Computer in Teaching and Research

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THE Computer is probably the greatest miracle of our time. If we run through all the great inventions of mankind and think of all the great machines that man has created, we will probably find nothing comparable to our inimitable computer. There is now hardly any aspect of civilized life that has not been touched by the computer and indeed a veritable folk-lore has developed around it; to a layman, it is capable of answering any question, solving any problem. There is some truth in this because a computer can even be used by a composer to assist him in the production of music. Indeed, using a computer, L.A. Hiller of the University of Illionois has produced his famous "Illiac Suite for String Quarter!"

Computers are constructed from a myriad of electronic components which carry minute electronic currents. The innermost working of the computers are controlled by sets of instructions called programmes. The programming languages are so designed that an ordinary user can write a porogramme using words and symbols well-known to him. Thus although computers are only machines, they are capable of performing millions of operations in a fraction of a second and with incredible accuracy. Programming can be done in such way that the machine can choose between different alternatives. In this sense, computers can be said to posses intelligence or at least the potentiality to learn. Can computers think? one way of answering this question, as A.C. Clark emphasised, is to employ "the famous test proposed by the British mathematician Alan Turing, even before the digital computer existed. Turing visualised a "conversation" over a teleprinter circuit with an unseen entity "X". If, after some hours of talk, one could not decide whether there was a man or a machine at the other end of the line, it would have to be admitted that X was thinking."

A thinking machine may be a Utopia to-day but "Utopia mongering has been a popular and on the whole harmless occupation since the time of Plato; now it has become a matter of life and death—part of the politics of survival."

One such Utopia is the possibility of the use of computers in Education. Can we employ computers in teaching just as they have been used in research in medicine? The new diagnostic tool called Computerised Tomography is one of the most revolutionary developments in medical technology. The technique makes it possible to obtain a cross-sectioned x-ray image of any body-section in order to locate tumors or other diseased tissue. A computer graphics simulation of the human heart has been accomplished enabling investigators to model the complex motions of the heart.

At the 118th annual meeting of the American Medical Association, computers demonstrated their skill at diagnosing some 263 diseases, including 78 mental and emotional disorders. Over 1750 different symptoms of gastro-intestinal, urinary and emotional diseases were handled by the computer. "The system has been compared to an encyclopedia of medical knowledge which opens itself at the appropriate page."

But probably space research is the field where the most spectacular use of the computer has been made. The pioneer here is the National Aeronautics and Space Administration (NASA) of the United States. In the first Apollo flight that landed on the moon, there were two computers in the lunar module and one computer in the command module. On land, the elaborate computer system of NASA operates so fast that there is virtually no time delay between receiving and solving a computing problem. The reliability of the NASA communications, network is 99.92 per cent! It has been said that the partnership of man and computer is now such that the whole is greater than the sum of the parts!

It is therefore no wonder that computers are finding increasing applications in teaching. Computers are now used for assigning individual students to classroom groups and to record the progress of individual students. Grading by computers is a commonplace affair in advanced countries.

The use of the Computer to assist a student in the learning process is known as Computer Assisted Instruction (CAI). Its purpose is to aid and assist both the teacher and the student even to the extent of offering the student individualised instruction. The computer allows each student to proceed according to his own capability with his performance constantly monitored.

The student can interact with the computer in three separate ways. First the computer can be used for practice sessions which supplement the regular teaching material. Second, the computer can be a personal teacher— a tutor— for the stuedent. A third possible use is that the student can conduct a genuine two-way conversation with the computer.

Computer-assisted instruction is thus an amalgam of two methods of teaching: the traditional method and the self-teaching method. No wonder the system is now-a-days being widely used in Distant Education or the Open University concepts.

The most well-known CAI system is the University of Illinois initiated PLATO programme started in 1959. With 1000 terminals spread out in the United States and Canada, PLATO has indeed come a long way from his Academy in Greece. The latest PLATO-III has provided opportunities for developing many powerful new teaching strategies in fields as diverse as algebra and anatomy, psychology and pharmacology, languages and life sciences.

Computers-based education is of course not synonymous with programmed instruction. It is not correct to think that computer-based instruction can only lead to transfer of information and is of no value in the development of critical thinking. Computer-based instruction has often been found to be more efficient than standard educational procedures in many learning situations that call for judgement and innovation.

Clearly we have advanced far beyond the role of the computer as a mere score-keeping device. To-day it is not only helping us in acquiring new information but it is also aiding us in fitting this information into a broader perspective. Indeed, computers are now actively assisting us in creating new knowledge as we know very well from the latest researches in physics, chemistry, mathematics, bio-chemistry, molecular biology and other fields.

Since computers are now an essential tool in research, there must not be any restrictions on their use. The United States Government recently attempted to restrict the use of supercomputers by nationals of certain countries. On 3rd November, 1985, the American Physical Society correctly pointed out.

"We believe that restrainst on the use of unclassified facilities would be harmful to the quality of academic Scientific research... Restricting access to unclassified University facilities is an unprecedented intrusion into institutional academic freedom. Universities and academic research centres must be free to select faculty and curricula and admit students and researchers on academic grounds. The government is properly excluded from intervention in the intellectual life of a University."

"...Universities are communities of scholars in which new ideas and research results are created and freely exchanged. The Computer leads to a fundamental alteration both in the way new knowledge is generated and in the way it is communicated. Indeed, the academic supercomputer centres were born out of the conviction that the Universities must be at the forefront of the new technology."

May the University of Dhaka also assume its destined role to be at the forefront of this new technology in Bangladesh.