Potential problems of computer-mediated school education

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Abstract: The growth of on-line capabilities in school education has reflected the overall growth in society. However, there are both advantages and disadvantages. In the twenty-first century, the availability of on-line education increases the possibility that virtual experience will be substituted for reality. There are also concerns that there will be a blurring of appearance and reality, and that cultural imperialism will continue to spread through use of the World Wide Web. These factors are considered in terms of the need to establish future guidelines to reduce the adverse impact of the Web on school education.

1. INTRODUCTION

It has become a truism to state that there has been an exponential growth of on-line capabilities in recent years. Indeed, the growth of the Internet in commerce has been paralleled by rapid uptake by individuals, in their homes and elsewhere. This process has fostered the use of the Internet in school education and there has been a rush to wire classrooms, libraries and laboratories. It is likely that an increasing number of schools in developed countries will routinely use on-line components in their curriculum. Observers have noted that this adoption is sometimes associated with a shift from print-based materials and didactic teaching methods to a largely screen-

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based environment where the teacher acts more as a facilitator. However, such observations do not always take into account additional ways in which the Internet, and, in particular, the World Wide Web, affect students.

In this paper, I argue that several additional concerns can be identified and that guidelines may be required in the future if negative consequences are to be avoided. The problems I identify include the substitution of virtual experience for reality, the blurring of virtual and real, and the spread of cultural imperialism through use of the Web. These factors also operate in non-school contexts, and it is likely that, collectively, they are implicated in the ways that people understand the world around them.

2. IMPLICATIONS OF ON-LINE CAPABILITIES IN SCHOOL EDUCATION

2.1 The substitution of virtual experience for reality

Among the range of computer-mediated applications available for teachers to use with students are simulations. Merrill referred to these as being "a representation or model of a real or imagined specific object, system or phenomenon." Simulations can be valuable, particularly when the original experience is impossible to recreate for students for example a moon landing, an emergency in a nuclear power plant, or an historical event. However, as Turkle (1997) argues, there may be a problem if the simulation is inaccurate, as the students may never become aware of their lack of understanding. In a real-life situation, it may be necessary to discern a complex web of human behaviour and cultural viewpoints, and the programmer may have been unable to accurately translate such factors into the software. If software is deficient, takes a skilled teacher to recognise this and still teach effectively. An additional problem is that some teachers may use simulations for activities that previously did not require the use of a computer at all. For example, many senior high school students would have had the opportunity of being involved in the dissection of a frog or a rat in their science laboratory. It is possible to use a web-based simulation instead. However, it has been suggested that, although the use of virtual frogs would save frog's lives and be less messy, no two frogs are exactly alike (Armstrong and Casement 1998). The use of a simulation, in such an example, could lead to an imperfect understanding of frogs and biology.

The possibility that computer-mediated experiences can be limited when compared to real life can be overlooked. Multimedia generally incorporates images, text and sounds. As an experience it can be considered less rich

when compared with a real-life context which also uses touch, taste and smell. Davy (1985) maintains the use of computer-based activities in place of traditional activities such as playground games can lead to "experiential impoverishment". This line of argument is not new. It has been argued that television replaces direct experience of the world with mediated experience and that the result was a lack of understanding of the real world (Mander 1978). In this respect, computer-mediated experience in the classroom exacerbates an existing situation whereby recognisable imperfections in a technology are accepted because the beneficial outcomes outweigh the disadvantages. However, such an attitude exposes people to unexpected outcomes and risks (Nissenbaum 1997).

Where the virtual experience substitutes for what teachers have often done in their classrooms, without clear evidence of it being educationally superior, there is room for suspicion of the motives of those involved. There may be a shortage of trained teachers or inadequate funding for laboratories and equipment. Underlying these factors are more serious questions about the commitment to teacher training and the funding of educational systems. Ironically, the decision to invest money in computers may have been at the expense of classroom supplies or resources. It is possible to imagine a hypothetical example of a school that decided to use virtual rats because of a shortfall in the science budget. If less money had been spent on computers and real rats had been available, the students might have developed better biological knowledge, and the cost may have been no greater.

When experiential education is subsumed by its computer-mediated counterpart, there is also the problem that students' abilities to form their own conclusions may be diminished - a possibility illustrated by a controversy at the National Museum of Australia (Shanahan 2001). The installation of high-tech exhibits in the indigenous gallery drew criticism because it was seen as politically correct. A more conventional exhibit might have displayed artifacts and allowed the viewers to form their own interpretations - the high-tech exhibit was seen as issuing fashionable interpretations. When exhibits do the interpretative work that individuals normally do there is an increased possibility of errors and false conclusions.

For schools, the implication of this example is that the importance of the teacher's role is increased. When students interact with a powerful medium which has the potential to inculcate the values of those who commissioned or programmed it, there is a need for teacher discussion so that students will be able to make informed decisions about the material. While this is a role which teachers have always undertaken, organisational decisions about teaching methods may run counter to it. In some cases, students may work in a library or resource centre without active teacher involvement; in others, they may work apart from the class using multimedia for enrichment or

remediation. Teachers may also encourage homework that involves computer-mediated interaction and parents may not have the opportunity or skills to assist their children with the problems inherent in some computer-based materials.

2.2 The blurring of appearance and reality

Slouka (1995) maintains that we are surrounded by simulacra, in areas such as television and advertisements. Virtualisation in schools is likely to exacerbate an existing trend in society whereby students' learning about the world does not always come from a direct and real-life interaction with it. In Australia, a recent television advertisement for a CD-ROM featured a girl who claimed that she had lived among native peoples, had seen wild animals and had explored strange places. Her experiences had actually been based on her use of the CD-ROM. While adults would be aware that this was a marketing strategy, it would be easy to assume that the differences between virtual and real were unimportant. Young children might be able to understand that the virtual experience and reality were different, but they might also not fully appreciate the extent of that difference.

2.3 Computer-mediated experience and cultural imperialism

Cultural imperialism, in a technological context, refers to the potential for a technology to erode existing values and replace them with the values of a more dominant group or individual. When students use computers at home or at school the values of the software are transmitted to them. A student in Europe can access a clip-art gallery and find an over-representation of Americans in it, or a student in Japan can access the Web and find that most of the sites are in English. Some researchers consider the mind of the programmer is reflected in the form that the subject matter takes (Bowers 1988). In essence, the teacher surrenders some authority to the unseen programmer. While it can be argued that the teacher has always had to cope with bias in classroom materials, including books, the problem is more acute with computer-mediated materials.

There are three reasons why this may be so. The sheer volume of materials available through computers exceeds the ability of teachers to evaluate it. There is an increasing tendency for students to be asked to use computer-mediated materials at home, or in contexts where there is minimal opportunity for teachers to consider its implications. Finally, computer technology amplifies the power of individuals, through corporations, to

influence others. Collectively, these factors can contribute to a classroom situation where teachers abrogate authority to an unseen programmer or the values of a corporation. The values of those involved in the programming and distribution of online materials challenge those of the classroom.

An emerging variation of this trend is advertising on web sites. In the pre-digital era, a student involved in a project on animals might simply have used a book to find the information. In contrast, a student in a classroom with web access might encounter a number of advertisements, the underlying values of which might run counter to those of teachers or parents. By concentrating too much on the enabling technology, and too little on the human factors involved in the educational process, computer-mediated learning using the web can result in a skewing of the values and understandings necessary for a developed society. There is, however, a contingent responsibility associated with the use of the web, illustrated by a reference to the introduction of motor cars. In the early twentieth century, these were also at a stage when their effect on society was not yet apparent.

3. IMPLICATIONS OF AN HISTORICAL PARALLEL

In 1901 a leading article in the London Times reflected on the growing popularity of the motorcar:

"The motor-car, as every one assures us, in phrase as new-fangled as itself, has come to stay. We cannot doubt it...We shall always have it with us ... we must all make the best of it. It is easy to draw an indictment against it...All the counts of such an indictment rest ultimately on the fact that the motor-car is new-fangled, unfamiliar and imperfect, like all human inventions at first. They have all been preferred from time immemorial against every new departure of human invention and progress...For good or evil, it will largely modify our social life."

The article went on to argue that drivers would need to exercise responsibility to avoid accidents and that authorities would have to consider registration and other regulations to avoid future problems. Similar comments could be made about the impact of the Internet on education. Although computers have had a place in school education for some years it is likely that the developments of the late twentieth century may yet prove to be only the first stage of a continuing involvement. In this context the growth of online educational applications may remind educators, students and parents that disadvantages as well as advantages can be expected

(Russell 2001). Consequently, it is appropriate to remind software developers, teachers and trainers that ethical choices must be made.

4. TOWARDS THE ETHICAL USE OF THE INTERNET IN SCHOOL EDUCATION

Discussions of ethical issues involved in the educational use of on-line computers often includes issues such as access to inappropriate sites, privacy and plagiarism. It can be argued that the issues discussed in this paper can be overlooked. Worldwide, parents, teachers and administrators use online computers on a daily basis. Sometimes they may be unaware there are choices to be made - awareness that virtual experience can be substituted for reality, understanding a blurring of appearance and reality is possible for learners, and an appreciation that predominant cultural mores on the Internet may conflict with those preferred in schools. Sometimes teachers who are confronted with these issues may elect not to use the Internet - at other times an awareness of the issues may help in the redesign of lessons that use on-line resources. To enable teachers to make these choices, teacher training and professional development will need revision. Educational authorities may need to consider guidelines to assist in this task.

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