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**Speech by the Vice-Chancellor, Y. Bhg. Datuk Musa Mohamad, at the Opening Ceremony of the Workshop on Microcomputer Courseware Education in Science and Mathematics Education on Monday, 20 August 1984, at 8.45 a.m. at the Viewing Room, Educational Technology Unit, Universiti Sains Malaysia.**

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Let me begin by thanking most warmly APEID and UNESCO for having so generously sponsored Professor Shinohara to run this workshop on microcomputers in education and also to thank Professor Shinohara himself for agreeing to come and make his expertise available to us inspite of the numerous international commitments which he has to fulfill. I would also like to take this opportunity to welcome particularly those of you from outside this University and from overseas, to the USM campus with the hope that you will have a most fruitful and worthwhile experience at this workshop.

Microcomputers, like audio and video technology, are increasingly being used as aids to provide solutions to some critical issues facing education today. One such issue relates to free or greater access to education which makes available to schools, colleges and universities students with wide-ranging academic ability, aptitude and degree of academic preparedness. I believe education tomorrow will increasingly find themselves unable to exercise the privilege to choose students and limit their numbers on the basis of their intrinsic or prevailing ability as compulsory schooling and open entry to tertiary institutions shall to my mind be the universal feature in all countries, big or small, developing or developed in the years to come. This trend of democratisation in education brings to bear an added weight of responsibility to educators. If the responsibility of an educator is merely to teach and to disseminate knowledge without caring how much of that knowledge is learned, then the responsibility may not be as great as it may seem. But an educator has the added responsibility of ensuring that his students learn, as well as develop the right attitude of mind to utilise the acquired knowledge well in an analytical and practical fashion and in a variety of more complex ways. It is this that represents the bigger challenge to the educator and this challenge is even bigger when students numbers are large and when the capability to learn well varies widely among those students.

When pondering over this challenge facing us, I have often asked myself whether it is right and just to tend only to the few students who show outstanding ability, or to the many who show greater promise or to spread our human resources thinly to cater for the learning needs of every student, no matter how slow a learner he may be. Perhaps to be just, I have to adopt the last course of action for I sincerely believe as long as there are students willing to learn, there are always ways of teaching him but in doing so, I may have committed myself to either increasing the number of teachers available or to develop suitable alternatives that will free the overworked teachers from some of the burdensome task of instructions and the induction of learning particularly of some of the basic knowledge required for advancement in a particular subject area. I find the sacking of alternatives as the best course of action and hence lend my support readily to the use of instructional technology in this University including computer-assisted instruction and learning which provides a greater opportunity to students to be in a learning situation that is interactive. What can be done in a University to uplift the level of academic preparedness of students, can as well be done in schools particularly in the senior years.

Large student numbers and wide-ranging student ability are however not the only big issue facing the today's and tomorrow's educator. This is the aspect of knowledge explosion which he has to contend with and which he has to find means to disseminate without having to load the teaching curriculum beyond what can be readily coped with. According to a recent calculation by Soviet statisticians, scientific output alone has increased ten-fold in the last half century. Patricia Crossman of the American Educational Testing Service calculated that so many new data are today being produced that they could fill a whole new Encyclopaedia Britannica every 40 minutes. John Platt, an eminent biologist, when referring to the tremendous advancement in human knowledge, cited that it took 3 million years until bacteria were able progressively to change their habits by genetic hybridisation, only some 8000 years ago did men systematically begin to accelerate this development by selective hybridisation of plants and animals and it is only in recent decades, that men have been able to produce millions of new species overnight by genetic mixing and control. In another instance, John Platt cited that it was only 5000 years ago that men first started to move more quickly than their legs could carry them — first on land by means of nimble animals and on water by windforce. And only 150 years ago men regarded progression at a speed of 35 km.h. by means of steam power as a perilous risk. Nowadays, aircraft and spaceships enable men and material to orbit the globe and to surmount the force of the earth's gravity. These are but very few examples to illustrate that knowledge has advanced by leaps and bounds in recent years and will continue to advance at an even faster rate in the years to come. The question in my mind is how do we as educators cope with this knowledge explosion and how do we devise the means to impart this knowledge to the students under our care.

If we as educators were to persist with the thought that quality education is algebraically equal to the amount of knowledge we impart, then we would have embarked on an exercise in futility for there can be no way in the time-frame we have, to impart all that knowledge with a high degree of confidence that effective learning would ensue. Perhaps, in particular at the University level, we could best concentrate on the basic principles, ensure that they are learned well, and established enough groundwork to allow the students to pursue knowledge through a life-long continuing education. As complex knowledge cannot be easily understood nor acquired by a process of self-study in the conventional way, computer-assisted learning may perhaps provide the most suitable form of inducing successful continuing education.

I see in my mind many other possible applications of microcomputers in education e.g. in distance education, in educating society to be technologically-oriented through continuing education, and in bridging the gap between the arts and science cultures that we have so deliberately created in our society through early specialization in schools. The potential is indeed wide. But the computer of today is a stupid machine. It can only do what it is programmed to do in exactly the same way over and over again. To create a programme suitable for instruction and learning requires the intelligence and ingenuity of man and in this respect, I am so glad you could be here to learn how to exercise that intelligence and ingenuity in a variety of ways so as to make the computers serve our educational needs well. I trust Professor Shinohara is best suited to the job of acquainting you with how best this can be done. I wish you all well.

With this, may I have this great pleasure of declaring your workshop open.