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Technological determinism and the school

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Introduction

Is the development of technology autonomous and inevitable and does it determine the development of society? Different ways of answering 'yes' to this question are usually labelled 'technological determinism'. In this paper, I relate some versions of technodeterministic opinions to the discourse of information and communication technology (ICT), schools and education. One purpose of this paper is to broaden the educational perspective to include aspects from history, philosophy and the sociology of technology.

Three aspects of technological determinism

a. The "hard" sphere as norm

One feature of this deterministic discourse could be called the normative account of technological determinism (Bimber 1994) - objectives of efficiency, rationality and productivity are transferred from the 'hard' (technological) sphere to the 'soft'. The distinction I use in this context is inspired by the historian Sven-Eric Liedman (1997), who distinguishes between 'hard' enlightenment - the continual progress of science and technology, and 'soft' enlightenment - the idea that the world will also become a morally better place to live in.

The great thinker of the Enlightenment, Condorcet, combined these ideas in his philosophy. Even today, one can meet the idea that progress in the 'hard' sphere will automatically be accompanied by progress in the 'soft'. Scientific and technological progress are often supposed to create a better world; a world that is more peaceful, free from prejudices and so on. This optimistic opinion has been questioned during some periods of the last century; perhaps in the seventies. However, the progress of ICT has meant a return of technological optimism (see Tapscott 1998). In the field of education, ICT is believed by many to be the solution to a number of pedagogical problems (Segal 1996).

In the 'hard' technological sphere, progress is cumulative. Problems are solved and a great many people can make use of the solutions. In the 'soft' sphere, the cumulative process of making progress is much more difficult to realise. Part of teachers' work may well belong to the 'hard' sphere, but most does not. In the 'soft' sphere, teachers must often recreate what they want to accomplish. Their knowledge is much more tied to specific contexts.

The problems of teaching and learning will not be solved once and for all; good teaching must continually be recreated. Maybe this can be related to the old and eternal debate about whether teaching is an art or a science. I think we should be cautious to ensure that the great interest in ICT for education does not make us believe in a simplified technological-scientific solution to the problems of pedagogy. This must not happen - thus this version of technological determinism is not deterministic at all. However, in western societies, with their strong historical belief in a direct connection between technological and moral progress, the 'hard' sphere can all too easily become a model for the 'soft'.

b. Has technology a logic of its own?

Another important question is to what extent the development of technology is determined by a necessary logic of its own. This is another version of technological determinism. As a reaction to this opinion, many researchers have emphasised a social perspective: they say technology is socially constructed. The development of technology is in their view determined by cultural, historical, social and other contextual factors. Different actors - technicians, economists, politicians - argue about the development, design and use of technology.

The introduction of ICT in schools has repeatedly been pushed forward by different groups outside the school (representatives of computer or network companies, politicians narrowly interested in economic growth etc). Many times it is seen as self-evident that the schools should adapt to the technology rather than the opposite. The technology is still expensive and it is constantly changing, creating problems and demanding space, extra personnel and support - all factors that limit its use. Still, teachers are expected to embrace the new technology.

To see technology as 'socially constructed' might facilitate opening up the debate and bringing the discussion of ICT in schools back to the broader political and pedagogical arena:

> What the social constructivist work points to is that the design and adaptation of technology should be part of the political agenda. In other words, these issues should be opened up for debate among wider constituencies than at present. There is no inevitable logic of development. There is choice. And this draws attention to the technology we never get. (Pinch 1996, p 34)

c. The unintended consequences of technology

Sometimes when people talk about the decisive and deterministic role of technology, they are actually interested in its unintended consequences. The problems caused by

motoring as a developed system, such as pollution and radical transformation of cities and ways of life, was impossible to realise in the youth of the automobile. In the same way, ICT will lead to unintended consequences for society and the school; some good, some bad.

Some unintended consequences of ICT-use in schools can already be seen; setting up and using ICT is time consuming and expensive. The costs mean that even if ICT can add value and improve quality in some respects, it may also reduce quality in others, eg when investment in ICT takes money away from other things schools need (textbooks, school lunches, teaching and other kinds of personnel, health care etc). The handling of technology consumes time intended for the learning process itself.

According to McLuhan, the form of communication, not just the content, will have subtle social consequences (Meyrowitz 1996). So, to observe and follow all the consequences of ICT in schools should be of great interests to researchers in the fields of ICT and education. Related to this, investigators might question if there is some implicit learning in the use of ICT by teachers and pupils. What might the hidden curriculum of teaching with ICT be?

"Behold, I make all things new" (Rev. 21.5)

Computers and ICT have in many ways stimulated new research and a new way of thinking. Computers were one of the factors behind the 'cognitive revolution' in psychology. Research about artificial intelligence has renewed the old discussion of what philosophy calls 'the mind-body problem'. ICT has renewed a discussion of knowledge; what knowledge can mean, what human beings can do and know and what machines maybe cannot do and know (Dreyfus & Dreyfus 1986; Dreyfus 1992).

Those in the field of education and schooling are also confronted with new questions - and sometimes with old questions they thought had already been answered. If the technology makes it possible, could pupils work at home rather than at school? What are schools good for? Are they needed at all? Should everything that is technologically possible be implemented or are certain changes undesirable? What do we want for the school of tomorrow? These questions should be discussed in public *before* 'communities of practitioners' (Constant 1980) or other technological-oriented groups go ahead and change schools.

Questions of pedagogy

The use of computers in the school is advocated by representatives from several different theoretical perspectives: Skinnerian, Piagetian, sociocultural, neoprogressive etc. This is not strange - ICT is a general technology that, like electricity, could be used in many and very different contexts. The technology itself does not imply any pedagogical method - it is a jack of all trades. However, this does not mean that ICT is 'neutral'; technology is neither good nor bad nor neutral (see Winner 1986). But it seems as difficult to connect the use of ICT to just one

perspective as it seems difficult to connect teaching and learning to just one way of doing things - one either uses ICT or not. Argument for a certain way of teaching and learning should be built on experience, knowledge and discussion in the field of education, not just on the more or less accidental qualities of the technology. And that experience tells us that the search for The Method to solve all pedagogical problems has so far been fruitless.

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