

A GROUNDED APPROACH TO SOCIAL AND ETHICAL CONCERNS ABOUT TECHNOLOGY AND EDUCATION*

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ABSTRACT

This is an inquiry into the problem of how practicing educators can build the conviction to act in response to social and ethical concerns they hold about technology and education. The inquiry is essentially philosophical in that it consists of a close examination of the language, concepts, and meanings people employ in thinking and talking about these matters. It is not an empirical study of the nature, extent, or frequency of teachers' concerns about computers nor of the ways they actually do respond to their concerns. Rather, it is an effort to show by example how educators who are concerned about one issue—dehumanization—could examine their concern and reach a responsible, informed judgment about its validity and seriousness. The method we use to examine these concerns combines the conceptual analysis characteristic of analytic philosophy with the review and interpretation of social science research on important empirical questions. We refer to this as a grounded approach. The goal of the inquiry is to use the grounded approach to examine and evaluate one particular set of concerns and to show how it can offer responsible educators a justifiable basis for acting (or refraining from action) on their concerns.

THE PROBLEM: BUILDING CONVICTION

It seems odd that so many educators worry so much about the perils of information technology in schools, and yet so few of them join in active organized opposition. The teachers and school officials with whom we talk confess quite openly to

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harboring misgivings about the social and ethical impact of using computers and related technology in schools. They worry about hacking, viruses, and similar forms of vandalism; indiscriminate, unacknowledged copying of others' work; encouraging a narrow technical mindset hostile to the humanities and arts; and interfering with children's social development, to mention just a few commonly held concerns. Even many educators who are staunch advocates of technology admit in private moments to concerns about possible risks stemming from over-use, mindless use, or misuse of the technology.

In spite of widespread concerns such as these, few educators step forward to oppose forcefully the use of information technology in schools. Reports of continuing rapid expansion in the use of computers in schools abound in the general media as well as in professional journals, but one does not read of teachers being reprimanded or fired for refusing to use computers, of teachers demonstrating publicly against them, or of teacher unions demanding limits on computer use in schools. Recent surveys show that the number of computers in elementary and secondary schools has continued to grow rapidly over the past decade, reaching 3.5 million in 1992, more than the 2.8 million full time teachers working in the schools [1]. For computers to be adopted in such numbers, superintendents, school board members, district office staffs, principals, teachers, and parents must have voted on thousands of occasions to approve the purchases. No doubt some questions were raised, but the opposition, if any, seldom raised enough of a ruckus to make the local or national news.

This peculiar combination of pervasive concern and negligible opposition persists in spite of a chorus of prominent, forceful, articulate critics. For instance, Theodore Roszak, in *The Cult of Information*, argues that using computers for education could expose children to powerful corporate influences [2].

The subliminal lesson that is being taught whenever the computer is used (unless a careful effort is made to offset that effect) is the data processing model of the mind. This model . . . connects with a major transition in our economic life, one that brings us to a new stage of high tech industrialism, the so-called Information Age . . . Behind that transition, powerful corporate interests are at work shaping a new social order [2, p. 217].

In a similar vein, critic Neil Postman claims in *Technopoly* that information technology will change our culture to one characterized by "the submission of all forms of cultural life to the sovereignty of technique and technology" [3, p. 52]. He claims that "in conjunction with television, [information technology] undermines the old idea of school" [3, p. 19], and he calls for concerned citizens to become "loving resistance fighters" [3, p. 183].

Criticism of information technology by educators and social critics is by no means a recent phenomenon. In 1969, the prominent humanist and former President of the University of Chicago, Robert Maynard Hutchins, warned that

computers would “confirm, deepen, and prolong the life and influence of the worst characteristics of mass education” [4, p. 105]. In the intervening decades a steady stream of criticisms have created a substantial critical tradition culminating in recent work by Apple, Bowers, Cuban, Ragsdale, and others [5-12].

Any educator with doubts about computers has probably read or heard these or similar criticisms, so why have they done so little to resist the introduction of computers into school? Surely educators who are already concerned about potential harm from the use of computers and who find their concerns articulated forcefully by prominent critics would be aroused to protect students and society by resisting the use of computers in schools. Among occupational categories, educators are a politically active group. The organized interest groups they join act zealously to oppose policies, programs, or trends that concern them, including such diverse examples as drugs and violence in schools, standardized testing, and school vouchers. Proposed school reforms such as bilingual education or constructivist mathematics teaching spawn spirited debates, intense lobbying campaigns, and often contentious and divisive battles within the profession. Why have the political struggles attending the introduction of information technology into schools been so tame by comparison?

The conclusion seems inescapable that the criticisms have somehow failed to be decisive for educators. For some reason, critics have failed to convince educators of the dangers sufficiently to spur them on to resist the introduction of technology into schools. Surely, if they were convinced that computers posed real dangers, educators would step up to defend against them, even if it meant banning computers from schools. Of course, educators may ignore the criticisms because they find them to be ill conceived or weak, but then why would educators continue to be troubled? If prominent critics fire their best shots and fail to score a hit, educators should be reassured, and their concerns about computers should fade. Yet it is our impression from the literature cited in this article and from our continuing conversations with students and colleagues that educators continue to express the same types and levels of concern as in previous decades, both in informal conversation and in the professional press.

Unresolved concerns paralyze practicing educators. Their doubts prevent them from embracing technology enthusiastically, and yet neither can they take action to protect against the dangers that concern them. If only they could resolve their doubts one way or the other, they could act as responsible professionals should act to gain the greatest benefits for students and to protect them against any dangers. But instead they harbor questions and concerns and yet are unsure about whether they really should be seriously concerned, and so they shrug their shoulders and let themselves be carried along with the mainstream.

This passive response poses several problems for society. It makes the recognition of real dangers less likely, since some of the concerns may be valid. It delays or forfeits potential benefits from educational use of computers, since some concerns may be unfounded. It forfeits potentially valuable insights and

contributions stemming from the concerns. And it reduces the influence of the concerned educators over the deployment of computers in schools, giving undue influence to the uncritical true believers on both sides of the question. Society would be better off if ways could be found to resolve the doubts of concerned educators and move them toward a well-founded conviction one way or the other about the risks of using computers for education. If the dangers are as serious as critics claim, responsible educators should act to protect students and society against the risks. If their concerns are unfounded, educators should dismiss them and move swiftly and vigorously to realize the benefits of using computers.

In this article, we propose an approach to educators' concerns about the risks of using technology that we believe offers greater hope of resolving educators' concerns into convictions that they can act on responsibly. We call this a grounded analysis. The article has three main parts. In the first, we introduce the idea of a grounded analysis. In the second part we develop a grounded analysis of one concern, the concern that technology may dehumanize education. In the third part, we recommend practical responses in light of findings from the second part.

A GROUNDED APPROACH

What is needed is a form of analysis that might help educators build the conviction they need to act responsibly. We began our search for a more convincing approach by asking why extant criticisms have failed to build conviction. By studying the criticisms in detail, we became convinced that the approaches most often taken by critics are at least part of the problem. By understanding how most criticisms fall short, we were eventually able to see more clearly what sort of analysis would be needed to help educators resolve their doubts one way or the other.

Most criticisms of computers are expressed in terms that are neither familiar nor meaningful to educators. Most critics draw their conceptual frameworks from philosophical and critical traditions. They adopt as their starting point some systematic philosophical perspective on technology and society and then proceed to show, given this perspective, that a strong case can be made that the use of computers for education poses this or that threat. Even if the key terms in the conceptual framework—terms like data processing model of the mind, technocracy, technopoly—have some currency in the scholarly community, they are for the most part foreign to educators.

An analysis that educators would find convincing should use terms and ideas that are familiar and meaningful to educators. It should accept, at least at first, the words educators use to express their own concerns. If later these must be replaced by other terms, educators should clearly see that the new language still captures their concerns. In other words a convincing analysis should use the language of educators.

Another reason why conceptual counter-cultural arguments often fail to convince educators is that they are not grounded in the concrete experiences of teaching and learning in schools and classrooms. Neither Roszak nor Postman is a pre-college teacher, and neither of them uses classroom examples in their criticisms. Like other writers in this tradition of scholarly criticism, they cite philosophers and intellectuals from Plato to Marx and Freud and computer luminaries like Marvin Minsky and John von Neumann, but they do not cite teachers or mention events in actual classrooms or schools. As a result, educators are left to wonder whether these analyses really apply to computers as they are actually used in schools and classrooms.

An analysis that educators would find convincing should ideally consider information technology in its educational context. It should examine how the technology is actually used by teachers and students in schools and classrooms, not only how advocates and critics claim they are or should be used. It should compare educational practices that use computers with other practices that do not. It should consider the findings of studies of the effects of using computers on students, teachers, and classroom life. In other words a convincing analysis should consider the experiences of educators.

Nearly always, critics adopt a counter-cultural perspective; that is, a perspective that rejects values, assumptions, and beliefs widely held within both the wider culture and the specific culture of teaching in favor of other competing ones. Roszak, for instance, rejects information processing theories of the mind in favor of an idealistic view drawn from humanistic scholarly traditions that endows the mind with "astonishing capacity to create beyond what it intends, beyond what it can foresee" [2, p. 20]. Readers who subscribe to Roszak's theory of mind may find his case convincing, but what about the many educators whose theories of mind are drawn from conventional cognitive psychology or from other theories such as those of Vygotsky, Piaget, or Howard Gardner? And how convincing will Postman's argument be to readers who do not accept his characterization of American society as a Technopoly?

An analysis that educators would find convincing should ideally be persuasive even to educators who retain most of their pre-existing beliefs about education and society. It should build mainly on generally accepted ideas about technology and education. It should certainly not require that educators abandon many of their most cherished, deeply held beliefs and values about education in order to achieve a conviction about the dangers of computers. In other words, a convincing analysis should be based on the beliefs and values of educators.

In summary, a more convincing analysis of the dangers of using computers would be expressed in terms that are familiar and meaningful to educators; it would consider the concrete experiences of educators; and it would be based on beliefs and values that are common among educators. We will call this kind of analysis a "grounded analysis."

The aim of a grounded analysis is the same as the aim of conceptual counter-cultural analyses like those of Roszak and Postman—namely, to identify and describe the dangers of using computers as accurately as possible and to pin down as firmly as possible their nature, origins, and seriousness. But a grounded analysis begins with the concerns that educators actually express and the reasons they give for being concerned. These concerns and rationales are presumed to reflect their experiences as they interpret them using the ideas they prefer to use. The rationales they give for their concerns, counter arguments to these rationales, and rebuttals to these counter arguments are all considered in light of generally accepted values and ideas and the best available evidence on disputed issues of fact. An attempt is made to identify the best actions educators could take to guard against the threat. Finally, a grounded analysis tries to isolate conditions that call for action.

In the following section we develop a grounded analysis for one broad area of concern about computers—that they may dehumanize education. We chose dehumanization in preference to other widespread concerns such as inequality of access to computers, socially harmful misuse of computers, or relinquishing control of education to a technical elite because it seemed at once more nebulous, and hence difficult to pin down, and more momentous, implicating more fundamental values. If our analysis were able to help educators resolve their concerns about this issue, we felt, similar analyses would surely help with other concerns. We hope that readers may be able to judge from the results of our analysis something of the potential of a grounded approach to social and ethical questions about computers and education. (A fuller account of the analysis of dehumanization can be found in Nissenbaum and Walker [13].)

WILL COMPUTERS DEHUMANIZE EDUCATION?

Many educators worry that computers may dehumanize the quintessentially human process of education. Philip Jackson, in *The Teacher and the Machine* voiced concerns about the dehumanizing effects of using computers in education as early as 1968: “The gravest threat to man’s well-being now as in generations past, is not the machine qua machine but those persons and institutions that applaud and support a mechanistic approach to human affairs” [13, p. 66]. The possibility of dehumanization continues to trouble critics. For instance, the program of an invitational symposium, “Computers in Education: A Critical Look,” held in June 1995 sponsored by the School of Public Health at the University of California, Berkeley and the Center for Ecoliteracy, includes the following statements by invited speakers.

All projects that propose to substitute a computer system for a human function that involves interpersonal respect, understanding, and love should not be undertaken at all. (Joseph Weizenbaum)

I am opposed to the use of computers in primary and secondary education. I think their use will . . . de-emphasize human exchange and the forms of knowledge that go with that. (Jerry Mander)

To use computers in the teaching of reading and writing is akin to a doctor prescribing poison for a dying patient. Students need human contact; they need to hear human voices. They need teachers. (Barry Sanders)

If these and similar criticisms are valid, the dangers to education are great, and responsible educators should be extremely cautious about using computers. But are the risks really that great, or have they been blown out of proportion? Are they even real? Are they what they seem to be, or just fear of the unknown? How can educators who worry about these risks become convinced enough either to act with conviction or to quell their worries?

The first step in facing fears is to understand them. Then, we must do our best to judge how serious the risks really are. Judging the seriousness of the risk of dehumanization requires a combination of guesswork and plausible inference. We cannot study dehumanization directly until it has already happened. Since most fears of dehumanization are about what *may* happen, the best we can do is to make plausible inferences. We can reason by analogy from what has happened in similar situations to what may happen when computers are used in schools. We can look for present signs of changes that may represent early signs of worse to come. And we can examine the logic and plausibility of the reasons advanced in favor of the likelihood and fearsomeness of various dangers.

Understanding Concerns about Dehumanization

What is it, exactly, that troubles those who worry about computers dehumanizing education? What do they think may happen if teachers and students use computers, and why do they think that would be so bad? To find out, we constituted some semblance of a dialogue from our conversations and reading. We talked with students, colleagues, and friends. We read the published statements we could find on the subject, included in the references for this article. We spent many hours discussing what we heard and read. We constantly asked “What, exactly, troubles you?” “What do you think is so bad?” “Who do you think will suffer and how?” “Why do you think this problem is so serious?” “Why do you think it is likely to occur?” We accepted people’s statements as valid expressions of their views; we did not reinterpret them or look for possible meaning hidden beneath the surface of their words. We recorded not only the substance of their answers, but also their choice of words, images, and examples.

At the conclusion of this process, we found that people worried mainly about four distinct possibilities that they considered dehumanizing.

1. Children may withdraw from other people and from society.

2. The teacher-student relationship may break down.
3. The teaching of important human values may be jeopardized.
4. Education may become overly standardized.

These four versions of the concern about dehumanization represent four different stories people told us about how it could happen that using computers in school could lead to dehumanization.

In the following section we express these four versions of the concern about dehumanization more fully and try to judge their seriousness. We begin by expressing the four versions of this concern as they were explained to us. Next we consider major challenges to these concerns—counter arguments attempting to show that these concerns are unfounded and not worthy of concern. We report on whatever evidence we have found that bears on the issue and try to consider it fairly and thoroughly in light of the contending viewpoints. The point of our effort is to find a sound, defensible basis for judging the seriousness of these concerns and, later, for deciding what to do about them.

Version 1: Children May Withdraw from People

Some critics fear that the use of computers in education may lead children to withdraw from people and interact with computers instead. They worry that students' attention and interest will then become centered on computers, estranging them from peers, teachers, and family. This premonition is supported by sights of children mesmerized by video games for hours at a time [14]. This concern reflects the high value many educators place on social interaction, either for its own sake or because they believe it leads to pro-social attitudes, social harmony, and the ability to form satisfying human relationships. They believe it is important for schools to take an active role in fostering constructive social interaction.

Those who feel this concern suggest several ways that the use of computers in school could lead to social isolation. Children who work at computers much of the day may be deprived of time and opportunity to learn social skills. In addition, children who are socially awkward may find social interactions less rewarding than activities with computers and therefore avoid them. Sherry Turkle contends that computers offer people a new compromise between loneliness and fear of intimacy [15, 16]. Before computers, people who feared intimacy so much that they avoided other people had to endure loneliness. Now they can feel a sort of ersatz companionship via the computer. Tittnich and Brown make the same point and worry that children may "withdraw from interpersonal confrontation and turn to machines for gratification, essentially giving up on humans" [17, p. 20]. Children could also withdraw from social interaction because they are so impressed by the power of computers that they come to prefer them to humans.

Who would be harmed if children withdrew from social interactions for any of these reasons? The children who withdrew would lose the benefits of socializing. Hard, scientific evidence seems to show that social support plays a vital part in

maintaining psychological well-being and even health and longevity [18]. Even those who do not withdraw from people will also suffer from having to live in a world where some people lack the skills to handle awkward or difficult social situations. A large pool of socially limited individuals could interfere with the social processes needed to sustain a democratic social order in a complex economic, political, and social environment.

How likely is it that students would withdraw this way? Critics point to evidence that some students already show a preference for working with computers. For instance, students in one computer education program in New York public schools are quoted by researchers as saying they liked to use computers because: "My mistakes aren't embarrassing," "It doesn't talk back," "It doesn't yell at me," "It calls on me every time" [19]. One of the attractions of computers for these youngsters seems to be that computers are less socially demanding than teachers.

The most direct challenge to this concern simply denies that computers foster social isolation. Barrett, for instance, argues that computers are "sociomedia" [20]. They are used for communication in environments where students help one another and often work together on computer projects. If working with computers is a social process that takes place in a highly social environment, then fears about social isolation seem unwarranted. However, those who fear that computers may lead to social isolation could hold higher ideals for social life than this and view an environment where social interactions are centered around computers as socially impoverished. But even critics who insist that work with computers lead to an unacceptable degree of social isolation can be challenged on the grounds that their concern, though valid in principle, is blown out of proportion. Schools already assign students to do many solitary activities like reading, writing, and seatwork. Is work at computers more isolating than this?

Both these challenges raise questions about how computers affect the social life of classrooms. We know that computers are used in different ways in schools. Some computer applications are highly social, like working together to produce the school newspaper. In contrast, other computer applications—like educational games, drill and practice programs, programming, and word processing—are mainly used by individual students who work alone at a computer. A summary of available nationwide data by the Office of Technology Assessment in 1995 indicated that "the most common activities on computers for elementary students have been drills in basic skills and instructional games" [21, p. 103]. In high schools, computers are used primarily to teach word processing, office skills, and programming. All these programs are designed to be used by single students working alone and, as typically used, do not encourage social interaction. This evidence tends to confirm critics' fears that using computers in school may lead to social isolation.

But does even the solo use of computers actually increase social isolation? Research findings suggest not. Using computers in school actually increases social interaction, even when students are assigned to work individually and use

programs designed for solo use, because students interact more when using computers than when listening to the teacher talk to the class. Sills, for instance, studied teacher-student interactions in an inner-city middle school enrolling largely poor, African American students and concluded that

The concern . . . that computers would interfere with personal contact among teachers and students did not hold true. Even with some teachers actually leaving the lab, more intimate contact among teachers and students was reported in the computer lab than in the classroom [21, p. 5].

Light, reviewing research on collaborative learning with computers, also concluded that we have little to fear.

The worrying image of the socially isolated and withdrawn learner, usually seen as an adolescent hunched over his or her (typically his) computer for hours at a time, still has considerable currency. However, the reality in most cases seems to be very different [22, p. 41].

The available evidence, then, suggests that concern about social isolation may be exaggerated, if not altogether mistaken. In spite of the evidence, many educators may find cause for continuing concern. They may worry that social interactions around computers are less socially meaningful or educative than other social interactions. They may worry about those few students who are particularly prone to withdraw from social interaction and particularly attracted to computers. They may worry about what will happen if schools expand the use of computers beyond the current average of an hour a week or less and if schools continue to assign students to mainly individual work on the computer. They may worry that some new ways of using computers, such as distance learning, threaten to reduce direct social interaction drastically. Still, it appears that at the present time those who are concerned about limited social interaction in schools should at least set these worries against the backdrop not of an ideal, but of existing traditional practices that are already limiting social interaction in classrooms.

Although this analysis does not entirely resolve concern about social isolation, it suggests some key characteristics of computer use that make this concern more plausible: the amount of time students spend with computers, how much of this time they spend in individual work, how much social interaction is constrained when using computers, and the quality of these social interactions (to the extent this can be appraised). As these indicators worsen, concerns about the student-teacher relationship should rise; as they improve, concerns should ease.

Version 2: The Student-Teacher Relationship May Break Down

Some critics worry that computers threaten the educational benefits of the human relationship between student and teacher. They fear that computers may

displace teachers from their respected place at the hub of classroom activity. Whereas teachers now serve as the social and intellectual leaders and the ultimate arbiters of both academic standards and standards of good conduct, they may be relegated to less powerful roles, becoming mere facilitators, attendants to the computer. Will the student-teacher relationship be harmed by computerization of schooling? Why should we care if it is? We take up the second question first.

Educators concerned about the student-teacher relationship say we should care because the human face of teaching is irreplaceable. Although computers may succeed in some limited aspects of teaching, such as in developing skills and conveying knowledge, they fail in the social aspects that are most crucial to the growth of human beings. Teachers motivate students to learn, guide their learning, and advise them on academic and social decisions. Teachers serve as role models for students. For less-advantaged children, teachers may be the only models of well educated persons they encounter. Except for parents, teachers are often the adults who know children best. Teachers serve as a social and emotional bridge for children in their passage from the intimate world of the family to the impersonal public world. They are the first representatives of society at large that a child encounters frequently enough to get to know them as human beings. And, importantly, this first relationship with adult authority outside the family is centered on learning.

A less obvious reason to be concerned is loss of educational accountability. Teachers serve as the human face of a school that can at times seem like an inhuman bureaucracy. When parents or children have questions or problems at school, a teacher is usually the first person they turn to for answers and help. Where computers are responsible for teaching and evaluation, to whom do questions turn? Even though people build computer systems, parents and children have no way to reach computer system designers. If schools replace teachers with computers, we are left with a less accountable system of education.

What reason do we have to suspect that the use of computers in schools might undermine the student-teacher relationship? To the extent that computers free students from dependence on teachers, they diminish the teacher's importance in the student's life. Also, students might lose respect for teachers if they saw teachers as less competent and trustworthy than computers. Many teachers worry that their ineptness with computers will cause students to lose respect for them. Furthermore, some evidence suggests that children view computers as more like teachers than books, videos, toys, and other educational materials, and thus that computers could actually be serious rivals for teachers in students' eyes. Psychologist Sherry Turkle calls the computer "a psychological machine" [16, p. 61] and reports that the children she interviewed talked about computers in psychological terms and regarded computers as more like people than like inanimate objects. Social scientists Reeves and Nass report that adults, too, treat computers like people [23].

Whether computers actually do interfere significantly with the student-teacher relationship is likely to depend on a number of factors. If teachers manage the use of computers, using them when and as they see fit, it seems unlikely that computers would adversely affect the student-teacher relationship. However, if computers make the important decisions, if class size is increased, and if teachers are replaced by computers and less qualified aides, then teachers' connections to students would be attenuated. Any measures that reduce the power, status, and influence of teachers threatens student-teacher relationships. The threat to the relationships is greater when either students or teachers or both find their relationships to be unrewarding. Conceivably, the presence of computers in the classroom could make teaching less rewarding for teachers or students or both.

How seriously at risk is the student-teacher relationship? At the present time computers are used so little, for such a limited range of teaching tasks, and so much under the control of the teacher, that the risk seems remote. But if schools ever do begin to substitute computers for teachers then student-teacher relationships will be seriously threatened. For the present, the key indicators of risk to the student-teacher relationship seem to be: reduced exposure of students to teachers, less favorable student perceptions of teachers, erosion of the importance of the role of the teacher, extent of role conflict between computers and teachers, reduced satisfaction of teachers and students with teaching, and lack of teacher control over the use of computers.

Version 3: The Teaching of Important Human Values May Be Jeopardized

Some educators fear that computers will interfere with the teaching of values. Some maintain that computers are inherently incapable of teaching values. They argue that computers are designed to solve problems that can be codified in precise rules, and are therefore inherently unsuited for dealing with value questions. They fear that computers will cause us to see codified rules as the model for all true knowledge and lead us to abandon efforts to teach and learn about values. Some fear that schools that use computers widely may give less weight to value-laden content like literature and history and to goals that cannot be expressed computationally, like judgment, intuition, creativity, or integrity. And some fear that computers will weaken the implicit teaching of values that take places as part of day-to-day life in classrooms when students share, take turns, listen, show respect for others, and reconcile conflicts with peers and authority figures [24].

Those who worry about threats to the teaching of values give several reasons for thinking it serious enough to worry about. They note that students who spend more time on computers have less time to spend learning human values. Students absorbed in computers may face fewer situations that call for value judgments. Ordinarily, school brims with opportunities for cheating, for cooperating or competing, for being one's brother's keeper or looking out for number one. Some fear

that students glued to computers will face fewer value-laden situations. Also, using computers could change the nature of classroom activities, focusing them more on technical matters and less on people and deeds, and therefore leaving school activities poorer in moral content [25]. Finally, computers may implicitly teach questionable values. For instance, playing games with serious subjects on the computer may lead students to feel less responsibility for the real consequences of their actions.

Serious harm could result if computers do jeopardize the teaching of values. Widespread failure to acquire basic social and moral values would widen and worsen social conflict and might overload basic institutions like the courts. Failure to sustain these values would break centuries-old cultural traditions and introduce social and institutional instabilities whose consequences would be impossible to foresee.

Concerned educators cite several lines of evidence to show that their fears are justified. Most teaching and learning done with computers is technical or practical rather than humanistic. The explicit teaching of values already receives much less emphasis today than formerly, and the implicit teaching of values could easily slip away because it is all done off the official curricular books. The explicit teaching of values is always a potentially volatile topic in a diverse, multicultural society, and those who want to avoid controversy might well turn to computers with relief precisely because they believe that computers could not be used to teach controversial values.

Advocates for computers challenge this concern in several ways. They maintain that computers can be used to teach values, just as books and movies are used today. They point to examples like the CD-ROM, *A Right to Die? The Dax Cowart Case*, [26] which presents a wealth of specific information about a person horribly disfigured in an accident who asks to be allowed to die. Teachers can use such computer-based products to create a rich environment for the discussion of value questions. Advocates also claim that working with computers presents as many opportunities for students and teachers to confront value questions as other teaching methods. Finally, the same kinds of social difficulties and dilemmas—cheating, helping, taking turns, and so on—arise when students use computers in schools and classrooms as arise when students study in any other way.

The strength of these challenges hinges on two empirical questions: Do opportunities to confront important value questions arise as often when students use computers as when they engage in other school and classroom activities? and Do teachers or other adults assume as active a role in helping students confront and resolve value questions when students work on computers as they do in other classroom situations? We do not really know because these questions have not been studied, as far as we can determine. It seems likely that opportunities to confront value questions would be similar when teachers use computers in an English or social studies class, but computer classes may well present fewer opportunities to raise significant value questions. If using computers means

teaching less of the humanities then there may well be grounds for concern. But is it plausible to suppose that a programming class, say, would present fewer opportunities to teach values than a math class, or that a teacher of programming would be less likely to seize whatever opportunities arose for teaching values than a math teacher? Similarly, we lack a solid base of information to judge whether computers may implicitly teach other values that we do not want to teach. We do not know, for instance, whether students who destroy a virtual city on the computer will become more violent or have less respect for life. Until we know, educators have cause to worry.

We conclude, therefore, that concerns that computers may jeopardize the teaching of values cannot be dismissed. Although the belief that computers are inherently technical and therefore somehow cannot be used to teach values is naive, concerns about computers interfering with implicit modes of teaching values and implicitly teaching undesirable values may or may not be justified. The analysis suggests that concerns about the teaching of values are most justified when students work on the computer in separate units or courses focused on purely technical learning. Excessive use of the computer that leads students and teachers to focus on narrowly technical learning at the expense of more value-laden goals and content raises the risk of this form of dehumanization.

Version 4: Education May Become Overly Standardized

Many educators express the concern that a rigidly standardized system of education will, in pursuit of laudable goals such as efficiency and equality, treat students as so much human raw material to be molded to standard specifications. Their nightmare is that a rigid standard program administered by computers will destroy the flexibility of the present system and eliminate the many individual, family, ethnic, religious, community and regional influences that humanize the present educational system. Where teachers may see a child with a unique identity and biography who should be encouraged to develop in unique ways, the computer will register only a set of numbers reflecting relative performance on pre-set objectives.

Those who are concerned about over-standardization value diversity, liberty, individuality, and the preservation of regional, religious, ethnic and cultural identities. They prefer local control of education and oppose centralization of power. They maintain that the standardization of education has already progressed far in the past two or three generations, and fear that computers will enable it to go farther, faster.

Some believe that standardization is inherent in the technology which simply has limited capacity to recognize, respond to, and foster individuality. Keyboards, mice, and joysticks, for instance, offer a narrow expressive palette in comparison to the crayons, pencils, paint, cloth, scissors, paste, and so on, found in the

kindergarten supply cabinet. Thus, critics charge, students and teachers are forced to adapt to computer technology rather than the other way around. In this form, the worry is a special case of the general concern over human beings compelled to adapt to the rigidities and limitations of technology, which critics consider dehumanizing [27].

In addition to rigidities inherent in the technology, standardization may also follow from its mode of production. Complex computer systems produced by multinational corporations will narrow choices to a few standard options. In every industry, critics claim, computers increase standardization. More standardization in computers, fast food, or household goods may be an acceptable price to pay for economics of scale, critics concede, but in education something precious would be lost [28].

The strongest challenge to concerns about standardization is the claim that nothing about computers inherently promotes standardization. People may use computers to promote either standardization or diversity. Computers may make it possible or easier for educators to standardize the curriculum, but educators may also use computers to increase curricular variety. For instance, instead of using computers to expand standardized testing, educators may use them to develop new, more realistic, more dynamic forms of assessment.

Critics maintain that using computers in schools will lead educators and parents to accept a greater degree of standardization than they would have chosen otherwise, but it is difficult to know what evidence would confirm or disconfirm this claim. The arguments are not decisive. The argument that standardization is inherent in the technology because of its digital, algorithmic nature can be countered by the argument that computers have been able to perform well in such unstandardized arenas as music, art, and humor. In education computers can monitor students' responses in detail and use that data to make split-second calculations to select different learning exercises for each student. Within the narrow borders of the data they have about students, computers seem capable of flexible responses. Although the borders seem to be expanding, it is impossible to predict how far they may expand, and therefore it is unclear how much computers may eventually affect standardization [29].

Many critics are attracted to an historical argument claiming that technology always promotes standardization. Careful historical studies, however, generally show mixed effects from widely used technologies. In the early years of this century people feared that telephones would promote standardization by centralizing power in the hands of bosses, but the net effect of telephones on centralization of power in organizations was negligible [30].

Furthermore, educators disagree about how much standardization is desirable. Few favor giving every child a unique educational program, and few favor a common program for all children. In the U.S. local schools generally have considerable latitude in shaping educational programs. Ideally, communities can achieve as much or as little standardization as they want. Would it be different with

computers? Would local decision-makers be free to choose whatever standardization they want?

These questions direct our attention to the locus of decision-making about the use of computers in schools and to the relative power of producers and consumers of educational computer systems. If the same people make decisions about using computers who now make educational decisions, and in the same ways, and if those decision-makers have as much access to relevant information about computers as they do about other matters, then they should be able to make decisions that reflect the will of the community about how standardized education should be. But people might find themselves with more standardization than they want if decisions about computers are made by more distant decision-makers, such as technical experts, school district officials, state and federal agencies, and corporate executives.

This brings the discussion back to a concern about accountability that arose earlier in connection with the teacher's role. If introducing computers into schools changes the way decisions are made or who makes them, then ways must be found to assign accountability in the new system or else existing protections will be weakened. This is especially problematic when decision rules are programmed into computers that assign scores to students that are then used to award or withhold educational opportunities.

The key indicators of risk of over-standardization seem to be: when distant, unresponsive decision-makers impose computer applications on teachers and students; and when computer systems make decisions about students using algorithms which are inaccessible or unchallengeable.

How great is this risk for schools today? How often do teachers make their own decisions about the use of computers, and how often do they defer to experts or distant officials? How often do educators rely on data from automated computer systems to assign grades or advance students? National data on these questions are lacking. Our guess is that some schools where school officials have purchased and imposed the use of one of the commercial integrated learning systems may be running this risk now.

WHAT CONCLUSIONS CAN WE DRAW?

Will computers dehumanize education? It is now clear that this is not the kind of question that admits of an unequivocal answer provable beyond a reasonable doubt. Even if we have managed to identify all the risks, and have correctly assessed their seriousness and likelihood, people of good will may still disagree about the seriousness of the overall threat because they place different priorities on different values or have different tolerances for risk. The best we can do is to offer our own overall judgements and invite readers to give them due consideration.

We conclude from this analysis that there are valid grounds for concern about dehumanization arising from the use of computers, but the most serious risks lie in

the future when computers may be more widely used. Some possibilities that concern many educators seem to pose little real risk. We need not worry, for instance, that most students will turn away from human relationships because they use computers in school. There is a risk that some students who spend a great deal of time working on computers may be harmed, and the risk would spread if the use of computers in schools expands markedly while nothing is done to guard against this danger.

Likewise, for most students and teachers, the student-teacher relationship does not appear to be in any imminent danger from computers. Computers may strain students' relationships with teachers whose computer competence is low, especially if they teach math, science, or other subjects where students expect them to use computers. When students know more about computers and use them more fluently than the teacher, the traditional image of the teacher as the expert in the subject is more difficult to sustain, but some educators think this is a good thing. In the long run, however, the student-teacher relationship would be seriously threatened if as a cost-cutting measure schools used computers to replace teachers or to reduce teachers' role and status. Furthermore, an indirect but potentially grave risk of weakening the teacher's role is the loss of accountability which would seem to be inevitable if teachers lose immediate contact with and control over key educational activities.

Computers as used in schools today pose little threat to the teaching of values simply because they are so seldom used. Concerns on this score are nevertheless well founded in schools where computers are used for technical study that displaces the study of humanistic content. Most high schools have recently added technical computer courses, often in new departments separate from math and science. In some schools enrollment in these courses consists disproportionately of children from poor and minority households. If these children have less opportunity to study the humanities, the threat to the teaching of values would be real for them. These situations bear watching.

The risk of over-standardization from simply using computers is small, but it becomes large when control over computer systems is vested in more distant and less accountable authorities. Furthermore, here too new dangers appear which may be even worse, such as loss of responsiveness and accountability in the education system.

In our opinion, none of these risks is widespread now, and none of them poses as grave or tangible a threat to students as, say, violence or drugs. But the risks are real, some students and teachers are almost certainly suffering from them now, and they could easily become widespread and serious if nothing is done.

How certain are we of this conclusion? Only as certain as the scope of what we know about the general effects of computerization on schools. Our minds could be changed by better evidence of several kinds. Suppose careful studies were to show, for instance, that children who use computers excessively actually manage by doing so to avoid emotional damage from negative experiences with other

children, such as teasing, bullying, ridicule, or rejection. If these students then go on to use computers to form constructive, albeit attenuated, on-line relationships, and grow up to live satisfactory social lives as adults, we would conclude that the dangers of social withdrawal are minimal. By contrast, if evidence came to light showing that schools were replacing the study of literature and history with narrowly technical content and goals, we would regard the risk of dehumanization as serious and needing immediate attention. In short, although our opinions about the severity of these risks rest on the best evidence we could find about what actually happens when students and teachers use computers, the evidence is not nearly as rich or comprehensive as we would have hoped.

DEVISING A PRACTICAL RESPONSE

Will this grounded analysis of concerns about dehumanization help educators come to a firm resolution one way or another about their concerns? We hope and believe so. While the analysis has certainly not given a decisive “yes” or “no” answer to the question “Will computers dehumanize education?” we believe it will help concerned educators act responsibly on their concerns. Specifically, it should help them to:

- pin down their concern, put a recognizable face on what were once vague anxieties
- examine their concern in an open minded way, testing their beliefs and values in dialogue with others
- identify signs in their own school and classroom that indicate greater or lesser danger of dehumanization.

An important step remains, though. To guard against the dangers of dehumanization educators must devise appropriate practical responses.

Concerned educators need better options than either outlawing computers from their classroom or ignoring their concerns and going along with dominant trends. They could reduce the rate at which schools acquire and use computers. While this seems at first to be a prudent and feasible course of action, it is indiscriminate in that it would affect all uses of computers equally, the benign as well as the dangerous. While it might offer some protection against the dangers of dehumanization, it might only delay them, and it would also delay or reduce any benefits that might be obtained from using computers in positive ways. A more discriminating policy would protect against the serious risks while moving ahead to secure the benefits that entail little or no risk.

A grounded analysis helps educators identify and evaluate each particular risk, opening up the possibility of putting in place specific protections. To protect against dehumanization, for instance, educators can encourage social uses of computers over solitary ones. They can favor uses that are closely integrated with

other school and classroom activities over uses that are separate from and independent of what else goes on in school. They can encourage teachers to use computers to teach humanistic content as well as practical, technical, and scientific subjects. They can ensure that the use of computers is controlled by duly constituted local public and professional authorities rather than by distant technicians, bureaucrats, or corporate executives. They can insist that decisions about computers be as open and accessible as other educational decisions.

Educators can also guard against risks by watchful waiting, closely following those indicators associated with greater risks. In the case of dehumanization, they can monitor the time students spend using computers. They can monitor those individual students who seem to be withdrawing from social life into an on-screen life. By watching closely, educators may be able to find out whether this behavior is a pathological flight from reality or a constructive search for a temporary refuge from a stressful social situation. They can pay special attention to those schools that use computers to replace teachers in performing important educative functions and watch to see if the student-teacher relationship suffers.

Finally, educators can tailor actions to their situation. The risks that are most serious in a specific local school should determine what uses of computers are encouraged there, not the risks thought to be highest on the average in the state or nation. For instance, much less protection against over-standardization would be needed in a locality where schools have a tradition of active parental involvement and strong community leadership in school affairs than in one where a powerful, unresponsive board or central administration run the schools.

Actions would and should depend, also, on educators' degree of concern. Those only mildly concerned about students withdrawing from social interaction might monitor informally the time the most computer-active students spend working individually at a computer. Those who are more concerned might want school leaders to subject all proposals for computer use in the school to a formal review focused on whether the activities would increase or decrease the risk of social withdrawal. Those with a serious, pressing concern about this issue might move to limit the number of hours students may work alone at computers in school or require that all school-sponsored uses of computers be done in groups.

So, while the use of computers may entail some threat of dehumanization, this analysis reveals that educators have practical responses that can protect against the threats. Educators are not helpless against the onslaught of technology. They can use powers already available to them within existing institutions to protect themselves, our children, and us from possible dehumanization due to the use of computers in schools. They can craft a protective response as forceful as their convictions require and tailor it to their situation in as subtle and nuanced a way as they know how. They can, that is, if they know the technology well enough to evaluate the risks, find actions that will protect against them, and judge the protection afforded by the various actions. Just as democracy needs an informed electorate, a responsible profession needs informed practitioners.

Educators face a difficult choice, individually and collectively, between engaging with computer technology and avoiding it. Engaging the technology requires a substantial investment of time, effort, and resources to build the competence to make responsible professional judgments. Avoiding the technology requires no effort, but leaves educators unqualified to judge whether or how best to use the technology for education. Educators play a vital role in deciding how and whether to use computers for education. Their experience with children and with traditional educational methods and their ethical commitments to the welfare of students and society are an important protection against the potential dangers of using technology. As long as computer systems are viewed as mysterious black boxes, however, control will have been effectively wrested from the hands of local educators and vested in the hands of distant, possibly unresponsive, creators of these systems. We would feel much less concerned and much more secure against possible harm if technically qualified educators are in control rather than technicians, officials, and corporate executives. Many educators find information technology difficult, frustrating, distasteful, and possibly dangerous, but we hope, for society's sake, that most educators will nevertheless choose engagement.

CONCLUSION

Educator's concerns about the social and ethical aspects of using information technology for education have persisted for nearly half a century. There is no reason to believe that they will evaporate in the next half century, either, unless educators face them and find ways to respond to them constructively. If our analysis of the current situation is correct, eloquent criticism of the familiar conceptual counter-cultural kind, which may be capable of fomenting an ideological and political struggle between pro- and anti-technological forces over social and ethical values—polarizing and politicizing them—may have little effect on the practice or on the quality of education. When critics and advocates of computers in the schools fight for the hearts and minds of an ill-informed profession and public, the result, regardless of who wins, is not necessarily a victory for education. A substantive dialogue that can form the basis for reasoned action and response—both in the classroom and in the academy—although difficult to sustain, is a genuine victory for all.

A substantive dialogue about social and ethical concerns requires a serious, active opposition that will articulate educators' concerns, speak out about them, and insist that they be taken seriously. It requires a determined, level-headed, fair-minded effort to understand the nature and extent of the risks posed by using various kinds of technology in various ways for various educational purposes. It requires studies of what actually happens when teachers and students use computers for education that will inform the discussions. It requires educators who engage with the technology and form their own judgments based on their own and

their colleagues' experiences rather than educators who stick their heads in the sand, defer to experts, or drift along with the mainstream. Such a dialogue should go a long way to help educators build the conviction they need to act responsibly on social and ethical concerns about technology and education.

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