

S.A.T.A. CONFERENCE

THE TEACHER AS MANAGER OF RESOURCES

Mr. Chairman, Ladies and Gentlemen, in standing before you this morning I am in the classical position of the tourist, who, long after he has paid a brief visit to a distant country, still presumes to pontificate about its problems, and that to an audience of the citizens of the country. The sum total of my high-school teaching experience is one term - teaching Mathematics to Standards 6 and 7 and Physical Science to Standards 8 and 9 - more than 25 years ago. It is a brave man who in my position essays to address the oldest teachers' association in the country. I take courage, however, from the fact that some of my best friends are teachers, with whom I have had many a lively discussion; even close relatives have been in your august profession. I have had the further advantage, too, of having for a number of years taught the products of your endeavours. If one takes seriously the Biblical injunction "By their fruits ye shall know them", then I can say that I do know something of schools.

By the latter criterion the schools I know best are the Transvaal schools, and if some of the comments I make seem unduly pessimistic then please bear that fact in mind. I have been informed that the Cape schools have by no means yet run into the same difficulties and dilemmas that have occurred to the North.

Almost universally, schools arose originally in response to religious needs. In the beginning children absorbed all that they needed to know from their parents, by way of example and precept, and through such informal means as fables and stories. The socialisation of the child took place through rituals and initiation ceremonies, whereby he learned his place in the tribe or wider social grouping. As religion became more institutionalised, in those religions which had a large corpus of revelation, particularly as contained in sacred scriptures, the task of inducting them into a knowledge of their faith became beyond the range of an ordinary parent, and religious education became professionalised. Right from the beginning, therefore, the teacher as surrogate for, or extension of, the parent, was concerned with the child as a whole, and with guiding him into an understanding of life as a whole.

Although the basic scripture was usually, but not always, in written form, the children learnt by oral instruction, and not through the medium of books, which being in manuscript form were both not easily available and expensive. The pupils were expected to know great quantities of material by heart, and to this day this tradition survives in Moslem countries with respect to the Koran.

In this tradition the pupil acquired all his information and attitudes through his teacher, home and church. Although writing was available as the first form of educational technology, it was hardly used in the teaching process, except as a means of reinforcing oral instruction through dictation.

The invention of printing, with the consequent widespread dissemination access to information in principle in a manner independent, or quasi-independent, of his teacher. This step was not without its critics, as witness the

widespread use of dictated notes without recourse to wider reading, which persists, alas, all too frequently to this day. Thus the first technical resource was available for the teacher to manage. Nobody disputes that, although the availability of books might be argued to diminish the influence and authority of the teacher, it certainly opened the minds of the pupils to much wider horizons. On its negative side it does enable the body of pupils to be exposed to influences regarded as undesirable, and positively destructive of the social order. Censorship was introduced practically with the advent of printing, but in the long run it has never proved a very effective barrier to the spread of ideas. Although a person could conceivably derive all or most of his education from books, in practice only an exceptional minority managed to do so. In fact, contrary to what might have been feared, the advent of books certainly did not replace teachers. On the contrary it increased the demand for them by slowly democratising the demand for education. Further, it created a class of teaching auxiliaries in the form of librarians, whose educative role should not be underestimated.

We are today on the threshold of an enormous revolution in education, far more far-reaching in its effects than ever the advent of printing was. I refer to the whole vast cornucopia of modern technology - radios, T.V., tape, cassette- and videorecorders, slide and overhead projectors, teaching machines and behind them all, whether as a helpful genie or a Frankenstein monster, the Computer. The visions conjured up by the proponents of some of these devices, or combinations of them in huge systems, is enough to make us all sit up and gape. Listen to an example of some almost Sci-Fi talk of this ilk, taken from a recent Computer Journal:

"..... the Community Information Utility (CIU) is envisaged as consisting of a computer and video broadcasting centre connected to remote terminals. The terminals would be located in all homes in the community, in schools, and in various commercial and government offices. Communication between the central facility and the terminals would be via television cables, and the terminals would be built around television sets augmented with at the very least, keyboards for input to the computer and devices to freeze still pictures on the screen.....

Amongst the categories of service projected are: education, library services, on-line polling and voting (instant referenda), home shopping, entertainment and news distribution we see education from preschool through university using instructional TV and Computer assisted instruction It is even suggested that we make friends in our own alienated world by seeing neighbours with similar interests on TV."

The author, Professor Laurence Press of the University of Southern California, notes that all the hardware is available now, and that some researchers are pressing for a pilot CIU to start immediately. He urges, you will be relieved to hear, that a moratorium be placed on such developments, at least until 2 000 A.D., or possibly even 2 076 A.D., on the grounds that we do not as yet understand how to do it properly. In particular, we do not even begin to understand what effect such a device will have on our own social values, cultural development or integration as personalities.

Let us descend for a moment from this realm of science fiction (which incidentally the Japanese are taking very seriously, and are working on as an initial blueprint for the fully computerised society by 2 000 A.D.), to describe some undertakings that are already underway.

In the University of Ohio at Columbus a first-year Mathematics class of 7 500 students is taught in 300 classrooms. The Professor gives his lectures from the TV studio with the classrooms listening in. The classes are then taken over by graduate teaching assistants.

At the University of Illinois, by means of Professor Bixler's system called PLATO, an appropriate paedagogic acronym, over 200 courses for credit are offered by computer terminals only. The cost at \$1,00 per student-hour is already comparable with that of instruction by conventional means.

In a TV experiment with a Statistics I class, the class was divided into two groups. One group was taught by TV alone and the other, as a control, in the usual way. It was found that the TV group learned just as well as the control group, but that none of the TV group wanted to go on to Statistics III!

At the Phillips Academy in Andover, Massachusetts, there is a Learning Resources Centre with a tape, film and slide library. Groups are given assignments for which they acquire their information by listening to tapes or viewing slides and films, with synchronised comments.

It must not be thought that these exciting ventures in Computer Assisted Instruction are being carried out only on the other side of the Atlantic. I was involved in an experiment in CAI, with special reference to this teaching of Mathematics, at a Coloured school in Johannesburg. It is a tripartite experiment at St. Barnabus College in the Western Township, the parties being IBM, the University of the Witwatersrand and the College. The results of this experiment could have far-reaching consequences for education in South Africa. It is a pity that we are not more experimentally minded for we are passing up such wonderful opportunities in this country.

What these ventures and experiments are all about is the sophistication of a technique known as programmed instruction, implemented with or without the use of computers. The basic concepts of this technique were introduced over 40 years ago by the behavioural psychologist B.F. Skinner. He demonstrated that pigeons could be taught quite astonishing feats - such as pecking out a tune on a toy piano - by breaking up the task into the smallest possible steps and reinforcing with a reward for each step.

In a recent article "Technology in Education", Lord Ashby agrees that Skinner's basic tenet is correct: children can be made to learn like pigeons. Ashby avers that this is why the technique is so dangerous. Pigeons can be taught to play the piano, but they cannot be taught to understand music. He goes on to quote T.H. Huxley's criticism of the examination system in vogue in Britain a century ago. It has a vaguely disturbing ring in the South Africa of today. "Students", Huxley said, "work to pass, not to know, and nature takes her revenge: they do pass and they do not know."

Pigeons' being taught to play the piano reminds me of the Dean who was fully persuaded of the efficacy of these new techniques:

Word has come down from the Dean
That with the aid of a teaching machine
Young Oedipus Rex
Could have learned about sex
Without ever bothering the Queen.

All these concepts are so new that we really do not know what properly to make of them. On the whole the tendency is, along with Lord Ashby, to overreact, and to concentrate on the disruptive, rather than the positive aspects. The human being is a remarkably resilient animal and, after a period of experimentation, many of these devices will permeate, when we can afford them, into our schools and classrooms. One thing is quite certain: they will not replace any teachers. The central role of the teacher will remain what it always has been, that of interpreter and integrator. Amidst all the plethora of information flung at him from all sides, the pupil's greatest need is for a mentor to help him interpret the information, and fit it into a framework of received values in an integrated way. Far from being replaced by technology, the teacher must tame it and use it.

At one time all the resources that a teacher had to manage were a blackboard and chalk. We have absorbed filmstrips, overhead projectors and taperecorders in our stride. Mini-computers and TV monitors will turn out to be more complicated devices, but essentially not a great deal more difficult to comprehend. In addition to his human charges, as always centre stage, he may well need logistic support to help him liaise with his hardware and the host of programmers, librarians, technicians and curriculum developers who will surround it.

One kind of tame computer in the classroom that the teacher of tomorrow will relish was initially developed by Dr. Jack Zawels, a Pretoria engineer, and is currently being experimented with by the Departments of Education both at the Rand Afrikaans University and the University of the Witwatersrand. The basic concept is that the limitation of most CAI systems is that the human being is deliberately left out. Except in the most basic situation of pure instruction rather than education, it is impossible to foresee all eventualities - hence the limited appeal. Dr. Zawels puts the teacher where he belongs - in the driver's seat. The computer is the magic genie that does all the donkey work and keeps the records. Each pupil has an inexpensive tablet terminal with 36 characters by means of which he is in instant communication with the teacher. There is thus instant feed-back as well as instant storage and record-keeping. This system has exciting possibilities and once past the development stage the cost should be reduced drastically. The present cost is R20 000 but, with mass production and the dramatic and continuing drop in the price of hardware devices, it could eventually be as low as R2 000.

As we find these devices moving beyond the testing and proving stage, the lot of the teacher will become an even more exciting and crucial one. His will be the benign and personalising influence, putting all the marvelous technology into perspective. It is more imperative than ever that we attract into the profession its share of the most gifted people with well-rounded and outgoing personalities. We must not hamstring ourselves with restricting the supply by excluding married women, immigrants and ostensibly non-suitable people.

It is when we look at all the people that education does not reach adequately today - the Blacks and Coloureds for whom inadequate or no facilities exist - the drop-outs and the disadvantaged adults, that the potential really becomes exciting. Through lack of sufficient manpower, certainly in the initial phases, we shall have to offer these people a rather more "canned" version of education than is ideal, but surely that is a great deal better than no education at all. In fact, it is the technology's ability to break down barriers and potentially to bring instruction to mass audiences that will be one of its main justifications.

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Within the next 10 to 15 years we shall be entering the most exciting phase that Education has ever known. Let us not be Luddites and smash or ignore the hardware. Let us not be Cassandra's who only have eyes and ears for all the snags and pitfalls, real or imagined. Like some new pioneers or settlers let us go forward into the new terrain, with proper caution, yes, but with confidence and a light step.

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I look forward to playing my role in conquering and taming the new territory, and, Ladies and Gentlemen, I sincerely hope that you do too.