Computer Education, Information and Communication Technology in Nigerian Primary Schools: Implications for Teacher Education

BY

EKONG, Xavier Moses, *Ph.D*
Department of Educational Technology and Library Science
University of Uyo, Uyo

ABSTRACT

The National Policy on Education (2004:17) stipulates that 'there is urgent need to integrate Information and Communication Technology (ICT) into education in Nigeria'. The document goes further to provide that 'basic infrastructure and training for the realization of this goal at the primary school level' shall be ensured. This paper is of the opinion that one fundamental prerequisite for the attainment of the aforementioned objective in the primary education sub-sector is the training of teachers through a viable computer education programmed. This paper therefore attempted to explain the concept of computer education and its development within the Nigerian school system. It also tried to show the relevance of computer uses in information and communication technology in teacher's education. It was concluded that since computer education ensures the effective utilization of information and communication technologies in teacher's education computer education should be made a core course for students in the Department of Primary Education Studies in Colleges of education in addition to general computer courses offered. This will ensure the effective and efficient use of information and communication technology (ICT) in our primary schools, as teachers at this level are expected to teach all subjects on the time table.

KEYWORDS: Communication, Computer Education, Information, Technology, Primary Schools, Teacher, Education

Introduction

The public image of the computer is of an electronic brain, epitomizing the in-comprehensibility of science. Actually, the computer is a simple machine or rather a group of simple machines whose actions are coordinated by a central automatic control. Some of these machines are electronic and others mechanical, acting together they are able to perform arithmetic and such simple logical processes as comparing or sorting items, they can take in information to be processed hold it while it is being worked on and issue result at the end (Ajelabi 2000).

Lots of scholars have given various definitions of the computer. Ajelabi (2000:160) citing Ellington and Perceival (1984) refer to it as 'a device which is able to accept information, apply some processing procedure to it and supply the resulting new information in a form suitable to the user. A computer can also be described as a general purpose and programmable automatic, electronic information processing machine. The computer differs from other automatic machines because of its control arrangements which are not specific. Thus, through the computer programmes of instruction which sets out in complete details the required sequence of operations, the computer can be pre-set to carry out any of a virtually unlimited variety of processes. The modern computer stands out at the end of a long line of

mechanical aids to calculation and is distinguished from them not by any magical new method of reasoning or calculation but by being automatic, general purpose and fast.

Meaning and History of the Development of Computer Education in Nigeria Education

Computer education is a broad term that encompasses all aspects of learning or studying about the computer. This implies that computer forms the content of the education which is at different stages and depths. Thus, is different from computer in education which refers to the utilization of computer in different aspects of education such as management of learning, keeping records of staff/students, assessment/examinations, etc. computer education within the Nigerian formal education system has been late and slow in policy and implementation. Beginning from 1842 when the first primary school was formally established by the Church Missionary Society in Abeokuta up to the end of the 20th century, there seems to have been no formal government policy on computer education in Nigeria.

It was not until February/March, 1985, that the first national conference on computer applications in Nigeria was held at the University of Lagos, Lagos (Ajelabi, 2000:175). Though the conference did not address the issue of computer education in Nigeria, on the 14th December, 1987, the National Computer Policy Committee was inaugurated by the then minister of education to plan Nigeria's policy on computer education. The major term of reference of the committee was the determination of computer education curricular contents and procedures suited to the needs of Nigeria.

Reasons advanced in support of the policy included the need to: catch up with the rest of the world (2) be ready to enter the 21st century of high technology where computer will undoubtedly be at the centre of all activities and (3) be able to land on jobs demanding computer knowledge.

The committee report, submitted in August, 1988 specified the general objectives of computer literacy in Nigeria to include: (a) to bring about a computer literate society in Nigeria by the middle 90's (B) to enable the present generation of school children at different levels of education appreciate the potentials of the computer and be able to utilize the computer in various aspects of life and later occupations. Adopting the recommendations of the committee on National Policy for Computer Education in Nigeria, pilot programmes were started in Federal Government Colleges in 1988. Some state governments also embarked on pilot activities towards the introduction of informatics into the school curriculum.

As an interim measure towards the successful execution of these pilot activities, a number of teachers were trained for a couple of weeks either by computer companies or higher institutions with computer facilities, depending on the cost considered reasonable by government. Teachers from the Federal Government Colleges were however trained by the National Teachers' Institute (NTI).

Computer Education in Primary and Secondary Schools

The National Policy on Education (2004:17) stipulates that 'there is urgent need to integrate Information and Communication Technology (ICT) into education in Nigeria'; with a further provision that 'basic infrastructure and training for the realization of this goal at the primary school level' shall be ensured. While a similar provision as above is made for secondary education, computer education is offered as a pre-vocational elective at this level of education in Nigeria.

The pilot projects of 4,6 or 8 selected secondary schools in some states in 1988 had by 1995 metamorphosed into full implementation of computer education. Though 18.7 million students are enrolled in over 39.7 thousand institutions of various levels and types, less than 2 million of them have access to formal computer activities except in a few private primary and secondary schools, (Alabi 2002:3).

Relevance of Computer Uses in Education

The modern computer has created new ways of accessing, storing, editing, retrieving and exchanging information through terrestrial cables or satellite networks. Alabi (2002) is of the view that the new information technology as reflected in the technologies of computer and telecommunications has provided new and speedy ways of constructing and delivering courses and new kinds of education resources. The use of telecommunications via micro-computer networks directly for classroom learning can be considered under two broad ways: (a) computer as tools and (b) computer as teacher.

(A) Computers as Tools

(1) Information Processing Tools: A database is a processing tool if you use it to store your own data. Spreadsheets and word processors are common publications used on desktop computers. While on database, the emphasis is on retrieval, in spreadsheets and word-processors, the emphasis is on the processing of the stored data. There is certainty some overlap: word processor or spread sheet documents stored and can be searched, while database can do simple processing in generating summaries and reports (Brown, Lewis and Harcelwad 1985:342).
(2) Data collection and analysis: Computer can be programmed to monitor laboratory experiments in education. The computer collects the data, analyses them and presents a summary of the results quantitatively and in graphic forms.
(3) Data retrieval resources: Data may have text, numbers, pictures, animations, sounds or videos. An example of a general purpose data resource is the CD ROM with much larger ones found online at large remote computers. Again, many computers in the internet provide free information, creating the largest possible data resource from which learners browse for specific information.
(4) Computer modified communication (CMC): includes such activities as electronic mail, text computer conferencing, audio and video conferencing. Its characteristics is that it passively mediates communication between identified individual humans (learners and teachers), not between a human learner and a computer.

(B) Computers as Teachers

I. Computers Assisted Instruction (CAI): Is where software instructs a learner, providing information and testing knowledge or skills. The simplest programmes are not more than quizzes where one or more screens of information are presented and followed by a multiple choice test. Computer can be used in teaching as computer assisted instruction (CAI) Akinyemi (1998:209); Brown, Lewis and Harclewad, (1985:340). CAI can be used in the classroom for drill and practice, tutorial, simulations and problem solving.
II. Drill and practice: This is the most common and also the simplest use of the computer to provide the learner with drill and practice exercises on content the learner but not yet mastered

III. Tutorial: This uses the computer to teach a series of concepts often developed like a programmed instruction lesson. This type of programme can be used for instance, to assist a pupil who was absent when 'characteristics of living things' were discusses in a primary science lesson. Rather than make that pupil to wait until the class has study time again for an explanation of the taught lesson, the teacher sends him (pupil) to the computer laboratory to use a tutorial lesson on this concept. While the characteristics of living things, the third, asks him questions to test his comprehension of the concept.

IV. **Simulations:** Computer-based simulation means the creation of the model of a real-life system inside a computer and subjecting that model to varying stimulus, observing the model's behavior in the process. The probable behavior of the real-life system under all possible operational conditions can thus be deduced before even committing any funds to the building of the actual system.

V. Games: Games are useful for instruction which can be played between two or more learners among themselves. Games are good instructional tools if they are content-based.

Demonstrations: These are closely related to games used for illustration in form of audio-visuals. They allow for better interaction between learner and media (Anakwe 2002:137-141).

Computer Education, Information and Communication Technology in Nigeria Teacher Education:

The current wave of globalization has resulted in the transformation of the world from a collection of many lands and peoples to a system of many lands and peoples (Pike and Silby 1988:4). Elaborating further, they 'submit that:

> The isolating effects of distance have been and continue to be overcome as a result of technological and electronic resolutions in transport and communication. Advances in transport have caused the world to 'shrink' geographically in that people and bulky goods can now be speedily conveyed between one part of the globe and another. Advances in communication have shrunk social, economic and political time and distance. The shrinking of the world and the migration of peoples have both influenced and been influence by the emergence of an economically inter-dependent world.

Education, 'an instrument par excellence and national development' needs to take cognizance, of these emergent trends and provide adequately for the production of youths with requisite attitudes and skills to cope with the changing society.

Information and communication technologies currently applied in education include. Computers, internet, electronic mail (e-mail), teleconferencing, World Wide Web (www) and electronic white board (Butler and Steven 1999).

The teacher who is often at the heart of the education process requires to imbibe these current and needed attitudes, skills and competencies at reasonable levels to be able to function effectively.

The injections of information and communication technology in teacher education programmes the world over has been sporadic. For instance, Bozeman (1981) reports that due to the ignorance of some educators of the relevance of computer-based education in teacher

training programmes in the United States of America, teacher education curricula were completely devoid of aspects of computer education. Moreover, it was only when it was realized that Britain's education and training system was not providing enough jobs for the majority of the audit population in the face of micro-electronics revolution that computer science, the development of packaged learning techniques, in-service teacher training courses and education for technological management were suggested and implemented (Ugwanyi and Olokun, 2004).

Perhaps the greatest boost to the integration of information and communication technology into teacher education programmes is the India example in which it was shown that ingenious combination and interfacing of older information technologies (audio and video tapes, radio and television, instructional television and new ICT (Internet, web, e-mail and teleconferencing techniques) can solve problems of acute shortage of books, and limited quantity of teachers (Isyaku, 2001). Presently, countries that have made remarkable achievements in the integration of ICT in the teacher education programmes include Belgium, Denmark, Italy, Malaysia, South Africa, Kenya, Tanzania, etc.

The integration of ICT into the Nigerian teacher education programme according to (Uqwanyi and Olokun, 2004:46) specifically dates back to the 2000, following the introduction of computer education studies into the Nigeria Certificate in Education (NCE) curriculum. This implies that all candidates registering for the NCE programme across institutions and irrespective of course of study will be expected to acquire basic knowledge and skills of computer in particular and Information and Communication Technology (ICT) in general.

The general computer courses with compulsory status are housed in the General Studies Education (GSE) department. The course contents for GSE 107 and 108 specified in the Minimum Standards of the National Commission for Colleges of Education (NCCE) (2002:28-9) are; **GSE 107: Introduction of Computer Studies 1.** (1credit).

1a. Definition and meaning of the computer;
b. Data and information scope;
c. Brief historical development of computer;

2 Classification of computers
a. By size, purpose, capability, etc.
b. Device system and application software

GSE 108: Introduction of computer studies II- (1credit)

1. Introduction of networking

2. Computer operations
   a. Booting, window, keyboards, the mouse, loading, application, etc
   b. Introduction to word processing
   c. Practical use of word processing application

3. Introduction to electronic spreadsheet such as MS-EXCEL or Lotus 1-2-3.

4. Application of computers in education
   a. Advantages and disadvantages
   b. CAI CAL, Multimedia
   c. Demonstration of education on CDS-English mathematics, etc.

It is hoped that on successful complication of these course contents by NCE graduates, they should sufficiently be equipped to function efficiently and effectively in the 21st century classrooms with their emphasis on globalization.

Hindrances to the Development of Information and Communication Technology in Nigeria Teacher Education

Inspite of the numerous benefits that the school system stands to derive from the integration of ICT into teacher education, the following bottlenecks are prevalent in the Nigeria situation.

(i) **Inadequate funding:** The education sub-sector in general and teacher education in particular has not been adequately funded by successive Nigeria governments in their annual budgetary allocations over the years. For instance, while the sectoral allocations of the 2002 Federal Government Budget reserved a total of 16.8% of the recurrent budget for a repressive forces of government (defence, 9.9% and Police 6.9%), education, which includes primary, secondary and tertiary levels, was allocated a paltry 5.6% of the recurrent expenditure (Academic Staff Union of Universities, 2002:6-7). Commenting on this lopsidedness, ASUU states that: 'for a government, which signed an agreement committing it to upward review toward 26% allocation to education, the 5.6% allocation to education in 2002 is, to say the least, calling into question the commitment of the present government to democracy; for education is the heart of democracy'.

(ii) **Poor infrastructure/equipment:** There are specific infrastructure and equipment required for effective computer education, information and communication technology to thrive. These are currently as (Ugwanyi and Olofun, 2004) note are in short supply as only 15 (22.73%) of the Colleges of Education in Nigeria have functional internet services with 60% (47) not having any internet facilities at all, the e-mail facility is found in only 7(0.6%) of the colleges with as much as 59(89.39%) not having the facility. Even older information and communication technologies as inter-com and radio communication system cannot be said to be available and functional in Nigerian teacher educational institutions as only 27 and 20 of these institutions have the aforementioned technologies respectively (Ugwanyi and Olokun, 2004).

(iii) **Acute Shortage of Trained Personnel:** The computer science, information and communication technology sub-sector like any other new and specialized personnel such as technicians, graphic artists, instructional materials designers, developers and instructional communication experts, etc. Surface it to say that majority of those involved in the computer, information and communication technology today are not sufficiently trained and qualified. Hence, most practices are undertaken on the basis of trial-and-error.

(iv) **Erratic Power Supply:** Virtually all computer and information and communication technology-based equipment require steady, continuous and sufficient supply of electric power. It is common knowledge that power supply in Nigeria is not only erratic but also insufficient as the quality of power supply most often is not more than 'sparks'. Thus, it is often said that the activities of the National Economic Paralyzing Authority (NEPA) have not changed as it has now become Power Holding Nigeria Company (PHNC).

(v) **Poor Attitude:** The attitudinal disposition of most users of ICT is to say the least non-committal. This is often hinged on the real or perceived fear of displacement. People, especially teachers are of the opinion that the application of computer in

education will lead to their ousting from their jobs, thus they are opposed to and uncommitted to computer usage.

(vi) Location of Teacher Institutions/Absence of Telephone Services: most teacher institutions are located in rural and remote areas where required and necessary telephone services are either not available or non-functional. Hence ICT facilities and other accessories cannot be operated in the absence of supportive services.

Conclusion

ICT is a phenomenon that cannot be pushed aside as it is fundamental to functionality in diverse aspects of life today. Once the teachers at the foundation level of our education are equipped with the needed ICT skills, then the future of the society shall have been assured as the teachers will no doubt lay the needed basic foundation of computer appreciation in the psyche of the children.

Recommendations:

1. Since the primary school teacher is expected to teach effectively all the primary school time table, he requires more specialized knowledge in computer education to be able to apply information and communication technologies in his classroom activities. It is therefore necessary to make computer education a core course in the department of primary education studies in all NCE awarding institution. This will provide the needed skills and competences in performing of modern classrooms.
2. The National Commission for Colleges of Education (NCCE) in collaborating with the Education Tax Fund (ETF) should increase financial allocations to the colleges for ICT infrastructure and gadgets.
3. The funding bodies should set up special monitoring committees to ensure that funds are judiciously used by colleges and for a specified purpose.
4. In-service programmes should be mounted in all colleges for staff to be exposed to the requisite skills in ICT. The Centres for Educational Technology (CET) in the colleges can be empowered in the direction.

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