

the fascination technology has for children and young adults frequently places them ahead of their teachers and makes it necessary according to Edmund King for us to take an example from young adults in our appraisal of the use to which information can be put. This theme, as Dore stated is not new. A hundred years ago Matthew Arnold in *Culture and Anarchy* pointed to the same dilemma at the onset of the information society. Nevertheless it remains a dilemma for educationists. Whether teachers are clear enough in their aims and objectives to know what they want to teach and what machines they should select were major issues on which participants were not agreed. Yet at the most general level of discussion there was clear agreement that in the present day information society child, society and knowledge centred educational aims should be pursued simultaneously. Whether such a reconciliation is possible is less certain. For example much was made of the need to prepare individuals for work - especially specialists for industry - while at the same time it was necessary to prepare them for increases in the amount of leisure time available to them throughout their lives. At the same time, it was argued, education should liberate individuals by disseminating information, rather than marginalising them, to ensure their autonomous development.

The key, as always, to the reconciliation of child and society centred aims lies in knowledge, meaning and understanding. According to Mitter, in his opening remarks, information technology directs attention to a new knowledge centred approach to (or aim for) education. Indeed Plomp suggested that the new information technology has had an impact on the general goals of education. *This may be so if a distinction is made between the general aims and more specific goals and objectives of education.* The former, as we have seen, include child and society centred aims. Knowledge makes it possible to reconcile them. What is clear, however, is that knowledge centred aims and objectives need to recognise that the traditional school has lost its monopoly on the delivery system of knowledge in ways similar to those brought about earlier by the introduction of printing and books. One consequence of this loss is that the relationship between teachers and pupils is in process of change. Students can be more independent of teachers but may, at the same time, become more dependent on the mass media of information. Traditional teachers may find this new independence difficult to accept. Hence questions arise: Are teachers useless or redundant? If they are not, have they a new role to play? And if so, what is that role? Traditionally their task has been to select from the accumulated knowledge of mankind that information they considered should be passed on to a new generation. They decided, moreover, to whom it should be given. The power of

teachers to control the distribution of knowledge has been largely removed in the new information society. Several speakers, were nevertheless reluctant to concede that, in the face of the mass of information available, teachers were impotent, useless or redundant. Several answers were given to the question: How should their role change? The main thrust of these answers was that teachers should no longer regard themselves as the guardians of knowledge to be distributed in accordance to their whim or judgement, but that they should regard their role as that of teaching young people how to 'learn how to learn' and provide them with the skills which would enable them how to identify their own problems and how to solve them.

What are these basic skills which teachers can inculcate? In the past, and even now in many countries, a major objective for teachers was to provide their pupils with literacy skills and then to decide what they should read and how they should write. There was a good deal of discussion about whether or not computer literacy should be added to the traditional 3 RS as the goal teachers should seek to achieve. Associated with computer literacy are many of the characteristics associated with traditional literacy - awareness, appreciation, familiarization with the application of computers, their capabilities and limitations in order to demystify them: for computers read traditional 'books' the appreciation, and limitations of which require an ability to read if not to write. However, the introduction of computer literacy as a task for schools was not universally agreed. The view of an MIT scholar was quoted. He questioned whether computer literacy should be a school objective in spite of the warning of H. Noah that unless individuals are computer liberated, the use of computers by the State may help to enslave individuals and deny some of them their human rights.

To look at the aims and objectives of education it is necessary to look beyond the first second and even third levels of education, to a system of life long permanent and recurrent education. And indeed to ask whether the aims of what has been known as general and vocational education should be the same. In the present climate of opinion many would agree with I.R. Marin that the principal aim of formal education should be to prepare its recipients for life - in terms of further education, work, leisure, family life, and civic participation if the formula of Herbert Spencer and the pragmatists is to be accepted, providing, again from Marin, that the all round development of individuals and their personality should not be sacrificed. Not an easy task since as several speakers maintained, since machines themselves reduce the autonomy of individuals.

As usual, uncertainty about goals and objectives gave rise to a measure of consensus on some vague (but important) general

dependency.

principles which might well have been stated at the time the first information society was inaugurated when books became widely available. It was agreed that teachers should teach pupils how to handle the mass of information made available to them, given that they can see and hear (without necessarily being able to read), in present day societies. Hence considerable attention was paid to the goal of 'learning how to learn' and to the acquisition of problem solving skills and the role teachers could and should play in the achievement of them. Little mention was made of the role teachers should play in the selection of information and in the selection of pupils to whom such knowledge should be given. All pupils apparently should be taught how to handle information and no suggestion was made that some of them may be more capable than others of doing so. Indeed one of the hopes embraced by those who discussed the implication of the information society is that the educational process will become completely equalitarian given that computers, like books before them, can be introduced into every educational institution. To make operational sense of this goal all pupils should be taught how to select and use the knowledge they need to solve problems they face or are likely to face when they are no longer attending an institution of formal education.

Such an approach, which is basically in line with what John Dewey was saying at the start of the twentieth century, shifts the emphasis from passing on accumulated wisdom and knowledge to an approach which stresses the goal of teaching pupils how to think reflectively. Content has been replaced by process and the implications for teachers are tremendous. The most important is that in the process of realising new educational goals and objectives deeply held beliefs and behaviour patterns will have to be changed - not least by teachers themselves. Much attention was paid during the conference to the possibilities of breaking this vicious circle.

If it is assumed that the general aim of education is to prepare people for life by showing them how to tackle and solve their own problems without denying them the chance to develop themselves fully as human beings (whatever that may mean) the role of information technology in schools and other educational institutions can be considered. The difficulties of using new information technology to solve some of the problems it has created in society at large were also central to the debate which took place in the commissions and in the discussions which followed the plenary speeches.

The achievement of new goals, however, depends upon the availability of resources ultimately measured in financial terms, the administrative arrangements which facilitate innovation, including curriculum development, the organisation of school

systems, teaching methods and teacher training. Each of these aspects of education was discussed by reference to the introduction of new information technologies into schools. The use of computers in school was held by some participants, to be a way of solving some of the problems created by new information technology in society. At the same time the introduction of computers into schools was seen as creating many pedagogical problems. Computers in schools are both problem solving and problem creating innovations.

Innovation, administration and finance

The literature on educational innovations is extensive. It was developed to a great extent during the 1960s by individual authors and OECD through the work of CERI. Of particular concern at the conference were the administrative devices that can and have been used to introduce new information technology into schools. Particular attention was paid to how computers could be introduced into first and second schools.

Just as traditional forms of literacy required the introduction of books into schools so implicit in the notion of teaching computer literacy is the requirement that computers should be brought into every school. For some their introduction has been seen as a panacea, for others this innovation has raised innumerable problems within educational systems.

One issue which aroused considerable discussion turned on the perennial debate about the effectiveness of centrally promoted innovations compared with innovations introduced by teachers themselves or by members of local educational authorities. The issue was stated in several ways. Some participants talked of 'grass roots strategies', others of 'top-down strategies' and others spoke of the need in decentralised systems to equalise opportunities by ensuring that all schools in the system possessed the same facilities. It was made clear, moreover, that the introduction of computers into schools had important international implications. Noah made the point that there are differences in the capacity to use efficiently existing technologies. Lessons, it was claimed, could be learned from the difficulties which had been experienced when older technological aids - like overhead projectors, film strips and motion pictures - had been introduced as teaching aids. Then, as now, many developing countries wishing to introduce the latest technology into their schools are dependent for hard and soft-ware on the industrialised countries. In their desire to leapfrog some of the stages of development through which the industrialised nations have passed they are in fact prepared to enter into agreements which increase their dependency.

However, a more sophisticated analysis of the processes of innovation is necessary if the successes and failures of technological innovation in schools are to be evaluated. A distinction should be drawn between processes of policy formulation, adoption and implementation. Competition helps to persuade national governments, local authorities and even those in charge of schools to decide that computers should be introduced into primary and secondary schools. At one level such a policy may be adopted and even welcomed by many actors in the educational enterprise. Several speakers emphasised that the successful introduction of new technologies takes time: - A. Louwyck suggested five or six years. Denis Kallen mentioned the differential take up of innovation resulting in a scientifically literate elite and, in this sense, illiterate masses. National governments can decide to introduce computers and subject to the necessary finance this might be done, although of interest was the account given of the Belgian experimental snowball innovation strategy. In many countries hardware has been made available and computers have been introduced into many schools either as a top-down strategy or through local initiatives. All were agreed that difficulties arose in the pedagogically successful implementation of computers as educational solutions. Hence a good deal of the discussion turned on the preparation of software and the implications computers had for various subjects.

Implementation, curricula and teaching methods

Several speakers offered explanations why governments and some international agencies have accepted computers as an educational panacea, facilitating economic growth and the achievement of education for all. N. Raivola saw educational changes, including a system of computer assisted learning as "not planned but reaction to change that has been initiated somewhere else". For the most part, in spite of differences in the willingness of governments in Europe, North America and the Third World (as mentioned by G. Kerewala and Franseco Pedro Garcia the 'we must not fall behind our competitors' syndrome was persuasive. Other explanations were offered. B. Makrakis suggested that since information technology is closely related to economic development the efficiency of an educational system may be measured "in responding and adapting itself to the new demands of the information society". P. Döbricht went further by suggesting that for some policy formulators a new educational crisis is forecasted if there is no rapid introduction of computer literacy. Thus although some educational innovations may not be universally adopted in contrast as Plomp indicated to the immediate acceptance

of computers in business, some industries and the home, climates of opinion were increasingly favourable to the use in schools of new as old technologies. The lesson learned about the introduction of old technologies, are, however, relevant to the successful implementation of new technological teaching aids. Adoption of a policy does not, from a social psychological viewpoint necessarily imply that it will be successfully implemented.

Indeed, one of the most important lessons to be learned, mentioned by Cerych in a somewhat different context, is the time that it takes for individuals so to internalise an innovation that they can use it effectively. By the same token it might meet resistance. The unwillingness of religious leaders in some developing countries with a vested interest in maintaining the status quo was mentioned by G. Saqeb as one reason why it took so long for the majority of teachers to internalise an innovation. D. Lancy's opening statement illustrates a general dilemma well:

"Many of us who have served as teachers/consultants/advocates for introducing computers into schools are saddened and frustrated by what appears to be a tremendous confusion, even conflict, surrounding the process."

Members of the Dutch speaking panel brought the issue to a head when its opening speaker made three propositions for discussion. They turned on the willingness and ability of teachers to implement policies associated with the introduction of new technologies into classrooms. The speaker made three claims. In summary they were. First that schools are not in a position to prepare pupils for an information society; second that teachers were not capable of implementing information technology; and third that the examples and analyses provided by guest speakers strengthened these claims. A lively discussion followed, during which Kallen asked whether in attempting to prove themselves schools may fail to prevent boredom and alienation and whether computers might not demotivate teachers and pupils and dehumanise the system. Plomp advanced the view that if teachers were to prepare pupils for the information society innovations must be in response to their perception of a need (and presumably not all teachers feel the need for computers); the proposed changes must be clear to them; and the need should be seen to be practical. Changes associated with the introduction of new technology had not been made clear enough to teachers nor had the quality and practicality of the programmes been demonstrated. Consequently some teachers are not interested in computers. H. Kremers answered the implied questions by stating that since most teachers are not very familiar with information technology they are not in a position to prepare pupils for the

information society. He pointed out that most teachers had been brought up in a particular tradition and information technology through data bank processing was taking over from them. Evidently one view was that teachers are neither willing nor capable of preparing pupils for the information society.

Fr. Daems illustrated a not uncommon situation by saying that the authorities in Flanders wished to introduce information technology into secondary schools for 15-16 year old pupils by creating a new discipline or subject which would include reflections on the implications of information technology. He mentioned some serious drawbacks which were not directly related to the ability or willingness of teachers. For example the new information technology was not integrated into the curriculum. The educational authorities had shown little interest in the educational issues associated with computer assisted learning and there was a shortage of good software. He concluded that teachers were not to blame and reported that many were preparing themselves by developing course work. As stated, Louwyck made the point that to prepare teachers for the new technology took time and that the expectations of government cannot be reached until clear decisions had been made about whether information technology should be a special discipline or a general component of the curriculum. Decoo rounding up for the defenders of teachers stated categorically that the opening statements were untrue, that teachers were not to be blamed and that many of them using computers were doing their best to improve education.

Clearly on these quite fundamental issues there was no consensus. At the same time no empirical evidence was provided which might have helped participants to reach an assessment other than on the basis of opinion. It is a weakness in comparative research that on such matters empirical evidence has not been collected and that among comparative educationists statements of opinion have to suffice.

They are able to express concern and few participants disagreed that the lack of good quality software which was interchangeable created serious difficulties. It was agreed that there was need for initial and in-service training for teachers who would be expected to implement policies frequently formulated and adopted by governments on grounds which were not really pedagogical. Speakers from Iran and Brazil commented on several of the issues raised by the panel and reported on reform movements in their own countries. Marin perhaps summed up the discussion by saying that even if teachers were not prepared, or willing, to use new technology successfully there were enormous problems associated with changing their attitudes and preparing them for the task of initiating pupils into the information society.

It was hardly surprising therefore that among the many issues

discussed in the six working commissions the application of new technologies in the teaching of specific subjects and their integration into curricula as a whole received considerable attention. Many of the comments made in discussion and in the commission reports were general in nature and identified problems more frequently than they described authenticated successes. Examples were given of reform movements in Greece, experiments in Africa and Europe and the dangers of increasing dependency in the technological and information society. Analyses were made of the availability and quality of software in various systems of education and relations between technology and the fine arts received considerable attention in the deliberations of at least one commission. Also discussed as a curriculum issue were what relationships should be established between general education and education for a career in the information society. In particular computers and literacy, computers in science and mathematics and computers as offering new ways of presenting accepted art were discussed in some depth.

These discussions and the papers presented before the conference, suggest the balance of interest and expertise existing among participants, in the theme of the conference. Nineteen papers dealt with theoretical models and introduced cross disciplinary dimensions to the theme. A majority (32 papers) of papers concentrated on innovations and problems in a single country in ways that added information to data on the theme. Twenty three papers, which might be regarded as satisfactory in such a conference, provided a comparative perspective in an explicit and direct manner. Of these some nine were about Western countries; three dealt with West and East Europe; six were about education in developing countries; and five provided overreaching accounts of cross cultural similarities and differences.

Certainly a mass of information was added to the analysis of the theme but it is clear that in the wide ranging discussions an identifiable comparative education research methodology could not be discerned, nor was much hard data shared equally among all participants, and finally there was no consensus of opinion on matters which were advanced as matters of opinion. Although many research studies were quoted and examples of successful and unsuccessful innovations were described much that was said was informed by political, sociological and pedagogical ideology and little was legitimized by reference to well founded empirical evidence. Apparently even in such a well organised conference as this, comparative educationists do not yet share an accepted basis of knowledge based on research. They speak for the most part as philosophers or at worst ideologues. Gone apparently are the days when, as in 1961, CESE was founded, most if not all

participants shared common assumptions about ways of conducting comparative education research and as philosopher-historians broadly speaking discussed on the basis of shared information about educational systems and the historical origins of them.

Perhaps it was because, though not by intention, members of the 1961 meeting were heavily European centred in their outlook and approach to comparative education. Certainly this could not be said of the conference in Antwerp yet a kind of European imperialism or nea colonialism prevailed without the emergence of a new consensus among comparative educationists.

There was, however, agreement that in the information society, whose characteristics were left suitably vague, a major pedagogical issue turned on the possibilities of teaching young people (and possibly through life-long education all individuals) how to handle information. I think Raivola summed up the situation reached rather well:

"The key issue in future education is not technology itself but change, of which technology is only a part. Education must prepare us socio-politically for a new society as it had to do 150 years ago."

Which, as I stated earlier, is "where I came in" in 1954.