Teaching with technology, through technology or about technology

When it comes to technology, education is no different from other fields. It is equally dominated by a blind faith in a hi-tech saviour. The debate surrounding issue of technology in education is an exclusivist debate, a 'yes' or 'no' to technology. But, not only the 'popular' literature is characterized by the presence of optimistic/pessimistic views. The majority of the academic literature endorses and reinforces it, a phenomenon strongly criticized by some researchers who identify taboo topics in the education and technology discourse (Hara & Kling, 1999). This issue is well summed up by Ragsdale who writes,

[m]ost of what we read or hear about computers in education emphasizes only one aspect, usually the good points, but occasionally the bad, to the exclusion of other points of view. This is at least partly due to the screening effect of the popular press, who favor the excitement of extremism over the calm of rationality, preferring in the name of 'reader interest' to create… an artificial dichotomy (Ragsdale, 1988, p. 50).

But if this 'yes' or 'no' to technology, that usually translates in the question, Do computers improve learning? If it is indeed artificial and ineffective, what then should we be looking for? There are different opinions as to what direction to take when trying to escape the high-tech hype in education. I propose that one should start at a higher abstraction level and ask, What role will technology play in the educational field? That is, are we going to teach about technology, through technology or with technology? It is not hard to foresee that our choice will have different implications. In this paper I will discuss some of the implications of each approach.

Teaching about technology

Not that long ago, computers were mainly the subject of engineering. The emphasis was put in teaching students how the machine operates and how to write programs. It was assumed that if students could understand what was going inside the computer, they would master it (Turkle, 1997). A good example of this approach is the instructional software Logo developed by Seymour Papert, a MIT Professor. The Logo software focuses on the construction of 'environments' and objects, that is, it requires some basic programming. The rationale behind Logo is that this type of activity, by creating an awareness of the internal, logic workings of the computer, will teach students to think like a computer!

Jacques Ellul, a controversial scholar and technology analyst, maintained an original position. According to him technology we cannot adopt a Luddite position towards technology. We live in a technological environment and therefore our children will inevitably have contacts with it. Thus, he said, we should create "mutants". A mutant is

someone who can use the technologies, but is not used by, assimilated to, or subordinated to them. In other words, a mutant is someone who is simultaneously able to work with the technologies and think critically about them (Ellul, 1981). In an educational perspective, this implies teaching students to work with the technology, on one hand, and also give them the critical tools to understand how the technology works and what are the loses and gains of using.

Teaching through technology
Nowadays, however, this approach has lost its appeal, mainly due to the evolution of the computer itself. The appearance, in the early 80s, of the Macintosh computer opened in a new chapter in the history of personal computing. That of intuitive, graphical user interfaces (GUI). The new Macintosh computers are no longer operated by the insertion of command lines -that requires some technical expertise- but by (intuitively) moving objects. The user stops being forced to deal with the computer's language, to become unaware of the proceedings behind his/her action. Some argue that this change represents a shift towards transparent interfaces, because now any user is able to work with a computer; others say that the interfaces became opaque because they hide what is behind them. The prevalent view is that today's computer with its graphical interface and intuitive logic is, indeed, transparent.

The shift to transparent interfaces had a significant impact in the educational field. It opened the doors to the second approach to technology: teaching through computers. The change to a GUI made computers easy to use, 'so easy that even your child can do it!', as commonly announced on television adds. Therefore, the goal changed from focusing on the computer's inner workings to the use of computer applications. The premise being that if they can work with the computer, they can forget what's inside and still be masters of the technology (Turkle, 1997).

Computers start being seen as 'teaching tools', that is, as potential teacher replacements. The computer becomes the teaching tool par excellence, since it can potentially recreate or simulate any given reality. Simulation software is a good example of teaching through technology: it allows students to manipulate situations that could never be played out in the classroom. However, what is usually overlooked are the downsides of simulations. Some researchers argue that often experiences with simulations do not open questions but close them down (Turkle, 1997). The most frequently quoted instance of this closure derives from Sherry Turkle's research on teenager interaction with Sim-City, a piece of software that simulates the creation of a city. In it Turkle quotes Marcia, one of the respondents, who says that the basic rule when playing Sim-City is to know that 'raising taxes always leads to riots'. Turkle defends that many teenagers take the simulation rules face-value, and do not question the sociologic of the programming that is behind it.

Another argument commonly used against the "teaching through technology" approach is the non-neutrality of the medium itself. Our relation to technology, it is argued, is not uni-directional but bi-directional, and this means that the tools we use do have an

impact on ourselves (Turkle, 1997; Bowers, 1993).

Teaching with technology
There is, of course, a third position that allows getting past the about/through technology: "teaching with technology". This approach presupposes that technologies are brought into the classroom in specific occasions and for specific purposes, e.g., knowledge-building. In a way it is the most moderate approach for it combines traditional education methods with technology. It recognizes the value and importance of technology without falling into the hype of technologic absolutism.

However, this approach is not problem free: How do we find out what are the occasions and purposes for which technology should be used? And, more importantly, how do we verify the results of its use?

Conclusion
When considered, and employed, in isolation none of these three approaches presents a favorable panorama. In fact, they all seem to feed the above-mentioned artificial dichotomy of a 'yes' or 'no' to technology. However, if one gets past the seemingly incompatibility of these approaches it is clear that the ideal solution is one that makes use of the three. That is, the ideal learning environment allows students the opportunity to learn about technology, through technology and with technology. If this state is indeed accomplished we will see a society comprised of individuals who can work with technology and without it; who can master it and think critically about it; and who know when technology is essential or superfluous.

References
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