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**THE ROLE OF INFORMATION AND COMMUNICATION  
TECHNOLOGY IN EDUCATION AND HEALTH**

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## ICT IN EDUCATION AND HEALTHY

### ABSTRACT

*Information and Communication Technology (ICT) is impetuously spreading in developing countries that its contribution in work is becoming more apparent to most of users. The indisputable acceptance of the technology becomes more expedited when people become informed about it and skilled in using it. Developed countries have made ICT an integral part of human life in business; industry; governments; politics; education; health services and in homes. However, present indicators show future prospects for the developing countries to posture similar automated working environment in which majority of work places will require employing competent personnel in ICT. Inherently, the impact of ICT in the society will very much depend on policies, strategies, conditions formulated within each working place and society in general. Just as important also, it will depend on individuals' intrinsic and extrinsic efforts accompanied by the ability to understand and work with the technology. The purpose of this article is to discuss on the roles of the technology apparently found in most developed countries that may be progressively emulated by the developing countries. Precisely focus is on the role of ICT; education; and Health services. The implications on the use of ICT in developing countries are highlighted mainly on work-reorientation, policy reforms, global economic competition, infrastructure; retraining and accountability.*

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### 1.0 INTRODUCTION

An instrument which started as a counting board (abacus) by 450 BC, later a portable calculator, today has become a corner stone of technology with artificial intelligence. The microchip has created a portable computer adaptable to various human fields of national development. As computer technology becomes integral part of human life in business; industry; government; education, and in homes, work becomes most efficient. Computer technological advancement has reached a stage where it permeates most of the electro-machines forming what is today known as Information and Communication Technology (ICT). This article discusses on the advances of ICT on societal development apparently found in most **developed countries that may progressively be emulated by the developing countries**. The major focus is on the role of the technology to a society in education and medical services. Finally the article highlights some of the implications of the technology in developing countries.

### 2.0 INFORMATION AND COMMUNICATION TECHNOLOGY IN MEDICAL SERVICES

Most sophisticated programmes have been developed for medical use in administrative and clinical tasks. Hospital doctors and nurses who are keen in handling difficult situations with the ever-changing computer technology, see how it is easier to work in hospitals today than in the past when every task had to be done manually. A contemporary doctor with sufficient knowledge and

skills on the use of computers, does not need scratching the head in searching medical records, diagnosing diseases, locating defected parts of the human body, prescribing medicine and so on.

## **2.1 The ICT in Hospital Administration**

A hospital has admissions of patients; employs administrative personnel, doctors, medical assistants, nurses, secretaries, typists, lab-technicians, accountants, cleaners, cooks and so on. Training hospitals admit students and teaching staff as well. The senior administrators usually face three key roles such as planning and making viable decisions; applying leadership knowledge and skills in interaction with hospital community who are implementers of various hospital duties. Essentially they act as information clearing-house within the hospitals and between the hospitals and outside other organizations. Since management of hospitals is a complex and sensitive process, developed countries have managed to facilitate in offering the best care and treatment services with minimum costs as possible by using ICT facilities.

## **2.2 Doctors' Office and the ICT**

Doctors' office uses ICT facilities for, among other things, clinical work such as surgery; pharmacy; laboratory; nursing and even mortuary, research, and many others. Most complicated surgery, for example, can easily be done using computers in investigating patients' problems. Doctors can also be guided accurately on surgical process of a patient providing various alternatives and treatment. The tedious and most risky work which doctors' office used to have before the computer technology is very much simplified, more accurate and much faster now than ever before. In very near future the intelligent robotics technology will most likely be in-place to assist and interact with the human personnel in working together (Yamashita, 1987; Martensson 1987)

## **3.0 INFORMATION AND COMMUNICATION TECHNOLOGY IN EDUCATION**

Most of the work places of developed world, have ICT in offices just like telephone receivers. Contemporary educational organizations, teachers and students have to grasp the challenge to introduce and learn about computers thoroughly well. When students graduate from schools, colleges and universities, are bound to face a job market quite different from that which their passed generation faced. Even in some of the major universities, ICT knowledge and skills is one of the prerequisites for securing admissions to pursue degree studies or certain graduate programmes. In this section discussion will focus on how ICT can be used to perform various tasks in educational administration, teaching and training, educational library service and research.

### 3.1 Educational Administration

At school and college level, including universities, there are different programmes that are designed for student registration and record keeping of the workers and students. Students' home background records and their addresses, parents and guardians' names and their addresses, students' health history and so on can be recorded in computers. Similarly students' academic progress reports can be recorded, monitored and be produced at any moment they are needed. By the use of computer-based file managers and spreadsheets' programmes can facilitate budgets for the institutions and procuring instructional equipment and materials, new projects, staff development and recruitment.

### 3.2 Teaching and training

There are two main **categories** of programs namely: **application programs** and **instructional programs** that, in conjunction with the system programs can be used in classroom teaching and learning. **Application programmes** are designed to perform various tasks ranging from designing and preparing teaching materials, statistical analysis in educational research, entries of students' records, inventory tasks, educational budgeting, communication, to various tasks related with word-processing, graphics and the like. With the use of word processing and graphics programmes, teachers can prepare their own instructional visual materials based on the objectives of the lesson. Graphics programmes such as SuperPaint, ClarisDraw, PC Paint, Print Shop and and PowerPoint in combination with word processing programmes allow teachers to prepare handouts, overhead transparencies, news-letters, bulletins and other desk-top publications. Today PowerPoint Lecture/lesson presentations are becoming common in most lecture halls.

Current ICT facilities and software can interchange instructional materials from video to the computer screen and from computer screen to the video screen. In this way, a teacher is given a variety of tools within the computer technology for a variety of uses in teaching. The major difference of **application programmes** from **instructional programmes** is that, they allow the user to manipulate them in order to solve problems or to create new work with much flexibility in modifying or transforming the existing piece of work to the user's satisfaction. They do not teach subjects as instructional software would do in mathematics, geography, history and others.

On the other hand, **instructional programmes** are designed purely for teaching and training in-built packages of various subjects such as Mathematics, Geography, Language and the like. The learner has to follow the subject matter that is already programmed. The broader approaches to classroom instruction that are commonly used include Computer Assisted Instruction (CAI) and Computer Managed Instruction (CMI).

CAI are programmes designed as a method of teaching students in various subjects with the help of classroom teacher. The teacher develops a lesson in such a way that a computer program will assist in teaching the material of a given topic. Essentially, a teacher plays a major role in articulating and monitoring the classroom environment for the students to learn the subject material through classroom instructions and then reinforced by the computer instructions using various techniques such as drilling and practice; demonstrations; imitations; and tutorials. Students and teachers can access information from various parts of the world through ICT facilities.

On the other hand, Computer Managed Instructions (CMI) are self sufficient programs for teaching students without necessarily the presence of the teacher. This approach may encompass each of the techniques applied under the CAI. The difference between the CAI and the CMI is the level of programming of the topics in various subjects. With the integration of computer technology and other different types of media technologies, it has been possible to develop multimedia instruction programmes for various subjects to be used under CMI. The externally attached sources may be audiovisual materials from video tapes, discs; television; graphics as textual materials from CD-ROM, and overhead transparency projectors. Multimedia instruction through CMI approach is also becoming popular in industrial ad business training due to their effectiveness and efficiency in learning.

Tests and examinations are also integral part of instructional process in educational institutions. Teachers can make their own examinations' questions and keep them in computer records as **examination bank** for future use. On the other hand, there are computer programs that are capable of compiling and duplicating examinations or tests. They can correct each question and compile the grades. In addition they can produce reports and comments for the examination in each subject and for each question item.

Classroom instructions depend very much library material. Most of educational institutions in developed countries and some developing countries have provided ICT facilities in library services for teachers' and students' accessibility. Bibliographical search for instructions, learning and research works, have been made much easier, quicker, and most efficient than the conventional index card. The users are informed about the type of collections in various libraries within the local network and at global level. On-line computer systems provide location of the needed literature, and sometimes together with the abstracts from various libraries in the world. With the inter-network system teachers and students can be accessible to various electronic libraries internationally within a short time.

ICTs are also special tools in preparing research and analyzing data. Depending on the type of research, there are statistical software of different types and sophistication that can be used to analyze data. In the past, educational institutions of higher learning were sending their research data to the mainframe computing centers for statistical analysis most of which used punching cards and levied very high expenses for using the computer services. With the use of modern microcomputers, data can be processed by powerful statistical packages within the office without using punching cards any more, and without wasting time and money for using mainframes in computing centers. Statistical analysis software can provide various types of graphs or charts and interpretation of the output.

#### **4.0 IMPLICATIONS OF INFORMATION AND COMMUNICATION TECHNOLOGY IN DEVELOPING COUNTRIES**

##### **4.1 Prospects in developing countries**

Developed countries have made ICT an integral part of human life in various forms of use in education; business; industry; governments; politics; and in homes. However, present indicators show future prospects for the developing countries to posture similar automated working environment in which majority of work places will require employing competent personnel in ICT. In order to achieve this goal developing countries can make a substantive impact on national development if policies and deliberate planning in all sectors are increased than what it is now.

Along with planning on the use of computers, focus should also be on expanding computer use in various forms, instead of using it in the traditional way like another modern electric-typewriter for the secretary and typist only. Other areas of consideration would be on how to improve ICT related infrastructure such as reliable electricity; retraining and changing attitudes of workers in order to cope with world technological transformation most indispensable in 21<sup>st</sup> century.

##### **4.2 Work re-orientation**

The implications of the development of ICT to the society, is an obvious one for those who have lived with it for some decades. Apart from work redundancy, it has been necessary to re-train the remaining workers, and deployment of others to other working areas including self-employment. These are inescapable realities of experiences which developing countries have to foresee when providing ICT facilities in their work places in speeding up national development.

##### **4.3 Competing Pressure From World Market:**

The main intention of using ICT is to increase work efficiency to improve the quality of education and health services with minimum human labour and time. Working conditions, salaries and various benefits can be improved for the remaining workers in these two sectors. If developed countries are competing in quality of education and health services, then developing countries are bound to use the same formula in order to compete in the world market. Oppositely, manpower and services from developing countries may find themselves very substandard thus remaining is very slow pace in development. Education acts as a fulcrum of development in any country. Hence, developed countries will globally take-over and control industrial and market economy of developing countries as a new order of economic imperialism.

#### **4.4 Responsibility and accountability**

Inherently, the impact of ICT in the society to an educator, industrial worker, commercial dealer, government worker, politician, medical worker, and many others, will very much depend on policies, strategies, conditions formulated within a working place and society in general. Just as important also, it depends on individuals' intrinsic and extrinsic efforts accompanied by ability to understand and work with the ICT.

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