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SPEECH BY DR SEET AI MEE, MINISTER OF STATE FOR COMMUNITY DEVELOPMENT AND EDUCATION AT THE SEMINAR ON 'TRENDS IN SCIENCE EDUCATION' THE NATIONAL UNIVERSITY OF SINGPORE, LECTURE THEATRE 27 ON THURSDAY, 11 MAY 1989 AT 2.00 PM

Science education is an integral part of the total education scene in Singapore. It should therefore embrace the guiding philosophy of our school curriculum, which is, to develop the potential of every individual student to be an informed, thinking and creative person, one who is responsible, morally aware, well-adjusted and cultured. Based on this philosophy, science educators at all levels must assume the responsibility to develop in science students the capacity to adapt and respond flexibily to a changing world and to be good problem-solvers and independent life-long learners with desirable attitudes and values.

Over the last few decades, the frontiers of scientific discovery and application has advanced ceaselessly. In keeping with this, our goals for science teaching should include the acquisition of a mature understanding of scientific concepts and mastery of the skills of a practising scientist. This means that science education should teach not only basic science knowledge and laboratory skills but also inculcate in students habits of working as problem-solving scientists.

Science education must not only develop scientific and technological skills in students, science education should also aim to develop in students desirable attitudes of initiative, impartiality, an inquiring spirit and critical awareness of the social and moral implications as well as the limitations of science knowledge and investigations.

With continued and advancement in scientific discoveries comes the inevitable knowledge explosion. It is imperative that science educators, be they school teachers, Junior College tutors or university lecturers, guard against content overload. Science educators at all levels have to be decisive and incisive in judiciously selecting from the vast and growing sea of science knowledge. This is to allow time for the development of positive attitudes and science process skills. It is the quality of the learning experience that is crucial, rather than the quantity of the subject content. Science education should be intellectual, investigative and interesting.

The knowledge, the practical process aspect of science education and the presentation of the subjects are essential elements of science education. In order to illustrate my point, let us look at one important area of science educators work - the design of science practical.

At the tertiary level, science practicals which are closed, content-dominated, leading only to verification of known physical laws or constants will inhibit critical thinking. Investigational or the more open-ended type of practical activities should be based on problems the students can relate to. Discussions on actual results and findings will be more meaningful and challenging.

In schools, science teachers should not merely demonstrate experiments but should provide hands-on science activities for pupils to develop process skills. These activities should include asking questions, making observations, designing simple experiments, collecting data, analysing and inferring from data collected.

Only when we approach Science education thus, will we be able to answer the recent criticisms of some - that our education system is producing students who are exam-smart and

who are not investigative, imaginative and creative. This same criticism from a university don, which was aimed at schools and Junior Colleges, could easily be made of tertiary institutions too. I am not in the game of apportioning blame or putting labels. To produce good science workers of the future, we must address the learning of science at all levels: Primary Schools, Secondary School, Junior Colleges, Polytechnics and Universities.

Science education must be intellectual, investigative and above all interesting. It can be done. Our current school curricula is already based on the broad concepts and processes of understanding science. Curriculum development is one thing, its teaching and presentation in the classroom is another. In the near future I would like to see a change in science teaching at every level from the primary school right up to the university.

In today's seminar, I hope you, the science educators and students gathered here will attempt to answer these questions on science teaching which I am posing:

At School level:

> How can Science teachers capture the interest and imagination of primary and secondary pupils? What will enable our pupils to acquire useful and life-long skills?

At University level:

> What mode of science education will enable our science graduates to be more investigative, reflective, adaptive and creative.

Your deliberations and answers could well provide the foundation of new approaches and curricula for the pupils in our schools and students in our universities.

I urge you to be forward in your thinking, and, questioning in your approach in this, your seminar on "Trends in Science Education Today."

I have great pleasure in declaring this seminar open.

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