world”, to communicate with friends and school mates to share information and ideas.

The Internet can provide resources and websites for practicing skills and monitoring student progress. It also has resources for teachers pertaining to student management, lesson plans and other teaching matters. It has already become a world-wide communication system that many people believe will transform society as profoundly as the telephone, radio or television. Eseyin (1997) described the Internet as a mixture of many services with the two most commonly used being electronic mail (e-mail) and world wide web (www).

Electronic Learning (e-learning)

The emergence of computer technology gave rise to the term e-learning. E-learning is a technology that makes information available to educators, learners, researchers, etc. irrespective of the distance and the technology enables one acquire education even without a physical teacher. It is a set of application and processes that uses computer technology components such as Internet, CD-ROM, DVD, video player, tape recorder etc to deliver vocational education and training. It is also known as on-line learning. Computer Technology plays a vital role in enhancing teaching and learning through e-learning. Students can stay in a home computer and receive lectures, do examination and receive your result on line.

Social Networking and Blogs

Teachers can use the Internet to connect to students while they're at home. Some teachers, for instance, have found that creating a blog on a free site, like www.blogspot.com or www.wordpress.com, is particularly helpful. Teachers can use these blogs to post assignments for absent students. The teacher can also post additional links or files that students might find helpful when they're learning about a new topic. Teachers should allow students to post comments on their blogs so they can have input too. Some teachers might also find it beneficial to create a social networking group or site for their class on a site such as Facebook. In this social media network, teachers could create a professional page for themselves, or they could also start a classroom group to keep students informed on class happenings and to encourage communication.

Audio Files

Auditory learners might benefit from having text, content and teacher's instructions presented in an audio file format. Students can listen to a piece of content in the classroom---an audio file created on a computer or even a compact disc---and then discuss what they've learned with other students. If files are able to be uploaded appropriately, students could even have access to these clips at home.
Obstacles to the Use of Computer Technology in Nigerian Secondary Schools

There are several impediments to the successful use of computer technology in secondary schools in Nigeria. These are: cost, weak infrastructure, lack of skills, lack of relevant software and limited access to the Internet.

Cost

The price of computer hardware and software continues to drop in most developed countries, but in developing countries, such as Nigeria, the cost of computers is several times more expensive. Apart from the basic computers themselves, other costs associated with peripherals such as printers, monitors, paper, modem, extra disk drives are beyond the reach of most secondary schools in Nigeria. The schools cannot also afford the exorbitant Internet connection fees.

Weak Infrastructure

In Nigeria, a formidable obstacle to the use of computer technology is infrastructure deficiencies. Computer equipment was made to function with other infrastructure such as electricity under “controlled conditions”. For the past fifteen years Nigeria has been having difficulty providing stable and reliable electricity supply to every nook and cranny of the country without success. Currently, there is no part of the country, which can boast of electricity supply for 24 hours a day except probably areas where government officials live.

When electricity supply is not stable and constant, it is difficult to keep high-tech equipment such as computers functioning, especially under extreme weather conditions as obtained in Nigeria. In rural Nigeria most inhabitants do not have access to electricity, thereby denying rural secondary schools opportunity to benefit from the use of computer technology. The few Internet access available in Nigeria are found in urban centers.

Lack of Skills

Nigeria does not only lack computer technology infrastructure, it also lack the human skills and knowledge to fully integrate computer technology into secondary school education. To use computer technology in secondary schools in Nigeria, the need for locally trained workers to install, maintain and support these systems cannot be over emphasized. There is an acute shortage of trained personnel in application software, operating systems, network administration and local technicians to service and repair computer facilities.

In Nigeria also, most secondary school teachers lack the skills to fully utilize technology in curriculum implementation hence the traditional chalk and duster approach still dominates in secondary school pedagogy. Information transfer using
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computer technology is minimal or non-existent in secondary schools in Nigeria (Anao, 2003). Teachers need effective tools, techniques, and assistance that can help them develop computer based projects and activities especially designed to raise the level of teaching in required subjects and improve student learning.

Poor ICT Policy/Project Implementation Strategy

The Nigerian Federal Government's 1988 policy on National Computer policy, introduced computer education to the secondary schools (Okebukola, 1997). The only way this policy was implemented was the distribution of computers to federal government high schools, which were never used for computer education of the students. No effort was made to distribute computer to state schools or private schools. Although the government planned to integrate ICTs into the school system and provide schools with infrastructure, concerted efforts have not been made to provide facilities and trained personnel. Thus, most schools do not yet offer ICT training programmes (Goshit, 2006).

Lack of Relevant Software

There is no doubt that the ultimate power of computer technology is the content and the communication. Though, software developers and publishers in the developed countries have been trying for long to develop software and multimedia that have universal application, due to the differences in education standards and requirements, these products do not integrate into curriculum across countries. Software that is appropriate and culturally suitable to the Nigerian education system is in short supply.

Limited Access to the Internet

In Nigeria there are few reputable Internet providers which render reliable services, charge high fees thus limiting access to the use of the Internet. Secondary schools in Nigeria are not given adequate funds to provide furniture, requisite books, laboratories and adequate classrooms let alone being given adequate funds for high-tech equipment (computers) and Internet connectivity. Nigeria is lagging behind other African countries such as Uganda, Senegal and South Africa who are already helping secondary school students in those countries to become better information users. All Internet service providers in Nigeria are based in the urban areas.

Prospects of Computer Technology in Nigerian Secondary Schools

There are numerous and good prospects for the use of ICT in teaching and learning in secondary schools in Nigeria. The following major areas suggest the range of applications that computer can serve teachers and learners in Nigeria.
First, computer technology can improve the quality of education by motivating students to learn. Computer technology such as video computer games and multimedia software that combine text, sound, and colorful moving images can be used to provide challenging and authentic content that will engage the students in the learning process. The efficiency in teaching various subjects could be improved using appropriate educational packages such as drill-and-practice mathematical software either on CD ROM or available online.

Second, if computer technology is introduced in school administration properly, administrative tasks will become faster, accurate and easier than before. Computers can serve all administrative functions properly. They can replace the laborious exercise of filing papers in filing cabinets and shelves where records accumulate dust over a long period of time.

Third, computers can be used for individualized learning in secondary schools in Nigeria. Due to large classes and differences in individual learning style and pace, microcomputers will enable the student to progress at his or her own pace and receive continual evaluation feedback and corrections for errors made.

Fourth, computers can change current pedagogical practices in secondary schools in Nigeria, which depended heavily on the traditional lecture method. It is universally accepted that computers allow more independent exploration, more personally tailored activities, more teamwork, e-learning, web-based learning, virtual learning and more significantly, less didactic instruction. The role of the teacher, therefore, changes from information dispenser to that of information manager, from authoritative source of information to a guide in interactive approach.

Fifth, computers will offer the Nigeria teacher improvement in the techniques of research. The problem of going through the library’s card catalog or periodical indexes can be made easier by typing few key words pertinent to the research topic into a computer connected to Internet and the researcher can receive extensive list of related sources of articles in books and journals in just a matter of minutes.

Conclusion

In modern society, Nigeria needs computer technology to aid teaching and learning and educational management. Computer technology is an instrument for the economic and technological development in the 21st century; therefore, Nigeria cannot afford to be on the wrong side of the digital divide.

The computer technology is an integral part of modern life and contemporary education that can transform students into technology leaders in a sustainable global
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Economy. By integrating computer technology into secondary school curriculum, a fundamental shift in the way a teacher teaches and students learn will be evolved. Therefore, dedicated efforts are needed to ensure that ICT policy statements are translated into reality to make sure that every student is able to acquire the necessary digital competence in the information society and to learn and develop other key competences via computer technology for participation in society.

Nigerian secondary school education system is yet to extensively adopt computer technology for teaching and learning and as a result Secondary school students in Nigeria are already farther behind their peers in developed countries, thus widening the global digital divide. Efforts geared towards integration of computer technology driven instructional aids into the school system, have not had much impact

Recommendation
1. Government should ensure that ICT policy statements are translated into reality.
2. To bridge the gap, both policy and practice need to be implemented. The current policy pronouncements are obsolete and need to be updated within the dynamic world of computers. For example, hardware configurations of 16-bit microprocessor, 640 KB memory capacity and 80 - column printer stated in the policy are outdated.
3. Qualified teachers skilled in computer technology should be posted to various secondary schools in Nigeria.
4. Computer technology should be integrated into school curriculum without further delay and become examinable subjects at secondary school level as a basis for providing sound background for the study of computer technology in tertiary institutions (Chijoke, 2013). Cameroon, for example, has introduced computer education as an examinable subject at the General Certificate of Education Level which has increased computer awareness (Onabanjo, 1997)
5. The Federal Ministry of Power should work towards stabilizing electricity supply in Nigeria.
6. Regular in-service training for teachers must be in place.
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