TEACHING COMPUTER FOR PRODUCTIVITY

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ABSTRACT

The innovation of computer has achieved far more than Charles Babage who invented the analytical machine in the 19th Century anticipated. Today, in the 21st century, almost all facets of human life have been totally eclipsed by computer application; be it in health, business and commerce, politics, education, law, meteorology, astronomy, etc. Training in computer skills has therefore become quintessential to productivity for any country willing to harness its resources for national development.

INTRODUCTION

A computer by simple definition is a machine that accepts data, stores it and processes it into useable information. From the invention of the "Analytical Engine" by Charles Babbage in the early 19th century to the development of Electronic Digital computers by large Public Universities in the United States, computers have continued to remain outstanding in playing an increasingly vital role in human learning.

The basic components of a computer include – the Central Processing Unit (CPU), the Visual Display Unit (VDU) and the keyboard, all of which are programmed to execute a variety of functions like statistical analysis, word processing, document retrieval, etc, thus, making it applicable to different fields of study, business and research.

The different uses of computer and its application to almost all fields of study and endeavour have made computer literacy a necessity to all social and economic life. The term computer literacy is a concept, which suggests a basic experience or familiarity in computer usage. For the individual to be effectively well informed in the secular society, he/she must be computer literate. Today computer related skills have come to play an important role in educational and social mobility. The

employment market, for example, has become very competitive because of the requirement for computer skills.

The computer is programmed to execute different functions in a variety of ways and for this reason is profitable for saving time and preserving intellectual energy. It transfers the necessary but routine clerical tasks of a tedious mechanical kind to machines. Stair Jr. (1986) stated that.

> *"...the computer is like a double-edged sword. It has the ability to cut us free from mundane activities, but it can also slice deeply into profits, personal privacy and the society in general..."*

Logsdon (1980) also defines the computer as:

> *"...any automatic device (usually electronic), which is capable of storing relatively large amounts of data and executing complicated sequences of mathematical or logical operations without human intervention..." Computers are very effectives tools for training: by it's general make-up, it guarantees an interactive learning process between it and the user. In the educational set-up for example, the concept of Computer- Assisted-Instruction (CAI) has served to boost productivity amongst students at whatever age, the computer enables the student to learn at his/her own pace by tutorial sequences for the purpose of teaching useful facts, skills and concepts. Also, automation which has been one of the greatest challenges to the industrial sector is achieved through the computer by promoting productivity. Contrary to fears earlier expressed of widespread unemployment, the computer has more or less improved worker productivity – these gains have been made through mechanization and a better-educated workforce. Computer training is therefore the key to unlocking the promised productivity.*

COMPUTERS IN EDUCATION:

There are two major objectives utilizing computers in education namely:

- To teach people computer skills by making them computer literate.
- To teach traditional subject areas with the aid of the computer through the aid of Computer-Assisted Instruction (CAI).

Until recently, learning about the computer was a choice that college students made if they were interested in working with these machines as computer professionals. These choices were made by students who worked in areas where there was much data to be processed, particularly areas such as accounting or finance. Based on the indispensable usage of the computer in this present age, it becomes imperative every student becomes computer literate.

While this remains the primary motivation of many college or university students who enroll in computer programs, computer literacy is carefully being viewed as a prerequisite for all students.

Computer literacy, broadly defined, implies an understanding of how the computer in general, operates and how it can be used for specific applications. Almost everyone today can be classified as a computer user, since we are all affected by automation in banking, education, shopping and so on. If we are to effectively understand the way these machines function and their impact on our lives, we must become computer literate. It is against the need for everyone to become computer literate that Carnegie (Mallon University) required all of its Computer Science majors to purchase an IBM Personal Computer. These machines were sold to students at substantial discounts. The purchase price was spread out over a period of four years and was built into the tuition cost. Today in Carnegie-Mellon, all students in all disciplines are required to obtain personal computers. This practice should be adopted in Nigerian universities to make computer literacy as an important university goal. Many boards of education in Nigeria have begun to mandate that computer literacy be a requirement for all high school graduates. Computers have begun to impact virtually in all areas

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of our environment. It has thus become expedient that learning to understand how they are used be encouraged.

COMPUTER ASSISTED INSTRUCTION (CAI)

Computers are utilized in education to help students learn a wide variety of subjects beginning with Spelling, Music, Geography to Mathematics and Science. In almost all cases, the computer is a "programmed learning" tool with short well conceived modules of instruction which are displayed on a terminal screen, followed by questions to which are to provide immediate response. These responses are evaluated and a computer-produced response followed. This affords the students an instant assessment of his/her performance as to whether or not he/she is truly grasping the fundamentals of the subjects being taught. There is thus no need to wait for the traditional and periodical class test which in some cases makes the students nervous.

Computer-assisted-instruction uses the following teaching strategies with optimal anticipated successes and results.

(a) **Drill and practice**

After a teacher has introduced a subject, the computer can be used to reinforce learning through practice problems. Using the computer for drill-and-practice saves the teacher the time it would ordinarily have taken for providing and grading practice exercises.

This CAI technique has become so successful that many vendors of CAI course materials actually guarantee results.

(b) **Tutorial**:

Computers also teach course materials with the use of a tutorial, which is a subject module designed to allow students to learn at their own pace. The modules frequently use computer graphics and sound systems to make the learning experience as exciting as possible.

After a student completes the module, series of questions are provided to test their learning. If the questions are answered correctly, the student proceeds to the next module, if not, an alternative tutorial on the same subject is provided. In this way, the student gets the advantage of a number of different teaching techniques. A lot of students who may be classified as slow or unmotivated learners find computer-assisted-

instruction stimulating and challenging. As a result, they often learn more, and at a quicker pace. Since students at a terminal can proceed at their own pace and not feel threatened by peer pressure or any other external competitor. This type of education can be reckoned with as a positive strategy.

(c) **Simulation:**

Computers are excellent tools for simulating experiments that would otherwise be too costly or take too long to produce results if manually carried out.

Students may be asked to hypothesize on the results of a particular experiment before it is simulated. For example, Social science modules with simulated population trends, polling techniques, physical and biological science modules, are available in which simulated experiments are performed. Chemistry students can perform simulated experiments without putting themselves into physical danger (acids attack or radiations). Medical students can use simulation packages for testing their diagnostic skills, which is a good way of helping them make diagnoses without jeopardizing the welfare of the patient. Aircraft simulators are also used for teaching prospect pilots to fly under a variety of circumstances. Simulators are also available for teaching air traffic controllers how to respond to different hypothetical crisis situations – all these are aspect of computer aided-instruction.

Arising from the above strategies are the following advantages of CAI.

1. Access to computers for learning when teachers are unavailable.
2. Individualized instruction. Both slow and advance students benefit from individualized instruction because they can proceed at their own pace.
3. Modules are usually developed with numerous teaching techniques, many of which utilize dynamic interest graphics and sound effects. These help make learning more interesting.

COMPUTER-MANAGED INSTRUCTION (CMI)

As a follow up on the usages and application of computers in the teaching and learning process, devices/techniques like the Computer-Managed Instruction (CMI) is used by instructors to monitor the overall effectiveness of Computer-Assisted Instruction. (CMI) provides the following as a method for evaluating CAI and its teaching effectiveness.

1. Tests the student's level of preparation and assigns an appropriate teaching module.
2. Determines the most effective learning techniques for each individual student.
3. Maintains records on student progress.
4. Determines the reliability of test questions themselves.
5. Determines the overall effectiveness of each learning module.

THE WONDERFUL RESULTS/ADVANTAGES OF COMPUTER APPLICATION

As can be seen in the following, usages of the computer systems are yielding marvelous results in various fields of endeavour in our daily lives:-

The Health Sector:

computers used in the health sector have reasonably resulted in better diagnosis and have enhanced physician's abilities to save lives as in the following cited instances.

(a) CAT Scanning. By this computerized means, specific illnesses are diagnosed. CAT Scanning has become an extremely effective diagnosing tool in modern medical practices. Areas that lend themselves to this application are delicate diagnoses such as brain tumors, cancer pancreas and strokes.

(b) Ultra Sound: This computer device applies to abdominal, obstetric and gynecological cases, which ordinarily cannot be palpated manually by the feel of the hand.

(c) Computerized multi-physic screening.
Computers are used as a preliminary tool for taking a patients history, determining the patients symptoms, and making routine recommendations for laboratory tests and treatment. This is referred

to as multi-physic screening. In this case, the computer collects, stores and transmits data, ready for the doctor's use.

Other areas covered by this application includes: monitoring a patients vital signs, detecting hearing, visual impairment as well as paraplegics, shutters, etc.

BEYOND THE HOSPITAL DIAGNOSIS

Computers are also used out of hospital environment to enhance artificial intelligence. This field of study attempts to use computers for tasks that traditionally require some form of intelligence. Areas in which artificial intelligence is derived from the computer includes:

1. Game playing – e.g. Chess, checkers
2. Problem-solving – brain teases, mathematical problems
3. Pattern recognition for scientific analysis-finger prints analysis , scanning satellite photographs etc.
4. Education.
5. Robotics
6. Language translation.

COMPUTERS IN ART AND MUSIC

Amateur and professional Musicians who compose music or play and refine existing musical compositions can use computers. Computers used in art and music help to achieve the following:

(a) Complete flexibility in controlling a musical sound or artistically design.

(b) Provide immediate feedback when testing a design or musical composition.

(c) Teaches fundamentals of music or art

(d) Plays back music or displays art works almost instantly.

Also in advertising, computers can be used to either modify an advert, create a different focal point or better emphasis.

COMPUTERS IN INDUSTRY:

1. Manufacturing Applications – computers have been effectively used in many industries to control the overall production process.
2. Air traffic control – without computers, the ability of traffic controllers to monitor traffic would be severally limited.
3. Robots in various production process. The term "Robots" is usually associated with human aid-type creations that walk and talk like those in science fiction and futuristic movies. An industrial robot is a computer-controlled machine typically used for performing tasks that are:
   (a) Repetitive (b) Require great deal of precision (c) can be somewhat dangerous.

Other uses of robots are:- bomb detectors, fire-fighter, die casters, packages, material handlers, spray pointers, welders and assemblers in automotive and assembly plants. As convenient as this application might appear to be, there is considerable fear that robots will lead to mass unemployment. This is because some organizations use human-like robots with voice capability as: receptionist, mail delivery, advertisers, hospital aids, entertainers, etc.

COMPUTER IN OTHER HUMANITIES

Computers can also be used in subject such as English Literature, Sociology, archaeology, political science and most other liberal arts, for tasks that have been traditionally performed by professionals in areas such as:

(i) Data handling and manipulation.
(ii) Development of modules
(iii) Retrieving source material from a library or database.

The use of computers has enhanced productivity through efficient and effective information systems and communication facilities. The use of computers along with data communication devices has great potential for:

(a) Electronic mail and message systems

(b) Teleconferencing
(c) Videotext and telex.
(d) Accessing database through subscriber service networking and distributed data processing. Local area networks as well as other more widespread networks micros and other computers even more useful for business, home, and educational use.

SUMMARY

The following changes are products of computerization and Computer training:

1. **The changing nature of the workplace**: The ways in which many people perform their jobs have been profoundly affected by the computer:
   (a) Users in large organizations are increasingly dependent on the computer.
   (b) Managers rely on computer decision-making
   (c) Office workers use computers for word processing and communications.
2. **The overall working conditions are more flexible, thereby resulting in:**
   (a) Greater job satisfaction
   (b) Staggered hours and days that can ease burdens on people, mass transportation, energy needs, and so on.
3. **Better use of existing workforce**. Housebound people such as those with small children or with physical handicapped can be employed to perform specific tasks directly from their homes.
4. **The computer as an integral social tool** is being used in the following areas, just to name a few:
   (a) For the handicapped: For using special adaptors for learning, special joysticks, wands or touch-sensitive screens.
   (b) For Law enforcement agencies – computers are used in patrol cars to make enquiries using the

National Crime Information Center and motor vehicle databases. Similarly,, facsimile devices are used to speed finger print analyses.

(c) For sports analysis- Computers are used to study tidal conations before a yacht race and also to provide biomedical information regarding the physical conditions of people engaged in athletic activities.

(d) For Agriculture – computers are also being used in farming to keep track of livestock.

In conclusion, it is clear that Teaching Computer has greatly enhanced Productivity in almost all facets of human endeavor.

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