THE IMPACT OF TECHNOLOGY ON SOCIETY AND EDUCATION.
INTRODUCTORY REMARKS TO A COMPARATIVE PERSPECTIVE

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Comparative educationalists have always favoured the idea that
scientific knowledge should be used for the support and impro-
vement of educational practice. It is true that the history of the
effects of comparative studies on reforms at the grass-roots, i.e.
in class-rooms and other educational set-ups, as well as in educa-
tion systems has not yet been written. I doubt that this will be
done at all in form of a complete and general analysis. There are
some significant factors complicating any enterprise of such kind.
In this context let me only point to two factors. On the one hand
we must consider the duration of impacts, since most of them
become manifest in long-term processes which are hard to assess.
On the other hand most effects are of rather an indirect quality,
as they produce side-effects, often undesired. This problem area
affects educational science as a whole (and the other social
sciences too). However, the assessment of effects to be made out
in the intercultural range is dependent on the identification of all
the additional intricacies which are well known to comparative
educationalists.

In the light of these uncertainties limiting the access to the field
of investigation, we are challenged to discuss the theme of the
12th CESE Conference, which is to be devoted to "The impact of
technology on society and education". The topical relevance of
this theme seems to be beyond any doubt, which may justify our
choice. The growing impact of technology on education is obvious.
Inquiring into the reasons for this impact we have to depart from
asking about the effects of this process on the whole of society.
In Europe and Northern America modern technology emerged with
the Industrial Revolution two centuries ago, starting as an auto-
didactic undertaking and increasingly merging with modern
science to a degree which, for instance, has made socialist philo-
sophers in Eastern Europe conceive the model of "scientific and
technological revolution". However, its genuine roots are much
older, reaching far into European history, whereby in this con-
text it is essentially irrelevant whether one should start one's
exploration with the period of Renascence and Humanism or go
further backwards, ultimately to Ancient Greece.

In any case it seems worthwhile including in our consideration Lynn White's "provocative theory", which concentrates on the thesis that it was Western Christianity "that elevated man above the rest of creation by giving him the monopoly on the spiritual world" and "thereby established a dualism of man and nature, with man clearly as master" (1). Suffice it to add J.J. Smolicz's stimulating comment that "no other civilization appears to give man quite so free a hand". He relates his comment to "the pagan religions of the classical civilizations of antiquity" - which I do not agree with in regard of Greek philosophy and science - and "the majority of the great religions of Asia". Smolicz's comment deserves to be quoted, because it provides an explanation of the historic fact that the breakthrough in science that occurred in the seventeenth century, with the Industrial Revolution as its technological and socio-economic counterpart, paved the way for a development that has brought industrialized countries on the threshold of what Daniel Bell has forecast as the "Post-Industrial Society" (2). To end up this brief excursion into history, we should keep in mind that the "anthropocentric view of the universe with nature in the service of man" (3) has seized, though to different extent, the rest of the world, and that as a consequence of what Karl Marx, as part of his theory of history, had in mind when stating that "the bourgeoisie (i.e. the European bourgeoisie) creates a world according to its own image" (4).

Education as a whole, as well as the curriculum in particular, have undergone several changes since the seventeenth and eighteenth centuries, the most significant being the overall integration of modern science at the end of the nineteenth century into the core of "general education" and, as regards the East European socialist states, its further enrichment by polytechnical education. However, the "new technologies", emerging as the recent branch of modern technology and culminating in "hightec", are about to open a new chapter in curriculum history which is characterized by revolutionising quality.

Beside curriculum development there are three further aspects of the confrontation of education with the current phase of the industrial progress which are likely to immediately tend towards its "post-industrial" successor. First, modern technology pervades all countries and religions. Secondly, in contrast to the previous phases of industrial revolution, the present confrontation challenges advanced as well as developing countries to a degree that seems to diminish those differences that have existed up to now with regard to the addressees' accessibility. Thirdly, the impacts of modern science and technology extend far beyond the world of work, seizing life styles, attitudes and expectations of adults as

well as children, which, for instance, has made Neil Postman
forecast "The Disappearance of Childhood" in his provocative book
(5).

In an outline like this, I am trying to present here, it goes
without saying that the impacts of the rapid development of
modern technology affect education in an indirect way, in so far
as the people concerned, first of all pupils and teachers, are
involved in the changes of life styles, attitudes and expectations
I have just mentioned. On the other hand this development also
influences education in a direct way too, which concerns, above
all, the curriculum. This direct intervention is caused by the fact
that educationists not only react to requirements and proposals
which are to be traced back to economic and social determinants,
but are also challenged by the rapid development of science and
technology as such.

Speaking of technology, with special emphasis on its combination
with its attributes "modern" and "new", I have been certainly
aware of the all-embracing meaning of this word which, besides
its material and methodological components, includes an anthro-
pological quality. In this radical meaning technology comprises
people's inventing and applying tools, and machines, for the
purpose of utilising Nature for satisfying their wants, whereby I
have chosen the expression of my thoughts with particular care
and "objectivity" or "neutrality".

In many oral or written utterances the usage of the word "tech-
nology", in particular in its combination with the attributes
"modern" or "new", is often confined to the means and skills
which are characteristic of the present stage of our industrialised
civilization. It is not surprising that as a result of such a nar-
rowed view, to give an obviously simple example, computer in-
struction in and outside schools is limited to the student's intro-
duction into the directions for use and into pure by optional
tasks, turning their minds only to products or outcomes, and not
to devising algorithms or to exploring the logical processes car-
ried out by the computer.

I do not want to continue these historical and conceptual consi-
derations. This problem area will be investigated by the plenary
speakers and discussed by all of you in a much more thorough
way and at a much more expert level than can be done in the
framework of introductory remarks. Let me, instead, call your
attention again to this specific Conference CESE has invited you
to. Why can Comparative Education make a contribution to the
identification of a theme which has been so often discussed at

many other places - not only by educationists, but also by socio-
logists, technologists and, not to forget, practitioners, such as
educators and politicians?

Apart from the positive response to our invitation as such, de-
monstrated by such a large attendance of participants, the book-
let which has been prepared by the organizing committee of this
conference seems to be a remarkable document to support the
notion of the "comparative perspective". Of course, this booklet
does not indicate the full scope of papers to be presented and
discussed, and you would certainly blame me, if I tried to anti-
cipate the rapporteur's concluding analysis. I consider the booklet
as a source of departure and outlook; within this limited range it
is, I am repeating, worth evaluating as an exemplary collection
(6). It contains 55 abstracts and announces 19 further papers
whose abstracts were not available for printing. As regards the
themes submitted, I do not want to allocate them to the specific
topics of the six working groups. In this context this would make
little sense, since the allocation of these topics to separate wor-
king groups can only fulfil the function of organizing group work
and of offering some orientation to the participants. There cer-
tainly are thematic overlappings, and a good number of the
papers would fit in several working groups.

The approach I have chosen instead, consists of an attempt to
subject the papers to a rough classification concerning goal and
range; it has led me to identifying three categories:

a) There are 19 papers dealing with theoretical models and
   aspects of universal range, namely the impact of technology on
   science and education in a global perspective as well as the
   inclusion of policy-making in this process at the macro-level,
   while the micro-level is filled with models and reports on in-
   strumental, didactic and methodic experiments. This group of
   papers will certainly be useful as an incentive to drawing our
   attention to the cross-disciplinary dimension of our conference
   theme, thus reinforcing the topics to be presented by our
   plenary speakers.

b) 32 papers, i.e. the majority, concentrate on topics relating to
   one country each. Most of the authors within this group want
   to speak about experiences and innovations in their own
   countries. Comparative educationists have always emphasised
   the demand for such case studies forming the indispensable
   base of any problem approach. In particular they appreciate
   such studies if their grids or sequences are presented with
   such a stringency as to provide data and arguments for
   "implicit comparison" (7).

c) It is, however, the third category which paves the direct way to the comparative perspective. In the table of contents it is represented by 23 papers whose topics can be subsumed under three subcategories. 9 papers deal with Western countries, in particular member states of the European Community and the Council of Europe. In three papers the comparison comprises West and East European countries, including the Soviet Union. Six papers are focussed on educational problems in developing (or better: less developed) countries, especially in the Arab world. Finally, 5 papers can be related to an overarching "crosscultural dimension", because their authors, though coming near the model building inherent in the first category, reveal comparative ap- proaches with references to specific countries or regions of each of the "three worlds".

This evaluation could be utilised as a quasiempiric approach to the crux of our discipline which, of course, is not my concern at this moment and place. Let me, instead, quote this paragraph from Gulistan Kerawalla's paper which, in my opinion, fulfils the task of stressing the justification of this specific conference: "The disparities in the nature and paths of technological deve- lopment on the industrialised and developing nations necessitate that the problems and issues which arise in education as a result of technological change are examined within each specific national context. Problems vaguely perceived as being 'common' would then reveal distinct peculiarities. By the same token, these disparities preclude the adoption, prior to systematic comparative analysis, of policy solutions from one society to another" (8).

Certainly, this statement does not contradict the universal re- levance of the impact of technology on education and society. It emphasises, on the other hand, the need for mononational and crossnational or crosscultural comparisons. Otherwise the theories of universal range will not meet the specific needs of individual persons, groups or societies, and, with special reference to our conference theme, scientific knowledge will not be used for the support of educational practice.

Coming to an end, I would like to put forth some concluding remarks which immediately result from my preceding thoughts.

In the following days we are likely to be provided with rich and multivarious information on microcomputers and other "new tech- nologies" as well as on methods of how to introduce them into educational practice in general and into classrooms in particular. Exchanging such information, with special regard to different socio-economic, cultural and political background conditions, will

certainly satisfy part of our curiosity. However, we should be misled, if we forgot to include the human level in our discussions.

To illustrate this consideration, let me recall an experience of my own leading me to my professional activity as a young teacher and, further backwards, to my adolescence, when I attended the gymnasium (academic secondary school) upper stage myself. Among the "free compositions" pupils had to write as part of their maturity examinations or only as ordinary papers on the subject of 'German language and literature', there was a widespread theme favoured by examiners and individual teachers. It was titled "Technology, blessing or curse?" It is true that at that time nobody, except a few sophisticated visionaries, even dreamed of computers entering classrooms, but the objects whose impacts on society (and education) the pupils should refer to were airplanes, radios, turbines and other devices of what was subsumed under "modern technology".

Compared to that period, forty or thirty years ago, the objects of the "impacts" have expanded in number, as they have improved in quality. There has also been some change in the metaphorical approach to our theme: instead of those metaphors taken from Christian technology which, to be frank, had been secularised at that time already, social scientists of these days tend to prefer a terminology which is more worldly in itself. For instance, T. Cerdeira, in his paper prepared for this conference, forecasts "social decadence or renewal" as the dichotomous outcomes of people's options in relation to technology and educational policy (9).

The substantial problematics have, however, remained the same. It is the individual human being in his/her real existence who must be identified and respected as the addressee of any impact, that means, in our case, the impact of technology on society and education. Refuting this postulate may, for instance, lead to conceiving and using technology as a means to exploit Nature for people's disaster instead of investigating and implementing its potential functions of fostering Nature for the sake of people's survival.

Finally, we should be aware of the historically based experience that education has often been considered and practised not only for the sake of promoting human welfare and right. There is multivarious evidence that educational measures have been characterised by indifference to moral values and, moreover, misused for human goals, such as discrimination and pressure. Particu-

larly the history of the recent past bears evidence of teachers and educators who have practised education for violence and hatred instead of being agents for democracy, peace and human dignity. Let us not forget that educated technologists have laid the ground for improving agriculture and medical care, while others constructed and used the gaschambers of Auschwitz.

Let me wish all of us a fruitful exchange of views and experiences and, moreover, a few days of open communication in the stimulating atmosphere of this University.

Notes

1. Lynn White, Machina ex Deo: Essays in the dynamism of Western culture. Cambridge (Mass.) 1968, cit. from: J.J. Smolicz, Cultural values and scientific development. In: R.E. Vente/R.S. Bhatal/R.N. Nakhooda (eds.), Cultural heritage versus techno logical development. Challenges to education. Singapore, 1978, p. 67.
2. Cf. Daniel Bell, Coming of postindustrial society: A venture in social forecasting. New York 1973.
3. J.J. Smolicz, Cultural values ...(vid. note 1), p. 48
4. Karl Marx/Friedrich Engels, Werke (Works). Edited by the Institut für Marxismus Leninismus beim ZK der SED. Berlin 1956 et seq., vol. 4, p. 466.
5. Neil Postman, The disappearance of childhood. New York 1982.
6. The impact of technology on society and education. A comparative perspective. 12th CESE congress 15 July 1985. Antwerp 1985.
7. Cf. Leonhard Froese, Ausgewählte Studien zur vergleichenden Erziehungswissenschaft. Positionen und Probleme (Selected Studies in Comparative Education. Positions and Problems). München 1983, p. 38. Wolfgang Mitter, "Komparative Forschung in der Erzie hungswissenschaft" (Comparative research in educational science). In: International Review of Education, 22 (1976) 3, p. 324.
8. The impact of technology on society and education ... (vid. note 6), p. 119.
9. The impact of technology on society and education ... (vid. note 6), p. 127.