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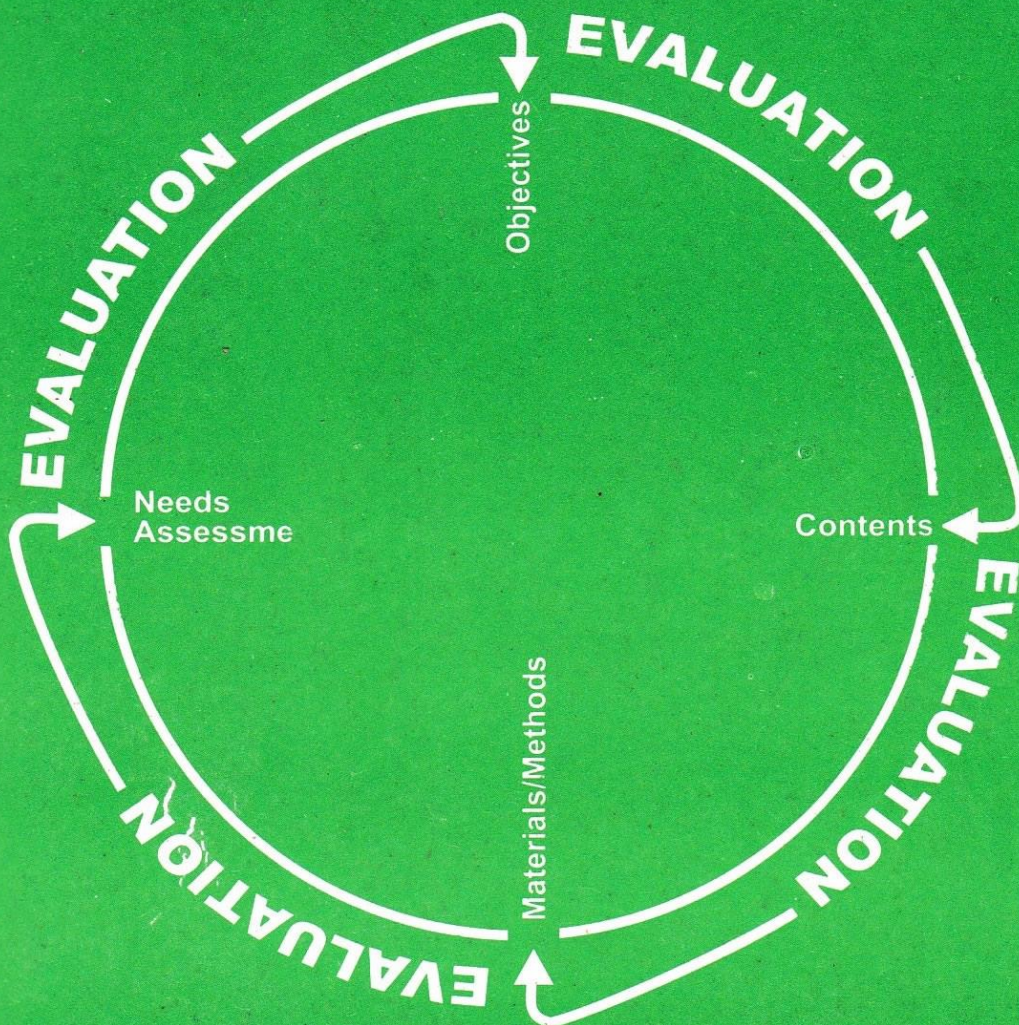
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EFFECTIVE UTILIZATION OF INFORMATION AND COMMUNICATION TECHNOLOGY: IMPLICATIONS FOR TEACHER EDUCATION

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ABSTRACT
Development in Information and Communication Technology (ICT) is indeed phenomenal and unique. There is no facet of societal life that is not affected by it. The application of ICT tools in education makes both teaching and learning to be exciting, challenging and very effective. Realizing the usefulness of ICT, the need to develop relevant skills for effective utilization of the technology, and the fact that teachers cannot impart what they do not possess, this article makes a case for the integration of ICT programme into the curriculum of teacher education in Nigeria.

Introduction

We are in a technological and information rich era. The evolution of microcomputer has brought us into what Leveson (1981) foresaw as computer revolution. The society is being profoundly altered through the ability to imprint thousands of transistor-like components on a chip of silicon. The impact of the computer on work we perform, our access to information, how we interact with each other and our life-styles has been enormous.

Technology may not only be considered as tools, process and products. It is about work. It is about human action on physical objects by serving human purposes. The realm and subject matter of the study of technology should be human work. Presently, the occupational structure is changing in some aspects. This change has occurred in the elimination of old jobs and creation of new ones. Jobs as we know them are disappearing, to the extent that when a counsellor talks with a student he may not be quite certain of what might or might not exist in the market-place. Permanent employment is giving way to contract, temporary or contingent employment (Anwana & Akpan, 2003). It becomes apparent that the problems to be encountered in this technological era will not simple be technical ones, but human problems as well.

Though it may be difficult to speculate on the exact features of work in the futures, it is important to consider the influential trends and their impacts on people lives. Understanding these trends will be a vital component in assisting people to manage their careers and personal lives.

The concept of information and communication technology:

The combination of advances in computer technology and communication technology has been referred to as compunication (Hahn, 1981) or telematics (Martin, 1981) and has brought about the phenomenon known as Information and Communication Technology (ICT). Ozoji (2003) defined Information and Communication Technology (ICT) as the handling and processing of information which may be in the form of texts, images, graphs, instructions and so on for use by means of electronic and communication devices such as computers, cameras, telephone, etc. According to Aniegbogu and Umeh (2003) and Salau (2003), ICT encompasses all that is involved in modern communication technologies such as communication satellites, radio, television, videos, tape recorders, compact discs, floppy diskettes and personal computers and other related equipment so that the output generated can reach the users at reasonable cost and in good time to the overall benefit of mankind. The term may be used to refer to internet and the information super highway such as fibre optics technology. ICT constitutes part of the globalization agents which are transforming the present world into a global village. According to Nwosu (2003), the ease of data processing and transmission provided by these technologies have engendered a flow of information across borders and between individuals, cultures and nationalities as never before, causing great technological, economical and social changes and shrinking the world more closely into a global village.

Advancement in information and communication technology are taking place very rapidly each passing day such that there is rarely any human activity that can be mentioned without reference being made to it. The development of information and communication technology is indeed phenomenal and unique. Salau (2003) highlighted some characteristics that differentiate ICT revolution from others that occurred before it to include:

(i)   it is happening at an extremely fast pace,
(ii)   it is spreading over all corner of the globe,
(iii)   the effect of the revolution is being experienced by all sectors of the society
(iv)   the demand for its product is insatiable.

Beneficial Effect of ICT on the Society:

The growth of compunication or telematiccs has spawned an information society. The economy of many nations has rapidly evolved into one dependent upon the information sciences as its primary industries. The network by which this information travels is creating a metamorphosis of the entire concept of work and human interaction. Bonnet (1981) had identified some general effects of this technology as follows:

1.   *Movement of information rather than people:* ICT has increased the personal appeal in sending messages and information electronically. Instead of highways for transportation, highways for information are needed to connect vitual cities, that is, the communities, campuses, laboratories or corporate offices geographically dispersed but electronically connected. Telephone conference calls, picture phones, teleconferencing room, communication via data buses, and e-mail have reduced the need for travel, thereby saving time, money and physical stress.

2.   *Decentralization of work:* Information networks have enhanced and encouraged decentralization of work. Some work aspects can now be carried out at organizational satellites. This would prove beneficial in areas where workers shortages exists. For example, placing word processing units within homes to expand the typing pool in geographical areas where secretaries are in short supply. It also seems reasonable to assume that the home will become a future work site because almost any white-collar work could be done there. This also has some far-reaching consequences. As commuting is curtailed, mass transportation and highway systems will be affected. There will be an increased flexibility in work schedules as activities can be performed at any time. Cities will no longer be considered loci of business and industry. The need to live in an urban area will be reduced.

3.   *Expansion of workforce:* ICT has the potential of making work accessible to those previously excluded from the labour force. Persons with family responsibilities will have more options in the way they chose to combine career and family goals. Disabled workers restricted by physical barriers can work from home. Senior citizens can continue to be productive members of the workforce through full-time or part-time employment from convenient locations. Those choosing to live in the rural areas will no longer discriminate occupations because of geographic preference.

4.   *Automation:* Another benefit of the ICT technology is in the use of machines to do manual tasks. This has resulted in high productivity and in upgrading work standard.

Educational Potentials of ICT:

Information and communication technology has made great impact in all aspects of human endeavour. Its application in education system has richly affected the system. The computer with its virtually instantaneous response to student input, its extensive capacity to store and manipulate information and its unmatched ability to serve many individual students simultaneously is becoming more and more widely used as an aid to instruction. The computer has the ability to control and manage a wide variety of learning materials and also record, analyze, and react to student responses.

There are two major areas of application of ICT in the teaching and learning process. These are the computer Assisted Instruction (CAI) and the computer Managed Instruction (CMI). In CAI the student interacts directly with the computer which stores the instructional material that has been programmed into the system. In CMI the computer helps teachers to administer and guide the instructional process by administering diagnostic tests, scoring them,

prescribing appropriate next steps, and monitoring the progress of each student all the way along the learning process. Beside these, the use of internet, electronic mail, tele-conferencing, web site hosting, topic searching and file transfer have provided a wide range of topics and interests in all fields of endeavour. The employment of these media can serve to supplement and complement information from prescribed texts and classroom interactions as well as laboratory activities.

As an instrument for instructional strategy, ICT can be used to present difficult and abstract topics and concepts through varied pedagogical approaches in an exciting and captivating way. ICT will, to some extent, help to minimize the problem of teachers scarcity in certain areas of specialization. Available teachers would save considerable amount of energy and time and use same to engage in other instructional improvement activities. Oloruntegbe and Odutuyi (2003) enumerated the benefits of ICT based instruction as making learning exciting and challenging, allowing quick responses and feedback, allowing learners to proceed at their own pace, increasing moderation, enabling students to gain both qualitative and quantitative understanding of the topics studied, and stimulating experimentation. According to Ivowi (2002), an index common to both the characteristics of information age and the consequences of ICT is the propensity for many sources of information. With ICT the learner no longer depends solely on the teacher as the only source of knowledge. Through internet, both the teacher and the student could have access to current textbooks, required information can be made available to both the teacher and learner within a short period.

Implications for Teacher Education:

Information and communication technology, undoubtedly, provides the most effective means of rapidly disseminating information and imparting knowledge. It has the tremendous potential to enhance the teaching and learning process. However, one must not loose sight of the fact that ICT tools themselves do not automatically change the nature of teaching and learning. The ways teachers can integrate ICT tools with classroom instruction through their creativity would serve as the catalysts that create fertile and thriving learning environment (Gates, 1995). Since ICT is useful in the entire school curriculum, the teacher's competence in the use of ICT for instruction should be one of the requirements for the certification of teachers in Nigeria. Definitely one of the objectives for teacher education in Nigeria as stipulated in the National Policy on Education is to provide teachers with the intellectual and professional background adequate for their assignment and to make them adaptable to any changing situation, not only in the life of their country but in the wider world. The policy also recognizes that no educational system can rise above the quality of its teachers. Such awareness indicates the importance of teachers in the whole system. By implication, therefore, development in ICT should engender the incorporation of ICT concepts and technologies into teacher education curriculum. The training of teachers in the use of ICT as an educational tool should concern teachers of all areas of specialization at all levels of education. Two broad areas of competencies which the teachers need to be trained have been suggested by Oyebanji (2003). The first is a personal competence in ICT with the application and programmes to be used. The second is to possess mastery of teaching strategies, management of information system and other issues which involve the use of ICT in the classroom. Capacity building among teacher educators themselves should be taken as paramount importance. Obviously, one cannot impart what he does not have.

Conclusion and Recommendations:

Information and communication technology is a broad-based technology that supports the creation storage and manipulation of information for the purpose of promoting awareness. ICT has made significant impacts in nearly every aspect of the society. Since it has now become a prevalent part of life that one needs to be well informed to be able to function productively in this age of information explosion and technological advancement, the acquisition of appropriate ICT competencies need to be given serious consideration in the education of the citizenry and particularly in teacher education in Nigeria. The increasing dependency of education on ICT is inevitable as it helps meet the needs of learners. It provides greater opportunity for individualized instruction in relevant subject matter areas. The pedagogical rationale for ICT focuses on the improvement of teaching and learning. Teachers at all levels of education should be encouraged to use or increase the use of ICT in the classroom. Completion of courses on ICT should become a pre-requisite for teacher certification in Nigeria.

The following recommendations are made for effective infusion and implementation of ICT programmes in teacher education:

Adequate budgetary allocation should be made for the inclusion of ICT into teacher education programme. This will facilitate acquisition of some basic gadgets and necessary linkages.

There should be adequate back-up systems such as standby generators, uninterrupted power supply, stabilizers and diskettes to sustain the system in the face of unstable electricity, disaster and other environmental hazards.

Educational resource centres should provide resources and experiences that will enhance teacher skills in the use of ICT in the classroom.

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