

THE JOINT VENTURE OF EDUCATION AND TECHNOLOGY: PRO'S, CON'S AND ROOTS

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The analysis of the contributions and harms of technology in the field of education has attracted a great amount of attention since the first applications of the information technology in this scholar realm. Unfortunately, the scientific discussion doesn't seem to have arrived to final, sound conclusions on behalf of the real value of the latter and is actually unable to supply neither theoretical nor practical advice on technology related policy.

Keywords: virtual education, value systems, social and cultural benefits and harms, governmental policies

This article was written in an attempt to contribute to the solution of the problem. It analyses the influence of technology in the field of education and its perceived effects. Those that have been argued positive are compared with the negative ones paying attention to the sometimes subtle differences that may be found to separate both. An effort to delimitate the roots of the differences that abound in scientific production is made on the basis of the provided overview of the major claims, where value systems are considered the key to the above described analysis. The present work shows with the help of examples how this analysis can actually be run. Finally, it is argued that the thorough analysis of the value systems underlying each and every statement on the appraisal of the role of technology in education can change the way in which technology is seen, interpreted, reacted to and used to gain a meaningful subjective experience that can contribute positively to commonwealth against the routinely attributed relativism to subjective values. Such a perspective can consequently be used to develop and establish better governmental policies that can guarantee some basic consensual democratic values.

Since the late 60's and the early 70's that mark the beginning of the joint venture between education and technology the evaluation of that enterprise has always been the spot of public attention, thus attracting a great amount of research aimed at the exact evaluation of its benefits and flaws (Chan et al., 2001). Yet it is difficult to resume the conclusions because they do not point in the same direction (Davies & Graff, 2005; Naeve et al., 2006; Mark & Greer, 1993).

It is evident that with the popularization of technology and the improvement of internet connectivity the demand of e-learning has increased greatly Allen & Seaman (2003), Gerard & Hussar (2003), Waits & Lewis (2003), Wirt et al. (2004), and The Sloan Consortium (2004).

E-learning, defined as the intersection between a world of information technology and that of education Stankov et al. (2005), is aimed at the creation, facilitation and fostering of education for people at any age, at any

time and at any place. This versatile flexibility hardly ever imagined before counts with many enthusiasts (Dyson, 1997).

Difference of opinion and lack of conclusive data can be due to methodological problems in the investigations conducted or to normative problems. While methodological problems, associated mainly with procedures and facts, are easy to isolate and deal with in a logical way, normative problems, whose source is found in values, are much more difficult to deal with. An extra effort has to be made to analyze the underlying values of claims. This effort does not always turn out to be straightforward because values are in general intimately interwoven with facts in the psychological experience of mental pondering, or in other words evaluation. As the proper root of the word "evaluate" shows, evaluation has much to do with the attachment of values to facts. On the other hand, we have made a continual effort to equate science with logic, something that contradicts our own nature. And so we tend to forget that human beings are not logical beings. Here we should take caution not to suppose our functioning less. The ability to go over logic is the basis of many human functions that technology based on logic has not been able to replicate. Therefore, the objective of this work is to show why data on the relation between technology and education seems so inconclusive through the concretization of the existing areas of positive and negative appraisal in conjunction of the appreciation of the influence of values. An improved understanding of the process will inevitably lead to a better and more conscious planning of the educational resources and improved social policies.

The pro's and con's

As it has been stated previously, both pro's and con's rest on values. This fact provides a starting point for a reasoned, methodological appreciation of the contributions of the information technologies to education. Without a clear understanding of our values as individuals, on the one hand, and as a community on the other, as well as their intersections, we will never be fully able to appreciate the differences in estimation.

Free access to information \neq Access to too much information

The internet makes it possible to access a great amount of information, from a variety of sources (public-private, individual-organizational), in a variety of forms (estimations, facts, opinions). Thus a value system that considers the ability to contrast information and draw well-informed conclusions based on a maximum plurality of sources can see the above stated fact as a great benefit. However, too much of that benefit is equally likely to be seen as negative. According to the university of California, the information generated each year is equivalent to 250 books a year per person, thus in the period 1999-2002 we have doubled the information produced until the beginning of that period. The saturation that causes the overproduction of information makes it impossible to process it all and is virtually equivalent to the lack of information. Lack of time and criteria to orient the reader in its search, and the subsequent demoralization, anxiety, reduced attention span and poor decision making, being the major causes of its negative appreciation.

Plurality of opinion ≠ Unreliable information

While plurality of opinion can be seen as an incentive that stimulates creativity by creating a possibility to look at things from a different perspective, and so seen as a benefit, the existence of a variety of sources that are often difficult to identify and access can make us focus on the lack of trustful information and cause the ignorance of the before stated positive effect.

Reduction of cost ≠ High cost of computers, connection and elaboration of material

The beginning of the application of the information technologies for educational purposes was marked by the promise of a considerate reduction of cost. Although the cost associated with the relocation of students and teachers may have been fulfilled, new expense has been created that accounts for connection, software, hardware and elaboration of material that virtually nullifies the pretence of taking learning resources anywhere at extremely low prices.

Enhances long distance communication ≠ Reduces face-to-face communication alternatives

Long-distance communication is believed to be highly beneficial educational experience. People have the chance to meet other people, with other values, lifestyles, collaborating in other ways for the consecution of other objectives, a fact that can offer an enriching personal and community experience. On the other hand, during the time spend in communicating or creating long-distance relationships and bonds we may be missing opportunities to collaborate with people pertaining to our immediate surrounding. Moreover, some scientists have argued that virtual relationships are much more superficial and less durable than “real” ones (Winner, 1997; Bergmann, 2004).

Cultural understanding ≠ Cultural fragmentation

Although knowledge of cultures, other than the one the student pertains to, can be considered beneficial in contemporary societies where travel and cultural exchange are frequent experiences, it has also been claimed by others that authentic cultural traditions are lost in pro of a unified and less diverse mass culture.

Identity formation ≠ Anti-social behavior

On the one hand technology allows students to express opinions and expose themselves to a great variety of views that might be beneficial for their identity formation (Turkle, 1995; Reingold, 2000). On the other hand, computer technologies allow the practice of violent actions or disrespectful treatment to others, behavior that is normally left unpunished. Some scientists argue that these practices can lead to the development of anti-social behavior or personality in the long run (Dreyfus, 2001; McCormick, 2001).

Cognitive development ≠ Cognitive deterioration

Cognitive development is another controversial point, where the betterment of visual literacy, the retention of action related information, problem solving skills and self-regulation (Jochems, Van Merriënboer & Koper, 2004) are seen as advantages and attention problems, lack of imagination and mental effort are seen as extreme disadvantages (Dreyfus, 1999).

The intersection of values and facts

Science has always tried to build its identity relying on facts. Emotion and irrational belief (sometimes a term used to eliminate any trace of what science is not prepared to discuss at a determinate moment), as not pertaining to logic, have been consistently denied the right to be taken into account. Thus, emotional and irrational aspects of opinions have often been treated in terms of “core knowledge violations” (Lindeman & Aarnio, 2006, 2007; Lindeman & Saher, 2007). Nevertheless, I sustain the view that values based in emotional experiences can never be eliminated from human information processing. Therefore, they should be integrated, understood, consistently analyzed and integrated in the interpretation of fact based discourse.

Discussion of the emotional and cognitive components of beliefs is not a new trend. Works that can be considered classical now, as that of Fishbein and Ajzen (1979) on the one hand and Oskamp (1977) on the other, have advocated for the elimination of any emotional trace in the term “belief”, which in turn is considered to be more appropriate for the term “attitude.” Nowadays, current view on “belief” is turning towards the blending of the emotional and cognitive facets of beliefs. Thus, according to Reber (1995) a belief is: “an emotional acceptance of some proposition, statement or doctrine.” It is also useful to differentiate opinions from beliefs. While beliefs are more permanently sustained, opinions are more revisable on the basis of knowledge on new facts. Values on the other hand are ideals that we all as a society sustain as highly desirable.

There is no way to evaluate facts, without human emotion. Imagine a study that announces that the usage of computer technology undermines attention spans and improves manual coordination. There is no way to take a stand; nothing would urge us to do anything just based on that fact. We need emotions to start action. Maybe we would remember numerous occasions on which manual coordination has been essential for our survival, survival which brought us a sense of relief, self-fulfillment, etc. That thought could make us believe that computer technology is a very useful tool in socialization. Those of us who concentrate on attention but not on manual coordination would hold a completely different stand. The value that life protection and adaptation are good for everyone and as a consequence should be sustained by everyone put a full stop to the inferential chain. Thus, emotion below and value over, our beliefs and opinions would always be a subject of both (Santa Cruz, 2007). There is no way to escape emotion because memories are linked to emotions on a permanent basis.

Still, I believe that the public in general and science representatives in particular are not always aware of this fact and spend much time and effort in scientific discussions that do not have determinate “truthful” solutions. If any two scientists do not compare their value systems and especially those aspects on which a conclusion is drawn, agreement will never be achieved.

Which leads us to the prescriptive value of science and a difficult question that many of us hope never to be asked: What is the meaning of building a science that can not predict more than the inevitability of a different point of view?

Traditionally, we imply a lot more than what we are consciously aware of. On many occasions, what we seem to say without explicitly saying it, is what makes our discourse more or less convincing. Let's consider Trevor Harding's opening sentence (Harding, 2008): "One of the most fundamental and universal aspects of being human, is seeking knowledge of what it means to be human – specifically a "good" human." Harding doesn't say openly: "I do not only believe that it is essential but I also believe that all and every human on Earth experiments the necessity to find out what it means to be good." This second sentence, if written that way, would give us more reasons to disagree. The author has not offered any statistical information, any data, for his claim, and yet, the phrasing of the author is extremely successful because it is based in an essential human value that good-hearted people, people who share the same belief, would judge desirable for everyone – to find identity on the side of the good and not the evil. I think that everyone would agree that the value of human well-being needs to be permanently attached to memory (if we do not remember what consequences "being good" brought to us, we can never judge anything as good or bad). And the process of remembering tugs an emotion or a sensation with it. Remember the last time someone helped you. Can you remember only the fact? Does it come alone or accompanied by a feeling?

Even when data is supplied we sometimes choose not to explicit everything. "Multimedia instruction enables learners to develop complex cognitive skills, such as understanding important elements of conceptual complexity, ability to use acquired concepts for reasoning and inference, and competence to apply conceptual knowledge to novel situations with flexibility" (Liaw, 2008). The author does not oppose multimedia instruction with any other kind of instruction but the fact is that he doesn't try to clarify any possible belief that complex cognitive skills, flexibility, etc. are exclusively pertaining to multimedia instruction leaves the door open to making a wrong inference, which implies that he is not conscious of it or that he has done it on purpose because, even if wrong, it is beneficial for the transmission of the global message that multimedia instruction is good because reasoning and flexibility are good for everyone, in other words, because reasoning and flexibility are values in today's society.

The above examples show us that analysis can be used to add a deeper understanding of implied messages but it does not allow us to validate or refute the claims conclusively. The stand we take would depend on the reader's individual values. Thus, agreement is only possible in a society where there is no plurality of values, where all values are shared. This conclusion poses a new problem to today's society where plurality of opinion is fostered.

Nevertheless, if this is the way the process works, it should be understood and actively managed. The only way to decide whether computer technology is good or bad for humanity as a whole is, first, to study its effects; second, to present data in the most objective way possible without the inclusion of interpretations; third, to specify the values that underlie our emotional and cognitive response to it; fourth, to decide on a consensual basis the extent to which we want what we consider natural now to be changed. Thus, it is important to remember that preservation can guarantee determinate results; innovation is open and very difficult to associate to a final result especially when promoted on a large scale. In that sense, we should never forget that if

we do not perform an experiment with technology, technology will perform an experiment with us.

Conclusion

Much of the scientific work in the field of education is dedicated to the clarification of the final effect of technology on human beings. The messages of its beneficial effects and its harmful effects are necessarily, but not exclusively, rooted in facts. When conceiving a machine, when creating a program, when encouraging someone to use it we are taking a moral stand. Machines are made with an intention, sold with an intention and used with an intention. In that sense we all, as representatives of society, create, maintain and/or reinforce machines' influence in our life. Technology is responsible for changing our neural structures, for the way we relate to each other, for the way we act and think only relatively because we are the ones that choose whether to use it and how.

Technology can be considered an important tool due to the multiple functions it performs instead of us. Nevertheless, its effects should be critically evaluated on a constant basis. This work proposes a four-step process centered not only on the facts we obtain from scientific measurement but also on the constant analysis of our personal value systems and their overlap with the more powerful social values. Critical assessment of what technology does and what we want it to do should shape public policies to guarantee democracy. I consider that if freedom of choice is eliminated the ideal of democratic society can not be sustained. If others decide which values to impose on our bodies, mind and interactions, liberty will be erased from the face of the Earth. Things can not be used just because they exist. Thus, the analysis of the influence of values on scientific work is not only intent to retrieve more meaning and understanding from the written scientific work (commonly associated with lack of emotional content), but to guide citizens' participation in public policy. And I would like to believe that the world as a whole is not yet prepared to surrender its right to be the owner and the maker of its own destiny.

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