Tool of transformation: the ideological role of computer technology in education

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Tool of transformation: The ideological role of computer technology in education

by

Lowell Wayne Monke

A dissertation submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of
DOCTOR OF PHILOSOPHY

Major: Education
Major Professor: Jackie Blount

Iowa State University
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1999

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Graduate College
Iowa State University

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For the Graduate College
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ABSTRACT

Computer technology is usually evaluated according to its effectiveness in aiding learning. What is generally ignored is the impact of the ideology embedded in the computer on the very structure of education. This philosophical dissertation consists of four essays which examine the relationship of this ideology to the learning enterprise. The first essay develops the character of that ideology and its general influence on learning. It is argued that the ideology embodied in the computer is congruent with the ideology of technology that has developed in Western civilization over the last 300 years. As a result, the computer furthers a faith in progress through the development of tools rather than the development of inner qualities of the human being. The next two essays explore two specific areas in which this ideology and, thus, the computer play a harmful role in the learning environment. It is argued that computer technology tends to support both the commoditization of education and the forces which use education as a tool of oppression. Each of these social ills develop around the treatment of subjects with intrinsic value as objects to be utilized, a view subtly supported by the use of computers. The final essay is dedicated to developing a positive approach to the use and study of computer technology for learning. In this essay it is argued that children need a period of aesthetic and social preparation before bringing the computer into the learning environment. It also argues that the entire structure of schooling will need to be altered if we are to escape the technological ideology that pervades education today.
INTRODUCTION: A PHILOSOPHICAL EXPLORATION OF EDUCATIONAL TECHNOLOGY

According to the woman I married, I dance like a drunken elephant. Since she is, by common standards, a marvelous dancer, I have had to accept her judgment. At one time slow dancing was an especially disastrous undertaking, as we both insisted on my obligation to lead. But gradually, and totally unbeknownst to me, Julie developed a means to subtly influence my movements, in a very real sense leading my leading. And so I became less of a danger on the dance floor and, until I finally discovered her treachery, was convinced that I was becoming a rather smooth mover.

It may seem odd to open a dissertation on the impact of technology on education with a story about dancing. I do so for two reasons: First, one of the reasons our relationship with our technology is so poorly understood is because it tends to be most profoundly influential through our mundane, day-to-day encounters with it, making it very difficult to speak about it from a perspective outside of that relationship (Borgmann, 1984). Thus, the use of metaphor and analogy seem essential in trying to come to grips with - or more accurately, hold at arms length - this frustratingly all too familiar phenomenon of human experience.

Secondly, and in response to the first reason, dancing strikes me as the most appropriate of all metaphors for the way we do relate to technology. Much as I dance with Julie, we dance with our tools, and in so doing they guide us as we guide them.

Implicit in this analogy is the claim of nonneutrality. But this nonneutrality is exhibited at two different levels: In one case we have the nonneutrality of individual tools; in the second case, we have the nonneutrality of Technology with a capital T - the idea that there is a technological worldview, an ideology, that, in addition to each separate tool, influences the way we dance through the world.
These two ideas are often conflated. When we speak of technology we tend to think in terms of the conglomeration of all of our tools taken together. This conglomeration does, as we will see, have an impact on our lives. But it is not congruent with the technological ideology that has arisen over the past 400 years, and it is essential that we recognize the difference.

**The Nonneutrality of Technologies**

Most of us have said at one time or another: "It's only a tool. It's how you use it that matters." Interestingly, there is another even older saw that goes "To a man with a hammer, everything looks like a nail." These two sayings are in striking opposition to each other. One claims that we determine how we use our tools. The other suggests that our behavior, even our thinking, is heavily influenced by the tools we use. This dichotomy almost invariably sets the parameters of the debate over the influence of technologies on our lives.

The value of the dance metaphor is that it provides a sense of how we can embrace this dichotomy. It seems that we both lead and are led by our tools, forever engaged in an intricate dance that is, at its core, a fundamental dialectic of human life (Ihde, 1990). This dialectic, in turn, grows out of a unique quality of human thought that is common to both technology and education - ideas. Ideas are what we bring to a tool when we decide to employ it for some task; they are what determine how we wish to use it. It is because we bring our own ideas to a tool that we believe that we determine how we use them. What we generally don't recognize, however, is that every tool also contains at least one powerful human idea - the idea that spurred its development. Complex tools embody many ideas - and just as we negotiate ideas among each other, we are forced, when we pick up a tool, to negotiate with the ideas embedded in it. Thus, every technology has certain biases built into it - a purpose for which it was designed to be used, but also other ideas that tend to influence us in our actions.
One of the clearest examples of how these biases influence us is the impact on children of a relatively recent technology, television. Neil Postman (1993) sums up the contrasting biases of TV and print media and the consequences these competing biases have on education:

On the one hand, there is the world of the printed word with its emphasis on logic, sequence, history, exposition, objectivity, detachment, and discipline. On the other, there is the world of television with its emphasis on imagery, narrative, presentness, simultaneity, intimacy, immediate gratification, and quick emotional response. Children come to school having been deeply conditioned by the biases of television. There, they encounter the world of the printed word. A sort of psychic battle takes place, and there are many casualties... (p. 16)

By drawing on and supporting certain cognitive capabilities while leaving others uncalled on, different media advance some thinking skills while neglecting others. In doing so they encourage a particular way of relating to the world. Sometimes it is not one mechanical technology pitted against another, but a mechanism versus the unaided human resource. The microphone-loud speaker system, for example, amplifies one's ability to reach a large audience, but at the same time impairs one's ability to reach intimacy with a small group.

We don't have to embrace McLuhan's extreme view that the "Medium is the message" to accept that we are to some extent influenced by the tools we use. Don Ihde's (1990) more modest view that technologies amplify and reduce tendencies is more in line with the kind of dance that I have tried to describe. It recognizes that technologies are not neutral, but neither do they fully determine our actions or our thoughts. We will see later how important this distinction is.

What Gets Amplified and Reduced

It isn't really enough to point out that all technologies are double-edged swords, amplifying and reducing. We also need to understand the ways in which these amplifications and
reductions occur, for the two effects tend to take place in different ways, in different social realms and quite often at different times.

Let me begin by citing Ihde’s example of harvesting apples. Someone who picks apples by hand will, by coming into direct tactile contact with each apple, tend to pick only the apples suitable for use, leaving the unripened or overly soft apples on the branch. Give that harvester an apple picker and the number of apples harvested will increase dramatically, but the quality of the batch will suffer, as the person will no longer have the feel of the apple to guide the selection process.

This example is a good metaphor for the way in which most technologies, including the computer, amplify and reduce. To give just a couple of examples: It is commonly argued that computers help expand our children’s horizons, especially through their connection to the Internet. And it is certainly true that enabling children to communicate with other children or even adults on the opposite side of the world, represents an almost unimaginable expansion of their world. But this expansion of the child’s boundaries of learning is almost inevitably accompanied by a contraction in the child’s immediate, in-depth relationship with her physical surroundings. In much the same way that the apple picker amplifies one’s picking power while reducing one’s ability to make close inspection of each apple or in the way the microphone amplifies one’s ability to reach a large audience while reducing one’s ability to reach intimacy with a small group, the Internet amplifies the number of people and amount of information that can be accessed, while reducing the quality of one’s engagement with the immediate environment.

This trade-off is not always a matter of quantity versus quality. Again, if we look at the computer we will find that it offers a means of revealing the world to students through such things as “multimedia” educational programs. Yet the means by which the world is revealed comes through a device which is the blackest of black boxes - absolutely impervious to comprehension through inspection by a child (or anyone else, for that matter). I doubt if there
is a grade school teacher in the country, certainly there aren't any children, who fully
understands, or perhaps even vaguely understands, how the technology works that they are
using in their attempts to better understand how the world works (if this isn't clear, ask
yourself how you would go about explaining to a child how a computer divides two into four).

Here is a final example that suggests that this process is very much a contextual one. It is
argued that the computer allows instruction to be individualized. And in one sense it does. Each
student can move at a different pace, often in widely divergent directions. So individualization
is amplified by the extensive decision-making capabilities of the programmed computer. Yet -
the programmer who designed the software the student uses could not possibly know the needs
of each individual. The programmer must write the program for some abstract hypothetical
student - a mass student - narrowing the choices to what that programmer, or a group of
programmers can anticipate. This is just the opposite of instruction based on specific
knowledge of my son, or your daughter. It is, in fact, the most abstract, impersonal instruction
imaginable. This may be somewhat hidden by the huge number of options, but these options
are merely predetermined choices offered based on the programmers' knowledge of an
extremely meager set of previous choices made by the student within the program, not the full
gamut of needs, desires, experiences and personal history upon which a good teacher or
parent, for example, will make hundreds of subtle, mostly unconscious, decisions every day.

There are many other examples that I could cite. It makes sorting out the full effects of a
technology a very interesting - and challenging - situation. What has bothered me for some time
now, and is the motivation behind this dissertation, is that for the most part the educational
community has not taken up that challenge. We have instead, like society at large, climbed
aboard the technological bandwagon, eagerly or reluctantly, but mostly without making a
close, critical examination of both aspects of its effects.

If we look closely at the examples I've given, or the many others we could come up with, I
think we can get an idea why this has happened. It turns out that the benefits and reductions
that take place in using a technology usually do not occur at the same time or in the same place or even in the same realm of concern. French philosopher Jacques Ellul (1990) has observed that while the benefits of a technology tend to be immediate and obvious, the problems that arise tend to be indirect and only come to our awareness over time. Also, while the benefits tend to come to us in the realm of mechanical assistance in some externally observable, systematic way, what is reduced generally takes place in the more intimate social or inner realm of the individual, where it is much more difficult to isolate it and trace it back to its origin.

A chart of our examples testifies to this claim:

<table>
<thead>
<tr>
<th>Amplifies</th>
<th>Reduces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microphone reaching the ear</td>
<td>reaching the heart</td>
</tr>
<tr>
<td>Internet access to the distant world</td>
<td>engagement with immediate surroundings</td>
</tr>
<tr>
<td>Computer access to information</td>
<td>comprehension of means of obtaining information</td>
</tr>
<tr>
<td>rational categorical choices</td>
<td>number of personal, intuitive choices</td>
</tr>
</tbody>
</table>

The point that we should bear in mind is this: The benefits of technologies are generally clear and present (through measurable outcomes) and show up on the physical level of observation. What they diminish is on an entirely different level - often within the inner life of the individual and usually impossible to observe directly and immediately.

**Externalizing Learning**

It is the fundamental character of physical technologies that they externalize some human abilities. Consider the microphone again. A singer once needed to develop a powerful voice to reach a large crowd. Rock stars today can mumble, whisper or hum and still reach the farthest seat of a football stadium. It is somewhat ironic that by giving humans such tremendous amplifying power, whether it is voice, muscle or mind, technologies can reduce the necessity
of building up internal strengths. This is one reason why Marshall McLuhan (1964) claimed, in his typically hyperbolic way, that media both amplify and amputate.

All of this has been known at least since Plato's Socrates, through the story of King Thamus in the Phaedrus, pointed out how the invention of writing doomed human reliance on memory. More recently, people like cognitive scientist Donald Norman (1993) have reiterated this claim but in relation to the computer. Norman, who for a time worked with Apple Computer, is no technophobe. But he emphasizes that "things that make us smart can also make us dumb" (p. 3). One of the ways this happens is by the externalization of human mental skills. Probably the most obvious example of this in education is the on-going debate over the proper use of calculators in the mathematics curriculum. No one denies that a reliance on the calculator at a young age to do basic arithmetic operations inhibits students' ability to carry out those operations on their own. Yet, like Norman, most leaders of educational mathematics believe that this is an inappropriate use of calculators and the challenge is to find applications of calculators in math that don't inhibit this particular internal development.

What I want to stress here is that the problem for education of technological externalization runs deeper than just how technologies are used. In a culture that looks to technologies to solve its problems, that embraces technology as a way of engaging the world, the problem of externalization becomes that a tool is used. When King Thamus chastised the god Theuth for boasting about his new invention, writing, he did not specify that the problems it would cause would develop because it would be used inappropriately; it was because it would be used, period. In a passage that has proven prophetic in showing us why we don't recognize this today in the technologies we apply to education, Thamus issues the following warning: "O most ingenious Theuth, the parent or inventor of an art is not always the best judge of the utility or inutility of his own inventions to the users of them. And in this instance, you who are the father of letters, from a parental love of your own children have been led to attribute to them a quality which they cannot have" (Plato, 1952, p. 138).
After encountering that passage I find it difficult to attend a computer education conference, with its attendant horde of vendors and proselytizers, and not see in many of them modern day Theuths, blinded by fondness for their inventions. That this has happened is understandable, given the character of the amplification/reduction process. Those who supply the products work in an altogether different domain than where the problems their efforts produce will eventually appear. It is not their area of interest or expertise. It is not their problem.

In fact, it is not a problem at all in their eyes because there is usually no simple, direct cause and effect relationship that can be drawn between any use of a technology and the problems that arise in society. Just as it is fair - and comforting - to say that there is no clear connection between the extra dollop of sour creme I put on my baked potato yesterday and the clogged artery that sends me to the emergency room 20 years from now, it is fair to claim that no one piece of technology used in education will cause educational, social or personal degradation either immediately or in the distant future. Rather, it is the accumulation of these technological encounters that gradually produce the problems. Ellul (1964) calls this “the phenomenon of technical convergence,” and uses it to explain why technology represents such a subtle and insidious challenge. “It is impossible to determine, by considering any human technique in isolation, whether its human object remains intact or not” (p. 391). But in a society filled with “techniques,” as Ellul calls them (in order to include technologies that exist apart from physical machines), the problem is their convergence. “A plurality of them converge toward the human being, and each individual technician can assert in good faith that his technique leaves intact the integrity of its object. But the technician’s opinion is of no importance, for the problem concerns not his technique, but the convergence of all techniques” (p. 391). In other words, the use of this piece of software doesn’t cause a problem, nor the watching of that television program, nor the playing of that video game, nor the exposure to three minutes of advertising on Channel One. But they, and hundreds of other technical activities converge on the child, with results that does indeed attack the child’s integrity.
This attack does not succeed merely by one technology, like the calculator, externalizing one set of mental functions, and another technology externalizing another set. As Ellul goes to great pains to explain, the process is much more complex than that. Most fundamentally it takes place through the gradual loss of faith in developing the internal resources of the student in favor of looking to external means of coming to terms with the world. It is through the shift from a belief in the possibility of a better life through perfecting the person to hope for a better life through perfecting our tools that we lose focus on our inner growth. One of the students I work with at Central Campus recently brought this trend home to me through his rebellion against it. He informed me that he had decided to stop taking Ritalin. "I realized that every morning I get up and go through this ritual of soul suicide," he said. "I take a pill to fix all of my problems before I ever run into them." He decided he could never work through his problems if he couldn't confront them, so he put the pills away. Whether he will succeed remains to be seen. What is important for our discussion is that, whereas those around him have for years defined his problems in physiological, mechanical terms and sought external remedies for them, he has chosen to redefine those problems as an internal struggle which he hopes to develop the strength to manage.

Though this example centers on one medical technology, what this young man finds himself confronted with is not just the bias of a particular tool, but an effect of Technology as an ideology, a particular way of engaging the world, which grows out of putting more and more trust in a mechanical orientation to life. Ritalin is an efficient, physical treatment, that helps all involved function more easily by getting the child quickly under control. It makes no serious, painful demands on the family, community or school structure or relationships; requires no examination of technological effects on the environment (food additives, pollution, etc.); entails no long term inner struggle by the child. It takes a problem in its narrowest mechanico-chemical constituance and provides a mechanico-chemical fix.
I should hasten to add that I am not here advocating that we take Ritalin away from all children. I have met with enough parents whose family lives were finally made bearable by this and other psychotropic drugs to shy away from such facile suggestions. It may well be that the student who now feels he is killing his soul each time he takes a tablet would never have arrived at the point of awareness and determination to take charge of his life if Ritalin had not helped hold his inner life together in his earlier years. Certainly, most parents and children, and their physicians, would say the benefits outweigh the disadvantages - or they wouldn't have chosen to do it. As Ellul says, it is generally useless in our society today to indict individual technologies. They can only serve to illustrate a common ideological orientation that converges on the student from every direction.

Still, this particular illustration could have come right out of the final dialogue in *Brave New World* (Huxley, 1932). And the words spoken by my student could easily have been uttered by the Savage, who in the story willingly opts for the life of struggle, misery and possible destruction rather than give himself over to the empty comforts and vapid happiness that Huxley believed was unavoidable in a Technological society. This orientation, which Huxley was too wise to pit against an idyllic nontechnological alternative, has brought Western civilization a level of wealth, health and comforts that went beyond even his fertile imagination. But as he warned, this form of progress has come at a price. Parker J. Palmer (1998) echoes my student in observing how this outward looking worldview tends to lead us into the same dilemma in all of our educational endeavors:

We are obsessed with manipulating externals because we believe that they will give us some power over reality and win us some freedom from its constraints. Mesmerized by a technology that seems to have done just that, we dismiss the inward world. We turn every question we face into an objective problem to be solved - and we believe that for every objective problem there is some sort of technical fix. That is why we train doctors to repair
the body but not to honor the spirit; clergy to be CEOs but not spiritual guides; teachers to master techniques but not to engage their students' souls. (p. 19)

In education as in all other areas of life, the ideology of Technology, like the tools that help define it, is both a blessing and a curse - and contrary to common belief it is anything but neutral.

The Language of the Technological Ideology

It is no coincidence that both my student’s and Palmer’s choice of words leads us into some treacherous linguistic terrain. Terms such as “spirit” and “soul” send shivers down many educational academics’ spines. I’m not certain about my student, but neither Palmer nor I intend these terms to be taken in their typical religious meaning. But that really isn’t the issue here. However we refer to the inner, inexpressible, mechanically inexplicable life of the student, it raises red flags, for these qualities lie outside Technology’s frame of reference and are, thus, irrelevant to those who would have us remain within it.

Soul and spirit aren’t the only terms that have fallen on hard times during the reign of Technology. Sven Birkerts (1994) notes that as we look ever more outward for aids in understanding the world, we are losing the capacity to reach those areas of our inner selves whose nurturance once formed the most profound task of education:

We are experiencing in our times a loss of depth - a loss, that is, of the very paradigm of depth. A sense of the deep and natural connectedness of things is a function of vertical consciousness. Its apotheosis is what was once called wisdom. Wisdom: the knowing not of facts but of truths about human nature and the processes of life. But swamped by data, and in thrall to the technologies that manipulate it, we no longer think in these larger and necessarily more imprecise terms. In our lateral age, living in the bureaucracies of information, we don’t venture a claim to that kind of understanding. Indeed, we tend to act
embarrassed around those once-freighted terms - truth, meaning, soul, destiny... We suspect the people who use such words of being soft and nostalgic. (1994, p. 74).

Technology amplifies that which is "hard," mechanical, both within us and outside of us, leaving that which isn’t lying fallow, undeveloped, and more and more inexpressible. Though providing a full explication of this ideology and how it manifests itself today is beyond the scope of this essay, and probably this essayist (Lewis Mumford and Ellul each dedicated several volumes to it with only partial success) it is important for the essays that follow to grasp its fundamental character.

**The Ideology of Technology**

Several years ago Budweiser Brewing Company, one of many corporations that attempt to both cater to and shape American culture, ran a TV ad campaign for Bud Lite that attempted to glorify the question “Why ask why?” Fortunately, the witticism did not endure. But it does offer us an excellent point of entry (slightly better than “Just Do It”) into the topic of how we as human beings relate to Technology.

It is excellent because “Why ask why?” is a perfectly natural question to anyone working as a pure technician. Technology is, first and foremost, concerned with means, not ends. “Why” questions generally focus on issues of ends, purposes. Those issues lie outside the technical realm. The technical aspect of any task is concerned only with how to achieve those ends, not why they are worth achieving. So the technician may very legitimately resort to that incredulous response when someone asks him why he is doing what he is doing. Such “Why” questions are settled elsewhere.

Those of us who are educators like to think that we are not pure technicians; that we have some control over the curriculum we use, the way we teach, the reasons we teach it. Yet when the question of employing computers in the educational enterprise arises, it is remarkable how little attention is given to the why questions. Three years ago when I undertook a study of the
cultural consequences of Des Moines Public School's decision to inject massive amounts of computer technology into the classrooms, I was surprised at how rarely the people I interviewed raised those kinds of issues. All the concerns focused on issues such as How do we get the computers? How do we deploy them? How do we support them? How do we train people on them? How do we use them to help learning? For nearly everyone I talked with the "why" questions, the questions dealing with ends, had been settled elsewhere, or so they seemed to presume.

Why did this happen? And why did the people I talked to, few of whom viewed themselves as primarily concerned with technical issues, accept this limited role without protest? For insight into that we need to establish an historical context.

The Rise of Technology

Technology as an ideology is a collection of values and assumptions that emanate from a faith in, and reliance on, a mechanical orientation toward the world. It is an orientation that brought the newly emerging scientific method into practical life. It was most passionately, if not originally, articulated by Francis Bacon in the 17th century as a new way of engaging the world: "I am laboring to lay the foundation, not of any sect or doctrine, but of human utility and power" (Borgmann, 1984, p. 36).

Descartes, joining Bacon in this quest, made it clear just how all encompassing this power was to be: "We should employ these entities for all the purposes for which they are suited, and so make ourselves masters and possessors of nature" (Borgmann, 1984, p. 36).

It is important to note that this was a new way of engaging the world, something that seems to be little understood in a society like ours that tends more and more to accept Henry Ford's alleged view that history is bunk. Mumford (1964), perhaps the most diligent and careful chronicler of technology's history, observes that, "All too soon a large portion of the human
race would virtually forget that there had ever existed any other kind of environment, or any
alternative mode of life” (p. 24).

Before Bacon’s time, and even today in what we now call non-technological cultures, tools
were and are used, but without the attendant design to bring progress in controlling both
human and natural conditions (Ellul, 1964). Only with the development of the drive to use
technology to exert this control over our environment did the values and assumptions of an
ideology come into being. The term “use” is critically important in this context. The new way
of looking at the world was instrumental - it involved the constant search for ways to use
whatever resources were available to increase human domination of the environment. In the
beginning this instrumentalism, and the attendant values which served to help develop more
and more powerful tools, remained subordinate to a much higher purpose than even power and
control. Bacon and Descartes both saw the scientific/technological enterprise as the means to
alleviate the horrible poverty, disease and generally miserable living conditions that constantly
plagued Western Civilization. Bacon especially was driven by a “love of God’s creation... pity
for the suffering of man, and striving for innocence, humility and charity” (Ravetz, 1971, p.
434), and believed that “knowledge and technique should be perfected and governed in love”
(Pacey, 1991, p. 463). It was clear to Bacon that the tools that developed out of this approach
were to serve a higher end; indeed, they were to serve God, and like all other human endeavors
were subject to God’s judgment.

Technology was viewed as a neutral means to achieve these higher ends, a belief that
lingers today. And in its purely functional sense technology is neutral in that it doesn’t take
sides in spiritual or ethical matters. By being concerned only with “how” questions it takes no
position in determining the traditional “why” questions that give life its moral dimensions.
The Dominance of Technology

The early development of this worldview is a story of many successes in Bacon's quest, especially in the 19th and early 20th century. But somewhere along the way, the drive to "make things work" came uncoupled from concern with which things were worth making work and became viewed as a good in itself. The search for answers to "how" questions separated from, and began to challenge for supremacy, the concern for "why." Historian Leo Marx (1994) observes:

At this time, accordingly, the simple republican formula for generating progress by directly improved technical means to societal ends was replaced by, or rather was imperceptibly transformed into, a quite different technocratic commitment to improving "technology" as the basis and the measure of - as all but constituting - the progress of society. (p. 20)

A number of developments (mostly inventions) have been nominated as the knife that finally cut the technological cord from its transcendent end.1 Regardless of how it happened, as it happened the values that had helped move technological development along - efficiency, productivity, objectivity, measurability - also became seen as inherently good (Postman, 1993). This gave even stronger impetus, and legitimacy, to the drive to build new tools on top of old ones. As the complexity of the technological milieu grew, many of the new technologies began making their own demands on society, leading to a phenomenon Langdon Winner (1977) calls "reverse adaptation," in which humans who make the machines have to alter their lives in order to keep those machines running smoothly. The unprecedented situation developed in which mechanical means were raised to the level of ends (Ellul, 1964), and the values inherent in them became the commonsense assumptions by which we now measure nearly all other things.2

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1 See for example, (Ihde, 1990; Postman, 1993).
2 Of course, it is precisely the elevation to commonsense assumptions that makes these beliefs ideological. Michael Apple (1990) points out that our commonsense views generally represent unquestioned ideological
Eventually, what was once a neutral means meant to serve within any number of moral and spiritual worldviews, became the competitor of all of them, offering an alternative in which its neutrality transformed into detachment - a belief that all transcendent ends were at best irrelevant. Transcendent ends could go on informing religious beliefs, but they had no place in practical matters, which were reserved for the “Science of Practice.” Progress, the hallmark of Technology, implied that there were no ultimate ends, only continual development of improved means. And these improved means were to be manifested not in the realm of inner transformation of human lives but in the improvement of mechanical devices and, eventually, mechanical thinking. Mumford (1964), points out the fundamental consequence of this recent historical development:

Out of this conjunction [between science and technology] arose the new mechanical world picture which, with every fresh scientific discovery, every successful new invention, displaced both the natural world and the diverse symbols of human culture with an environment cut solely to the measure of the machine. This ideology gave primacy to the denatured and dehumanized environment in which the new technological complex could flourish without being limited by any human interests and values other than those of technology itself. (p. 24)

The technological drive rearranged the hierarchy of human cares, motivations, ideals, and governing principles - those attitudes we now lump together as “values.” Those that eventually percolated to the top - and which today we take for granted - actually grew out of and promote this relatively new ideology. The most important and most radical of these values were: objective measurement, efficiency, quantification, standardization, constant change, progress and, of course, the aforementioned power and control over nature. All of these are qualities

assumptions. Theodore Roszak (1969) observes that this is the way with widely accepted ideologies: “The most effective ideologies are always those that are congruent with the limits of consciousness, for then they work subliminally” (p 56).

3 Langdon Winner (1977) argues that, in part, Technology’s success can be attributed its amplification of the same forces, power and control, as that with which politics is concerned.
that can be secured within or through the development of mechanical means, and as Mumford asserts do not find limits in human interests or values. Again, this refusal to be bound by any set of religious or ethical tenets has been interpreted as a benign neutrality. But it is more accurately understood as a disregard, a redefining of meaningful action according to what furthers technological development rather than human welfare in its full physical, emotional and spiritual dimensions.

By the time Frederick W. Taylor began applying his principles of “scientific management” to the workplace in the early part of the 20th century, the ideology of technology had escaped its dependence on physical tools altogether and become codified as abstract rules of behavior that could be applied to nearly any situation - even human conduct. And this is just what educational leaders did (Callahan, 1962). At the time, this way of looking at schooling - as a productive, objectively measurable, rationalized enterprise - still had to be argued and pressed by leaders onto society. But as the technological enterprise has come more and more to dominate our way of engaging the world, this realm of debate has almost disappeared. Most “why” questions are now answered in accordance with the same values as those which govern our search for “how” and, thus, technological progress has become self-justifying. In other words, the ideology of Technology has become congruent with the limits of consciousness in most minds and, therefore, almost impossible to question at its most fundamental level. The questions of purpose that were absent from my interviews with Des Moines school personnel weren’t really settled elsewhere - they didn’t need to be. They were so commonsensical, so fully and communally assumed, that they never arose in people’s minds.

Eventually Des Moines policy makers decided that the most appropriate way to start distributing the new technology across the district was to put a computer in every classroom. As a mostly mischievous attempt to get them to examine their assumptions I sent to all school

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4 Harry Braverman (1991) points out that Taylor was not really concerned with tools at all, but with bringing the values that had led to technological progress to the management/labor process.
board members and several administrators a report of a study completed by researchers at the University of California, Irvine, which found that piano lessons were much more effective (34% higher scores on tests) than computer instruction in improving elementary students' spatial-reasoning ability (Rauscher & Shaw, 1997). With the report I suggested that perhaps we should now consider putting pianos in every classroom. The suggestion brought a number of sympathetic responses, but no lasting interest in exploring why computers could command such enormous expenditure of time, money and transformation in infrastructure and pedagogy. It seems to me that this should strike us as odd, especially since everyone involved agreed that there was no good evidence that they improved education. That my suggestion generated no real concern, and that it struck no one - not even me - as odd that it didn't, is because computers possess a particular characteristic which sets it apart from all other technologies and fits it ever so tightly inside the protective shield of Technology.

The Convergence of Technologies with the Technological Ideology

What I believe is most important to understand about the computer is that it represents the convergence of the bias of an individual technology with the ideology of Technology. I believe this is the key to understanding the computer's uniquely powerful role, not just in education but society at large. The computer is the tool in which is embedded the essential values of the technological ideology itself. It is almost a pure processing machine, a general purpose means carved in silicon, given to almost infinite increases in efficiency and productivity, offering the user almost unimaginable power and control over the elements in its environment, all through the reduction of everything to measurable quantities of data. Like the ideology it embodies, the computer has universal qualities and therefore can be led in an almost endless variety of directions. But the values it brings to the dance, which subtly shift the thinking, language and structure, the very firmament of our culture, are congruent with those of the technological worldview itself.
This is not to say that the computer does not have effects other than those generated by the technological ideology. Its particular physical configuration, its heavy reliance on keyboard input (or voice in the future), its visual and aural means of output, all have their own impact on society and our personal lives. But it is in its ideological foundations, in its emergence from a worldview that we find a uniqueness among technologies that needs to be explored more fully, especially in the educational domain.

It may be oversimplified to say that the computer is "Taylorism in a box," but I believe that phrase captures the essence of its character. For example, it is not difficult to operate the computer irrationally, it is impossible.\(^5\) The computer enforces absolutely the rationalized working environment Frederick Taylor sought so diligently. It cannot make a person wise, but it can *empower* the *user*; it is never touted as helping the student come to know him or herself, but it is praised for putting the student in *control* of his or her learning; a person cannot sense "the deep and natural connectedness of things," through it, but she can *build a network of resources*. None of these computer enhanced qualities is bad, evil, depraved, uneducational. But they are instrumental, and indicate that the computer amplifies an externalized, material, and mostly mechanical understanding of learning, and life, that finds value in things solely in their use. In our language as in our activities we tend more and more to relate to the computer out of the ideology from which it has sprung. This is why when I speak of "technology" I am always understood by listeners to be referring to computer technology, whereas when I want to speak of other common technologies such as a pen or even a telephone, I have to refer to them specifically.

When we recognize this convergence of the machine with the ideology, it does two things for us: First, it helps us get beyond the particularly polarized neutral/nonneutral argument with

\(^5\) It is important to distinguish the difference between operating the computer and using it to express human thoughts. Certainly I can express irrational ideas via the computer (some might say this is a good example). But if I try to operate the computer irrationally it simply doesn't work. Computers do not respond to cursing, coddling, bribes, threats, prayer, telepathy or, usually, violence (though I regularly see people employ all of those irrational tactics).
reference to the computer. If the computer embodies a whole set of human ideas, then the question of whether it is the machine itself or how one uses it that matters is moot. The computer reflects our own selves - or rather, a portion of our own selves - back to us, so that it reinforces certain values that are already within us. This is why Stephen Talbott (1995), in assessing where the real challenge lies in mastering this most powerful of tools, stresses that while the computer itself does pose serious problems for us, ultimately these problems are projections of our own internal loss of balance: “What I really fear is the hidden and increasingly powerful machine within us, of which the machines we create are an expression” (p. 36). Talbott clearly sees the computer as the most human-like of our machines and therefore the strongest contributor to a continued amplification of this machine-like thinking.

The second thing that recognition of this convergence of machine and ideology does for us, and which follows from the first, is that it separates the computer from other tools. It forces us out of the argument that the computer is just a tool, like any other tool. The computer, in all of its multitudinous manifestations, is a mental machine. Indeed, it is that by definition. I relate to the computer much more on the mental plane than the physical, and as that relationship becomes ever broader, encompassing nearly all aspects of my life, the ideology that is embedded in the machine is in constant, though generally unconscious, interplay with my own thinking processes. As in any close intellectual relationship there is a tendency to adapt my thinking to that which I encounter. But unlike human relationships, there is absolutely no reciprocity from the computer. It demands that I adapt to it for except on the most superficial level it cannot adapt to me. And so I must at least temporarily abide by its ideological values if I am to make use of it at all. This does not mean that I will inevitably become encased by strictly technological values. But it may very well mean that my personal values, as well as the general values of society, will gradually move in that direction.
Ideological Conflict

There was once perceived to be a separation of policy-making thought (which concentrated on the why questions) and implementation (in which technicians worked out the hows). As the technology has become more and more inextricable from every form of work, the ideology of Technology has become more and more dominant in our lives and this separation has been lost. In our schools, it is the technological Theuths who generally set the agenda for setting computer policies in schools. As has happened in every policy-making committee with which I have been a part, the proponents move immediately to matters of implementation (how questions - the only ones they see as debatable) while those who insist on asking why questions are perceived as foot draggers and luddites.

I am not the only one who has noticed this polarization. Langdon Winner (1977) notes the tendency of scientists, engineers and managers he has spoken with over the years to “refuse to tolerate any ambiguity on this cherished, threadbare dichotomy” (p. 10). I think it is worth quoting his description at length, for it affirms precisely the experience I have had at every level of educational institutions:

I have suggested that there might be some desirable alternatives to the ways in which we now employ various kinds of technology - for example, other ways of structuring the use of television than our present nationwide, corporate-owned networks. As innocuous as these views are, they are often taken as a threat. Any criticism of sociotechnical practice could only be vile opposition. “You’re just using technology as a whipping boy,” the response comes back. “You just want to stop progress and send us back to the Middle Ages with peasants dancing on the green.”

A typical response of engineers, for example, is to announce that they are merely problem solvers. “Tell us the problem,” they demand. “We will find a solution. That’s our job. But you may not presume to question the nature of our solution. You are not a member of a technical profession and, therefore, know nothing of relevance. If you insist on raising
questions about the appropriateness of the means we devise, we can only conclude that you are antitechnology.”

It soon becomes clear that in this enlightened age there is almost no middle ground of rational discourse, no available common language with which persons of differing backgrounds can discuss matters of technology in thoughtful, critical terms. Conversations gravitate toward warring polarities and choosing sides. (p. 11)

Winner does not say it (though he seems to be well aware), but at least part of the reason that the technologists he and I both encounter are so unyielding is because the ideology they are defending, to which nothing is beyond limits, is itself, ultimately a closed system, one unable to accommodate the fullness of human capacities to know and grow. And as I have tried to show here, it seeks to restrict the realm of investigation rather than expand it. In seeking to establish a “neutral” means of learning it denies the value of transcendent ends which have given meaning to learning for millennia. It turns out that there is no neutral ground in this situation, no way to dance without choosing who (or what) will lead. And as our dance with technology becomes ever more constant and more intricate, we in education who hope to make specific technologies serve our purposes must become ever more vigilant in drawing attention to the nudges and pushes and pulls that this insistent partner I’ve called Technology subtly make. It seems to me the only choice we have if we hope to regain command of our tools. And choose we must, for it is impossible to be neutral toward Technology. As Apple (1990) states at the end of Ideology and Curriculum, “Our work already serves ideological interests. One has no choice but to be committed” (p. 166).

The question, of course, is committed to what? And that is precisely the question that Technology tempts us to avoid. In giving up on the pursuit of Truth, wisdom or other transcendent goals, we find ourselves in constant pursuit of means: higher degrees, better jobs, more money - an ephemeral success that is itself merely a means to greater successes. And throughout it all the question of “For what ultimate purpose?” goes unasked.
What the Ideology Serves

The question of what we should really be committed to, especially as it pertains to education, is one that I hope the reader will keep in mind while reading the essays that follow. It is the question that allows us to at least partially escape the grasp of the Technological ideology - to step outside of it and examine it at arms length. This introduction is meant to serve that examination as I focus it on three different topics. The first concerns the role that high technology plays in the commodification of education. The second concerns the way in which Technology is used to serve oppression both within and through education. Finally, I will attempt to provide some positive suggestions for addressing these issues in our schools.

Throughout these explorations we should keep in mind that I am not talking about the computer as something totally separate from either ourselves or the ideology I have contended that it embodies. To view the computer in that way eventually leads us back to the conclusion that it is how we use the computer that matters. And, of course, this is true in any case. But how we use the computer is inextricably wrapped up in who we are and how we understand the world. Unlike my human partner, I cannot fully separate myself from this dance partner. As Talbott (1995) observes, "The one sure thing about the future of the computer is that we will behold our own reflections in it" (p. 32). So the critique that seems to focus on this machine is, in a very real sense, a critique of ourselves and a worldview that I believe, in its dominance, has come to serve us poorly.

All of this may seem to preclude getting a handle on the technology itself. It is as if we are caught in a chicken-and-egg dilemma. If so, I take this as a sign of progress, for fundamental human questions tend to be dialectical - and I am most concerned that we come to grips with Technology as a human issue. The essays that follow offer no ultimate solutions, only an effort to bring Technology out of its own self-justifying logic, into the expansive realm of human affairs in such a way that its encounter with education can be seen in a new light.
COMPUTER TECHNOLOGY'S CONTRIBUTION TO THE COMMODITIZATION OF EDUCATION

Last fall (1998), like every fall, Des Moines Public Schools began its year with a staff inservice day. At Central Campus, where I teach, much of the informal staff conversation focused on the programs that had been cut from the previous year's curricular offerings. All of the programs had been eliminated primarily due to lack of sufficient student enrollment. These programs had not reached the magic number of 15 students per class for two years running. The consumers had spoken by ignoring these products, and the products (and their producers) had been taken off the market.

As the staff began going through our annual orientation, the Director of the school focused our attention on the section of our teacher's handbook in which was listed the faculty committees. I had been named the chair of one of the new marketing committees, and since I was already well along in researching this essay, I was curious about just how much attention we were paying to the commercialization of our school. Of the twenty-eight faculty committees listed in the handbook, twelve were listed under the heading Marketing. These were in addition to the half-time position already existing in the school that coordinated all of the school marketing activities. We were determined to not see any more of our educational commodities disappear from the marketplace.

Now Central Campus is an unusual school. It is not a high school in itself, but rather serves all of the district high schools with special programs. Students choose to come to Central Campus, so our marketing efforts are more pronounced than what one would expect to find in a typical neighborhood high school. Yet with the constant advance of school choice in all its manifestations it is likely that the necessity of marketing that is today so integral a part of a school like Central Campus will eventually be the rule rather than the exception among public schools.
Education as a Commodity

Marketing may actually be one of the later, more conscious elements of the commodification of education. It is likely that codification into bureaucratic structures such as marketing committees indicates that commodification has merely reached such a point of saturation that administrative action has to be taken to organize and control it. That education is already largely commodified is something that reformers of all stripes seem to recognize. Consumerist language has more and more become the accepted way we refer to the educational endeavor. Parents in my school district are commonly referred to as “the consumers of education,” and graduates as our “products.” At the university level the students merit both labels while the course offerings and even entire programs are now viewed as products which are, to a great extent, consumer driven. The Central Campus experience of program reliance on numbers of warm bodies is quite familiar to higher education.

What has struck me most in my own experiences in the K-12 environment is how uncritically this view of education is accepted by the school community. That we have all become “stakeholders” in our children’s education, that students must take “ownership” of their learning, that teachers “deliver” instruction to their students are all indications, through our adoption of its language, that we are comfortable with, or at least are willing to accommodate, education as a commoditized activity. I attribute this easy acceptance as primarily the result of the spread of the ideology of consumerism across our culture in general. With consumerism, or its more deeply rooted parent materialism, serving as the lens through which we look at life, it is not surprising that it has slipped quietly into our educational thoughtworld. Ideologies tend to operate not at the level of conscious contention but at the level of what Apple calls “commonsense assumptions” (1990), so that what one believes seems to

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6 See, for example, critics (Apple, 1990; Emberley, 1995; Illich, 1973) and enthusiasts (Dertouzos, 1997; Perelman, 1992).

7 Each of these terms, and many others imported from our commodity culture, can be found in the introduction to the Des Moines Public Schools Technology Plan for 1997-98. This is typical of policy documents generated by the school district.
be so obvious and compelling that there appears to be no need to debate its value. That students should take ownership of their learning is so commonsensical it requires no justification, at least in my school district. But it only makes sense at all if one tacitly accepts that learning is something that can be possessed; in other words, if one assumes that education is a commodity.

In this essay I am concerned with the way in which this ideology of consumerism works dialectically with the ideology of technology to further the commodification of education. But to jump right into a discussion directed at computers and schools is, I think, premature. No matter how strong an argument I present that computers are being employed to commodify education it will do no good if, at the bottom of it all, the reader assumes that learning really is a commodity, or has no clear understanding of what a commodity is. Though our lives are filled with them, few people I know, including teachers, can articulate just what makes something a commodity. Given Apple's analysis, this is to be expected. The role of commodities is now such an embedded, assumed part of our culture that its character rarely undergoes examination. So this is where I will begin - with a brief investigation into the character of commodities and an attempt to contrast it with other ways in which humans encounter the world.

The Disconnectedness of Commodities

My father-in-law turns 65 this fall. The last time we were together I asked him when he planned to retire from farming. He shook his head and said, "I'll never quit as long as I can get around." It wasn't the money, it wasn't the habit of work, which was getting tougher as the arthritis laid siege to his knees. What kept him going was the corn. "I just love to put a seed in the ground and watch it grow. One hundred and twenty days and that seed becomes a huge ear. I just love seeing that happen."
Watching corn grow is probably something only a farmer can appreciate. Corn for most of us is something that is purchased at the supermarket, bought and sold on the commodities exchange, consumed without a thought about its origin or production. It is, in other words, a commodity.

According to the *New Heritage Dictionary* a commodity is "anything useful or that can be turned to commercial or other advantage." As with most definitions, this does not fully convey the character of a commodity. In a mobile, industrialized society, where production is generally disconnected from consumption, commodities also exhibit a peculiar quality of superficial meaning. That is, because an article's production is obscure to the buyer, its significance lies solely in its utility to the consumer, not in its own history. Corn purchased at the supermarket has no significance to the person who eats it beyond its price, taste and nutritional value. The planting of the corn, the life of the farmer who nurtured and eventually harvested it - these are all qualities of that corn that are stripped away leaving for the consumer a vegetable that represents nothing but the side dish for a meal.

For my father-in-law, however, that corn represents far more than just vegetables for the market (or, in his case, food for hogs). That seed he plants in the Spring represents a multitude of meaningful relationships - the change of seasons, the turning of the soil, the long hours on the tractor dealing with the elements of nature, working with his family. It means paying attention to weather conditions daily, going deeply into debt with no assurance of a return in the Fall. Everything about my father-in-law's way of life is conditioned by those seeds he puts in the ground each Spring. It is the farthest thing possible from a commodity.

For most of us living in urban environments, working at jobs that have little to do with our personal lives beyond what our pay can provide us, this example seems quaint and dated. And that is just the point. My father-in-law still has one foot in a culture whose roots are pre-industrial. For such cultures, and the nontechnological cultures that still exist in isolation today, all of life is bound up in things and activities that are deeply enmeshed in relationships.
(Barfield, 1988; Hill, 1988). Everything is connected to everything else. Even McLuhan hints at this when he observes that “terror is the normal state of any oral society, for in it everything affects everything all the time” (quoted in Emberley, 1995). In industrial societies, on the other hand, most of our experiences are filled with commodities - articles with which we have no relationship at all except for the purpose for which we purchased them. In fact, the less connected those articles are to anything beyond our own desires, the more they free us to exert our own power to do with them as we wish. One of the distinctive features of a commodity “is the concealment and unfamiliarity of the means and the simultaneous prominence and availability of the ends,” writes Borgmann. “A commodity is truly available when it can be enjoyed as a mere end, unencumbered by means” (1984, p. 44). A good pork chop, a pair of Nike sneakers, a tropical vacation are all most felicitously consumed if the connection with their production is hidden from view. The best commodities are the ones that come to us empty of meaning.

By keeping complex moral, ethical and other relational issues obscured, commodities allow us to bring the article fully into our own personal sphere - to fully possess it. This is, to be sure, the great attraction and convenience of commodities: they come to us free of the ordinary reciprocal demands of relationships. They have been pried loose from all previous meanings and are ours to own, to use, to consume, severed as we are from knowledge of their prior connections to the world. There are “no strings attached.” Thus we can exert almost unlimited power over the things we have. But in contrast to my father-in-law, these encounters with commodities don’t help connect us with the rest of the world and are therefore relatively empty experiences. “Commodities are not designed to make demands,” writes Borgmann (p. 142), so there is no opportunity to be responsible to them, no way to respect their otherness. Erich Fromm calls this the “having mode” and contends that when this becomes the routine way in which we relate to the world it has a deadening effect. “In the having mode, there is no alive relationship between me and what I have. It and I have become things, and I have it, because I
have the force to make it mine" (Fromm, 1976, pp 77-78). The only aliveness is experienced in the process of *getting* the object. This is why, according to Fromm, the life given over to consumption leads only to temporary satisfaction which must be constantly recharged through further consumption or accumulation of more commodities.

I have used food for my illustration here, but it is important to recognize that nearly anything can, and has, come to be viewed as a commodity in our society. Fromm observes how the change in our language patterns over the past two hundred years (roughly since the onset of the industrial revolution) reveals that the transformation of our thoughtworld from one of "being" to one of "having" has penetrated even our orientation toward nonphysical aspects of life.

Assume that a person seeking a psychoanalyst's help opens the conversation with the following sentence: "Doctor, I *have* a problem; I *have* insomnia. Although I *have* a beautiful house, nice children, and a happy marriage, I *have* many worries." Some decades ago, instead of "I have a problem," the patient probably would have said, "I *am* troubled"; instead of "I *have* insomnia," "I *cannot* sleep"; instead of "I *have* a happy marriage," "I *am* happily married." (p. 21)

Fromm was just revealing what is now the tip of the iceberg. Today we "have responsibilities" rather than being responsible, we say "I have time" rather "I am free"; in fact, we now "have freedom" rather than "being free." Even in our most intimate relationships we often "have sex" rather than make love. This, perhaps as much as anything, calls our attention to the diminished character of commodities. When Huxley (1932) had the citizens of his *Brave New World* constantly speak of "having" each other, he was pointing to the disconnectedness of sexual relations in a purely instrumental society. Of course, prostitution is the ultimate treatment of sex as a commercially traded commodity. Slavery is the treatment of one's entire life as a commodity. To treat another person as a commodity (or to package oneself as such) is
degrading, for it turns the person into an object of use, denying that person's stature as a unique and autonomous living subject.

Many things, like corn in a supermarket, suffer little by being treated as a commodity. But personal experiences, as well as living beings, have rich contextual ties and are severely diminished by being conceptualized in this way. So it is disconcerting to recognize that during the course of my own career as a teacher the phrase "she has an education" has, for the most part, replaced "she is educated" as a way in which we describe people who have completed - which is now to say consumed - schooling. In this case, as in the other examples cited, the change from verb to noun transforms our conception of the experience from a relationship or process into a detached, self-contained object.

All of this may seem a trivial matter of semantics, but Bowers (1988) argues persuasively that our language "frames" our thinking (in this he is clearly drawing on Heidegger's (1977) concept of "enframing") in that it "provides the initial footing for understanding, establishes the boundaries of the discourse and interpretative framework that will be viewed as legitimate" (p. 25). He cites our past gender biased language as an example of how this framing is accomplished. "For example, we can now look back on how sexist language framed, at a taken-for-granted level, our way of thinking by constraining what was considered important, how actions were to be interpreted, and what was not considered or seen as relevant - that is, appropriate to the controlling frame" (p. 25). By naming what were once deeply connected processes as things, we reconceive them at the "taken-for-granted" level of assumptions as commodities and in the process reduce them to objects apart from ourselves which we then regather as wholly our own - which we can then sell, warehouse, or use.

Probably nowhere is this language transformation more significant for the discussion here than in the change from "knowing" to "having knowledge." "Knowing does not mean to be in possession of the truth; it means to penetrate the surface and to strive critically and actively in order to approach truth ever more closely" (Fromm, 1976, p. 40). Once the relational, active,
penetrating process of knowing becomes reconceived as a "body" of knowledge, it becomes conceivable to buy it, rent it out, exchange it for a consulting fee; in other words, treat it as a commodity. But as we have seen, commodities permit no penetration of their surface character. Knowledge so conceived cannot be knowing, but it can be abstracted into a computer as information. The ability to "have knowledge" opens the gates for a Seymour Papert (1993) to promote an educational system based on futuristic computers dubbed "Knowledge Machines," and a Dertouzos to conceive of a global network as an "Information Marketplace." Both of these technological entrepreneurs recognize the close connection between commodities and technology and have demonstrated how technology and its users profit from this new, diminished conception of knowing. But not only has technology been the beneficiary of this objectifying of human concepts and activities, to a great extent our modern relationship with technology is what has allowed us to recast our world in this way.

Technology and Commodities

Borgmann, for one, is bold in claiming the relationship between our modern use of technology and commodities: "Commodities and their consumption constitute the professed goal of the technological enterprise" (p. 48). Borgmann may be bold, but he is not completely clear. It is tempting to take this statement as casting all technologies as contributing to a commodity culture. In an already commoditized society it may be difficult to quickly think of a technology that serves as an exception, but it could be done (something as simple as an ax or a book would probably suffice). Historically, the claim would be totally unsupportable. But this is not what Borgmann is claiming. By "technological enterprise" he is referring to the same ideological orientation I discussed in the introduction. It is the goal of using tools in accordance with this ideology to produce commodities and encourage their consumption. Someone using an ax to fell a tree for use as firewood may very well not be contributing to the production and
consumption of commodities, but it would depend on the ideological orientation he brought to the task.

Keeping in mind that our use of technology and our orientation toward it are inextricably bound up with each other, it is still not clear how this ideology contributes to the commodification of culture. To get at that I will begin by examining one of the more mundane, and therefore typical technologies found in the home, the automatic washer and dryer. There is no question the automatic washer and dryer has eased the burden of wash day for millions of homemakers in the last half of the century. Yet Susan Strasser (1982), who has studied the history of domestic work, makes the following observation concerning what this convenience has cost:

Women who had once compared their wash over back fences or the clothes line they strung up across alleys, in a day of grueling labor that nevertheless provided the company of other women, often put nonautomatic machines on porches in the summer where they could call out to friends... The permanently installed automatic washer and dryer, however, brought the work inside, isolating women in their houses and denying them the companionship that had once enlivened washday, compensating for the woes of the chore they hated most. (p. 272)

This theme of isolation as a companion of labor saving technologies in the home is a recurrent one. Victoria Leto (1988) has observed that “dishwashing, like laundering, was once considered a social occasion where primarily women and children worked together and visited, making the best of the routine chore” (p. 162). The dishwasher has mostly removed that opportunity for social engagement. Leto concludes that, “Technology has curtailed important sources of social interaction for women, and the new contexts for communication which have evolved are limited, and may not be as rewarding” (p. 162).

Not only have these modern technologies disconnected the homemaker from meaningful social interaction, it is not even clear that they accomplished their intended purpose. In her
fascinating book on the family. *The Way We Never Were*, Stephanie Coontz (1993) observes that during the 1950's when these modern labor saving devices started streaming into the home, women actually spent more time doing house work than before, evidently because with these expensive new machines around they were expected to be able to do all the work themselves, alone, rather than rely on the cooperation of the rest of the family or domestic help.

I think I should interject right here that I'm not in favor of going back to washboards and dishpan hands, especially since I do a lot of the laundry in my home. But it is important that we recognize the dialectical relationship between our commodity culture and the technological ideology at work here. This relationship is illuminated by bringing together Bowers' observations on the framing power of language and Talbott's (1995) reminder that every tool embodies an idea. The men who designed these terrific modern tools were guided by the language of "scientific management" which operated out of the most technological of values - efficiency, productivity and control. This technological framing of the cleaning tasks put out of focus the personal and social circumstances surrounding the labor they replaced. Just as important was the necessity of reducing the act of cleaning to a commodity, for when *and only when* it became isolated as such, it became available to the technological fix. This fix may have succeeded in making dirty clothes and dishes clean again with less effort, but it exacted a price beyond its substantial financial one; a price that is difficult to measure and rarely even acknowledged because it too exists outside the technological frame of reference: It has been paid not by the purchase of other commodities, which is the way we generally measure costs in our society, but by draining the social relationships of the family members, mostly women, who used them.

What is important to recognize here is that the social degradation that accompanied these technologies into the home originated in the thoughtworld that guided their development and implementation. Understanding this, we can see that the nonneutrality of our tools is rooted in the nonneutrality of the ideology out of which they spring.
There is a second aspect of the relationship between technology and commodities which will prove crucial to our understanding of its impact on education. This is both the opacity the relationship between the technological device and the commodity it produces and the opacity of the device itself. We have already noted how commodities are most available when they are severed from the means of production. This means is, in fact, the technology. So Borgmann, who argues this means-ends distinction, goes on to say, "Commodities are more fully available if the supporting machinery is less obtrusive, i.e., more concealed and reliable" (p. 116). Thus one of the distinguishing features of technologies that contribute to commodification is their propensity to fade into the background, leaving the commodity alone in the foreground of our attention and concern. When I flip a light switch, I get light. I rarely give a thought to the technology that produces it. The technology works in the background and electrical light is freed-up to be purely a consumer good.

The drive to achieve this disappearance of underlying technologies has led to the gradual concealment of the machinery of the technology itself. Not only is the technology pushed to the background, its workings are no longer available for easy inspection even when they do come to our attention. This concealment of the interior workings of technology further commodifies its product as it severs more connections to the product's character or history. But working within the ideology of technology, even this concealment is put out of focus. Reliability is a facet of efficiency, and as efficiency drives the technological enterprise the accompanying increase in reliability makes comprehension of the mechanism by the consumer unnecessary.

To bring this down to concrete terms, let's consider one of the most common and straightforward tools of technological ideology: the microwave. This time-saver is all about reducing labor by concentrating on efficiency in getting food cooked (even if such aesthetic matters as texture and taste suffer a bit) while at the same time completely hiding from our comprehension the means by which it is accomplished. The food goes in cold and comes out hot. I can't see, feel or in any other way observe either in the commodity produced (hot food)
or the mechanism that produces it (the microwave) how this transformation takes place. But then, for someone who doesn't have time to heat things in an oven, this opacity is not an issue so long as the microwave works reliably. In fact, if the technology that produces frozen dinners continues to advance to the point that taste and texture are no longer matters of concern, it would seem foolish for an often rushed cook like myself to spend hours preparing a meal from scratch when dinner can go from the freezer to the table in a few minutes with little effort on my part.

That, of course, is if I operate out of a technological thoughtworld that seeks to establish the single most instrumental of ends - heating the food - and then seeks out the most efficient of means to get it done. But this orientation assumes a radical disconnection between ends and means. It puts out of focus even the possibility that there could be more to a meal than just the sum total of commodities that are consumed.

What if the ends and means were not so radically severed? We may get a sense of this by going to the opposite extreme by examining a meal of the kind my mother once prepared daily on our own family farm: Let's say roast beef, mashed potatoes and corn, with apple crisp for dessert - a good old-fashioned Iowa farm dinner. Certainly, in making the meal from scratch my mother had to do a lot of work. She would have to clean, cut and boil the vegetables, bringing to a close months of work in the garden nurturing and protecting them from the ravages of insects, weeds and weather. The apple crisp may have come from worm-infested apples picked, in a delightful family ritual (I always got to climb the trees), out of our grove. The beef, of course, would come from an unfortunate steer that my sister and I probably cared for as a calf. It takes my mother a couple of hours to prepare a meal like this and some skill to season it properly and to time the cooking so it is all ready at the same time. If my sister and I were in the house it is likely that we would have to help prepare the meal, perhaps arguing, perhaps complaining, but eventually following my mother's expert instructions. Finally, when we all sat down to eat the meal, the food that was laid out before us represented more than just
nourishment for the body. The memory of the shared effort to put that meal on the table has also, in some small way, nourished our souls. In its preparation my mother had the opportunity to display to her children her skills, self-discipline, initiative, commitment to the family’s well being and interest in helping us develop those same traits. It gave her an opportunity to engage us in a meaningful activity of family survival in a way that increased our sense of self-worth and inspired in us respect for her authority. And she, in turn, gained a sense of fulfillment and pride from bringing all of this together to place before the rest of the family. It is likely that all of these consequences had a cohesive effect on our family.

Now let’s reconsider my choice to microwave the frozen dinner. The dinner was probably purchased with money I earned working away from the rest of the family, from which there are no shared memories, no shared sense of accomplishment. A few minutes ahead of time I pull the dinner out of the freezer, set the timer and leave. When the buzzer goes off the meal is ready and everyone is called to the table to share - in what? Nutrition for the body? Its taste? The only thing that is really shared in this meal is consumption, for the items set before us have no other significance than being commodities bought at the supermarket. The meal itself is no longer an occasion of rich significance calling forth a quiet but active reverence, but just a refueling stop. In preparing that meal what skills and mature personal qualities can I display to my sons which earns their respect? Of course we can say that the boys could participate in the meal by setting the table or even cooking the food, but this simply confirms what they already intuitively know - that there is little in this home done by their parents that they can’t do themselves. For not only can they operate the microwave as well as we can, they can also run the washer and dryer, the dishwasher and the lawnmower perfectly well, and they can operate the most important devices - remote control TV, the stereo and (if I were to let them) the computer - even better than we can. They don’t need me to survive in the home, all they need are the commodities and the devices that now contain the skills that once were found only in mom and dad.
This is admittedly an extreme (and idealized) comparison. But I could have used other more subtle, and contemporary, ones: The mother who laboriously cuts and sews a dress for her daughter instead of buying one, or a father who spends the winter knitting a sweater for his son. Gardening, making home repairs, playing instruments rather than stereos for entertainment - all of these could serve as examples of what I am getting at here, because they allow and require us to wholly participate, rather than just invest our money, in the events of the home.

Each of the examples I have cited uses technology, so it is not just the machinery that commodifies. Borgmann separates technologies into two camps: "devices" and "things." Devices are those technologies that simply procure a commodity, without further engaging us in other meaningful relationships.® He compares the hearth (a thing) with central heating (a device) and notes that a hearth demands engagement with the weather, wood, smells, and other people, while central heating procures mere warmth and disburdens us of all other elements. These are taken over by the machinery of the device. The machinery makes no demands on our skill, strength, or attention, and it is less demanding the less it makes its presence felt. In the progress of technology, the machinery of a device has therefore a tendency to become concealed or to shrink. Of all the physical properties of a device, those alone are crucial and prominent which constitute the commodity that the device procures. (Borgmann, 1984, p. 42)

The technology in each of the examples I have given is revealing rather than concealing, and the personal commitment of time and effort and the display and development of skills that ensue imbue the final product with a richness of meaning that simply cannot be separated out from its production. The means and ends are inextricably intertwined and in all likelihood the effect on the family is the likewise.

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® Borgmann’s choice to use “thing” to designate what does not commodify is unfortunate. As we will see, “thing” is a term used by most writers examining this issue to designate what is commodified. I will be using it in that sense as well.
What we see here is not the villainy of technology (even Borgmann does not see central heating as evil) but the ambiguity of technologies at work: the technologies that have entered the home in the last century have contributed to the demise of family cohesiveness even as they have made family life much easier. They have succeeded in reducing much of the hard labor that once was required to keep the family going, but in doing so they have eliminated precisely that: what is required to keep the family going. The purely technological values of efficiency, productivity and control which the modern home technologies tend to focus on and which are the essential characteristics of commodities do not support, and more often work against values such as togetherness, mutual support, open and frequent communication and most of all, loving commitment to each other, that are essential in holding a family together. As Dewey (1916) pointed out, meaningful engagement is needed to make communities of any kind viable. It is just this meaningful engagement that is sacrificed by the technology-commodity process.

This is what the inventors and marketers, and eventually most of the rest of us, lost sight of when we moved the industrial revolution into the home: that the technological orientation is all about getting a specific, isolated job done, not, as it was often portrayed, about the larger goal of improving family life. Had that larger goal truly guided its development, the microwave may have been designed quite differently and used in a different way, or perhaps not marketed at all. The more these efficiency oriented machines came into use the more technological values took priority in the home, and the more family life was emptied of the rich contextual meaning of shared experiences. Borgmann (1984), observes that “the tasks that once gave the family weight and structure and the parents genuine power were the ones taken over by the machinery of technology” (p. 137).

He goes on to state that our labor saving devices have turned most family activities into the shallow consumption of commodities; and there are no cohesive properties to consumerism. Parents do not inspire in their children respect, admiration, industriousness or self-discipline by consuming with them.
We may argue that by making work less tiresome and less time consuming, families are freed to engage in meaningful activities together that are also enjoyable. But here again, if we recognize that it is not the tools themselves working on us but the ideology that spreads into every part of our lives, it is easy to see why empirically this optimistic attitude rarely becomes reality. Let me give one more example that illustrates, I think, how our present relationship with technology has subverted this enviable goal.

I rarely watch TV anymore, but last spring I watched a basketball game and saw a commercial for Mastercard that really impressed me. It shows a boy and his dad enjoying a major league baseball game as the narrator ticks off the cost of each item I might have to purchase if this was me and one of my sons: “Tickets, $40; hot-dogs and sodas, $18; autographed baseball, $45.” Then this: “Quality conversation with your son, Priceless.” And then the punchline: “There are some things money can’t buy. For everything else, there’s Mastercard.”

I think this is a brilliant commercial. It taps into our nagging sense that money - and even money combined with modern technology like a credit card - can’t buy familial happiness. But at the same time it subtly undercuts that suspicion by presenting our longed for connection with our children as just another commodity, one item on the long list of things that can be consumed at the ballpark. What this commercial illustrates so well, I think, is that even those things, like family relationships, that technology can’t turn into a commodity directly, it influences us to think of as such, and in so doing degrades them, reducing them to isolated, empty abstractions - like “quality time.”

It also illustrates, both in form and in content, how television reduces even the most serious issues of social life to simple, tightly contained episodes which can be wrapped up as a commodity - or what Postman calls the new parables (1988). Whether it is marital problems or bad breath, TV works by recasting the problem as a self-contained object and finding a resolution (which almost always involves purchasing another commodity) within the ever-
shrinking attention-span of the viewer. The Mastercard commercial took thirty seconds to show me how to put in order both my financial and parental responsibilities. This is not just a matter of content but the character of television (Postman, 1993).

The computer pushes this reductionary vision of life even further. As Theodore Roszak (1986) points out, its influence on us comes from the ideology that has been embedded in the very silicon from which the computer is made.

Something very big, new and threatening is permeating our political life. It makes use of the computer as its vehicle, but more important than the means is the mentality that uses the machine... No ambiguities, no subtleties, no complexities. The information that data banks hold is life stripped down to the bare necessities required for a quick commercial or legal decision. Do or don't give the loan. Do or don't rent the property. Do or don't hire. Do or don't arrest. This is human existence neatly adapted to the level of binary numbers: off/on, yes/no. (pp. 186-87)

He may also have said that this is life reduced to the level of commodities - have/don't have.

This reduction of all experience to the consumption of commodities ironically reaches its apex in the most abstract of media, the Internet - where information itself is reduced to a commodity - an isolated product, removed from the context of place or time, that can be downloaded, manipulated, encapsulated in electronic bits. It is here that we find the technology-commodity machinery operating at full throttle, for as we have seen, the computer that facilitates it most fully embodies the ideology of technology while the information it traffics is perceived as the nearly perfect commodity. Lewis Perelman (1992), observes with great relish that, “information is the closest thing we will ever have to an inexhaustible resource,” (p. 69). Michael Dertouzos, head of MIT’s Computer Science Lab, in explaining why he chose the phrase “Information Marketplace” for his conception of the work, play and learning place of the future states that, “I wanted to characterize information as a useful, no-fuss good, closer to
physical goods and services than to ideologies, that will be used in our everyday lives” (1997, p. 21). That Dertouzos has failed to recognize the ideology that inhabits his own terminology is not surprising, given my earlier discussion, but that is not the point here. Information is viewed by its own proponents as a commodity, with all the “no-fuss” disconnectedness from messy contextuality of place, person and relationships that we have seen characterizes commodities.

This is, of course, not the only vision available to us of telecomputing. A great deal has been made of the ability of the Internet to connect people who otherwise would remain isolated. This would seem to belie the contention that the Internet exerts a commodifying influence. Here again, we need to hearken back to the ambiguous character of technology. It most certainly can be used for opposing purposes. But that does not mean one potential is as likely as the other. Networks are designed to treat information as commodities, and thus they influence us to work this way. If we want to develop a deep relatedness through the Internet we must consciously work against this bias. And because it is an embedded, unarticulated ideology working through the machine on us, its effects are likely to be subtle and gradual, diminishing not the quantity but the quality of that relatedness. The connectedness achieved through the ‘Net is often a reconstituted kind of connectedness, much different from that which can develop through the face-to-face engagements of physical presence. It is an impoverished, superficial connectedness (which is not to say that it cannot be intellectually or emotionally intense) for the communication itself is purely symbolic, profoundly abstract. It comes to us in packets of email messages, web pages dumps and chat room bursts. These packets themselves are as disconnected from shared experience as imaginable. Talbott (1995) points out that with each new development in the mechanical conveyance of communication, “The word has increasingly detached itself from the human being who utters it” (p. 221). Postman implies much the same in referring to Internet communication as “messages from nowhere.” Of course,

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9 See for example, (Maybury-Lewis, 1998; Rheingold, 1993).
he is not being literal here. What he is pointing out is that where the information comes from is irrelevant, and more than ever before, who it came from is irrelevant as well. Context is necessarily stripped away until we are left with “words conversing with words” (Talbott, 1995, p. 221), images flashing at images.

All of this should tell us that the character of telecomputing lends itself much more readily to the trafficking of information as commodities than to deeply connected human relationships. That we so often hear the Internet touted as a medium that brings people together is much more indicative of our growing inability to recognize just what it means to be deeply engaged with others and a willingness to settle for an easier, less demanding conceptualization of community. The recent study conducted at Carnegie-Mellon (Kraut et al., 1998), that found that using the Internet seems to cause people to feel more isolated and depressed caught many, even the researchers, by surprise. But if we recognize the commodifying character of computer technology, these findings aren’t surprising at all. In fact, this study is at once a confirmation of the disengaging character of commodified communication, and the invisibility of the technological ideology that supports it. The researchers, in searching for answers to the phenomenon they observed, settled mostly on the substitution of “weak relationships” that generally characterize on-line associations for “strong relationships” that are developed face-to-face. In this they are surely correct. But in attempting to explain why those on-line relationships tend to be weak, they completely ignore the thoughtworld behind the technology which mediates the development of those relationships. Fromm stresses that “the human desire to experience union with others is... one of the strongest motivators of human behavior” (p. 104) but that in a commoditized culture this drive to connect with others rarely is able to transcend the acquisitive ideology. Engagement itself becomes commoditized and one is left, as the Carnegie-Mellon researchers discovered, feeling lonely amidst a huge network of “friends.”
This effect is not only felt socially. Talbott, in describing our estrangement from nature, quotes Dutch psychologist Jan Hendrik Van den Berg's comparison of Rousseau's emotional response to traveling through the Alps with modern day visitors:

Many of the people who, on their traditional trip to the Alps, ecstatically gaze at the snow on the mountain tops and at the azure of the transparent distance, do so out of a sense of duty. They are only imitating Rousseau; they are simulating an emotion which they do not actually feel. It is simply not permissible to sigh at the vision of the great views and to wonder, for everyone to hear, whether it was really worth the trouble. And yet the question would be fully justified; all one has to do is see the sweating and sunburned crowd, after it has streamed out of the train or the bus, plunge with resignation into the recommended beauty of the landscape to know that for a great many the trouble is greater than the enjoyment. (p. 255)

Talbott then reminds us of the technology we use to try to overcome this alienation from nature but which, in the end, only seals our separation by commodifying it:

Most of us will recognize something of ourselves in this description. Strangely, however, our alienation from nature is matched only by our passion to "capture" these bland encounters, to reproduce them in the more easily grasped two dimensions. "There, I've got it," we say as we click the shutter and turn away. This is not really reproducing nature, however, for the experience was not of nature but of taking the picture.

"I've seen people in the Everglades come onto the walkway with their video equipment, take a picture, and go away," says Massachusetts naturalist John Mitchell. "They will go home and put it on and they will see the image they have captured of it. They will never have seen the real place." (p. 255)

When I lived in Ecuador, a bird watching friend of mine regularly bemoaned some of his fellow birders whose only interest in going out into the bush was in order to build their sighting lists. Their real interest wasn't in the birds themselves but in "capturing" them,
accumulating the sightings. Once added to the list, these fair weather fowl hunters had no more interest in the bird itself. Their interest was in the growth of their lists and a bird became merely a commodity reduced to a name and number.

I think it is telling that this same friend later applied for graduate school at a university with a highly regarded biology program. Concerned that his undistinguished undergraduate grades would keep him from being accepted, he met with the head of the department to plead his case. According to my friend, the professor told him not to worry, that they were having so much trouble getting graduate students away from their computer simulations to brave the heat, cold, mosquitoes and other elements out in the field, that someone who had spent as much time as he had in the jungles of South America would be welcomed regardless of his earlier grades.

These are, I believe, examples of what Fromm is pointing to. Our inability to connect with the experience at hand leads us to try to grasp it, possess it, control it with whatever technology can be brought to bear. Writing in the mid ‘70s, Fromm did not have the full-blown computer society to analyze. But it seems to me that nothing epitomizes his description of this degraded connectivity that grows out of a commodity ideology so well as the idea of networking that has become a taken-for-granted concept, not only in the business community and in the telecomputing culture (whence it comes), but more and more in the educational community as well. We attend conferences to network. We subscribe to listserves to network. We design and publish web pages to network. We encourage our students to network in order to increase their employment opportunities. The essential purpose of networking is to accumulate people as resources, in hopes that these “ready-at-hand” tools will be “useful or... can be turned to commercial or other advantage.” Networks are tools as commodities, as is the view of the people who constitute them, and they epitomize the symbiotic relationship between the ideologies of technology and commodity consumerism that fosters the kind of reconstituted, degraded social connectedness Fromm describes.10

10 If that comes across as too cold and dehumanizing it is not because it is inaccurate but because many of us
Let me illustrate this point with a preview of the coming discussion regarding the use of computers in the classroom. About three years ago I helped coordinate an on-line project called "The Media Matter." It was all about investigating how media influence the way we think and communicate. Associated with the study of communication was a self-conscious attempt to develop a community of inquiry - the antithesis of commodification - among high school students through the medium of telecomputing. To do this we asked participating students and teachers to commit to an in-depth study and dialogue both within their own classes and among the classes over the Internet. Helping to maintain the level of commitment, respect and effort it takes to develop a genuinely engaged on-line community required an enormous effort by my partner and myself as well as the teachers involved. In the midst of the project I received a message that was not dissimilar from others I have received from participants in my telecomputing projects throughout the years, but it was striking in its honesty and blithe insensitivity. The teacher wrote:

Our class has made the decision not to continue with the Media Matter on-line discussion group. It was fun while it lasted, but the kids wanted to move on to creating their own web pages, so that's what we are doing. Perhaps we'll join up with you on another project. Thanks!

This is a sad illustration of the commodification of even connectivity through telecomputing. They came, they ate at the trough of our virtual community and then moved on, presumably to consume web pages next. No sense of responsibility, no relationship that calls forth commitment. Just a desire to use their network of connections to consume an experience. That the teacher remained oblivious to the sense of betrayal she evoked from the other participants is testimony to the depth of the ideological assumptions out of which she worked. She is not alone. The 'Net makes this kind of activity easy, for there are no ties that bind. It

tend to rationalize it and soften it by combining it with other more humane motives: a search for kindred spirits, the opportunity to lend support as well as receive it, etc. Yet none of these qualities displaces the fundamental motivation of networking as an attempt to connect with others as tools which can be used to our advantage.
makes committed engagement difficult for it puts even the idea of commitment out of focus. As we will see it is just one of the ways in which computer technology facilitates the commodification of education.

Taking Technology to School

A Bit of History

The trend toward viewing education as a commodity began long before computers arrived on the scene. But it has always been conditioned by the ideology of technology. Almost a century ago, when the factory system first began pouring commodities onto the national market, the push to commodify education was wrapped in the technology-based terminology of "Scientific management." Elwood P. Cubberley wrote in his *Public School Administration* (1916), probably the most widely read text on school administration at the time,

> Our schools are, in a sense, factories in which the raw products (children) are to be shaped and fashioned into products to meet the various demands of life. The specifications for manufacturing come from the demands of the twentieth-century civilization, and it is the business of the school to build its pupils to the specifications laid down. (p. 325)

Not only were the children to be treated as commodities rolling down an assembly line, the courses drilled into them along the way were viewed similarly. Frank Spaulding, the most notable of the city superintendents who instituted scientific management techniques in the nation's schools clearly illustrates this mindset in his recounting a curriculum decision he faced. Spaulding had found that in his schools the unit cost of teaching Greek was 5.9 pupil-recitations per dollar while in French it was 23.8. Thus, he concluded that "we ought to purchase no more Greek instruction at the rate of 5.9 pupil-recitations for a dollar. The price must go down, or we shall invest in something else" (p. 73).

This blatant attempt to reduce children to abstract units and then reconstitute them and the education they received as commodities was opposed and, to some extent, frustrated by the
Progressive movement, led for a time and inspired for decades by John Dewey. Though Dewey valued and promoted practical education, one of his major contributions in fighting the factory model of education was his refusal to disconnect children from their world (Tyack, 1974).

Learning in a Commodified Environment

Despite the efforts of Dewey and his followers, the factory model of education prevailed (though with the rhetoric of scientific management considerably toned down). As texts and tests in all areas of study became standardized, as degrees became certificates of employability, as grades and classes themselves became filtering agents, education as a commodity slipped quietly into the fundamental structure of schooling, a system governed primarily by the technological ideology.

This ideology serves some very concrete and important functions. Because it tends to present the learning experience as decontextualized, discrete and measurable units which do not rely on any web of local relationships specific to the students’ lives, the students’ efforts can be compared nationally (and even internationally) with good reliability by those, mostly employers and colleges, who in turn view the students themselves as commodities. It allows school administrators to buy prepackaged learning activities to supplement the efforts of overworked, poorly qualified teachers, while improving their own external control over classroom instruction.

I will have some things to say about these consequences here, but much has already been said criticizing this trend in education (e.g. Apple, 1990). What I want to focus most of my attention on is the way in which computer technology furthers this trend. And it is important to recognize that fundamentally the new high technology is furthering the historical trend sketched earlier, not inaugurating a revolutionary new trend. Consider the early rhetoric concerning
Internet-like networking advanced by Dr. Richard Cyert, then president of Carnegie-Mellon, one of the most prestigious technology universities in the country.

[The school’s computer network] will have the same role in student learning that the development of the assembly line in the 1920's had for the production of automobiles. The assembly line enabled large-scale manufacturing to develop. Likewise, the network personal computer will enable students to increase significantly the amount of learning they do in the university. (quoted in Roszak, 1986, p. 64)

One may wonder if there is any connection between this vision and the findings of the research team fifteen years later at the same institute. In any case, the network as a conduit for moving information which somehow is then translatable into measurable amounts of learning is not a new way of thinking about the human-technology relationship. It is merely the ideology of Taylorism brought to bear with new vigor by a new technology on an old field - information management. The ensuing marriage between this field and education, which as we have seen is already dominated by the same ideology, merely furthers the trend of decontextualizing, abstracting and, hence, commodifying education that has been going on throughout this century.

Lewis Perelman, for one, is unapologetic about this commodifying trend in education and is more than happy about what he perceives will be the ultimate consequence - the end of schools. For Perelman, education is all about access to useful information. And the more contextual baggage that can be stripped from the information, the more accessible it becomes.

Recognizing that high technology has finally allowed information to pull completely free of its source, Perelman treats it as a pure commodity, whose availability is only limited by the power of the devices used to transport it. We can see the intertwined ideologies of technology and consumerism at work in his explanation of the benefits of “Hyper-Learning” (HL) to educators: “Such HL technology can permit educators to telecommute to the consumers of their services, without the encumbrance of a school building or classroom” (1992, p. 59). The symbiotic
relationship between technology and commodity is evident here. When, through technology, education is severed from the "encumbrance" of place, association with institutions and all the other demands of typical school life, it becomes free to be consumed as an isolated commodity. This brings great benefits to the individual learner.

Technological opportunity and economic necessity will give the individual learner of any age at least as many choices of "schools" as the television audience now has of cable TV channels. For most adults and many youth, school will not be identified with any distinct building or location, but rather with a brand or franchise of media through which services are accessed. (p. 57)

The idea of franchised education calls to mind the premiere franchise corporation of all time, McDonalds, which, more than any other company, has used "scientific management" techniques to commodify our eating (and most other) experiences (Ritzer, 1996). This seems to be the kind of learning-on-demand system Perelman envisions; one in which the delicacy of taste, atmosphere, effort and cooperation in procurement, count for nothing against the goal of having as much as we want when we want it.

Michael Dertouzos (1997), who is much more cautious about the benefits of technology for education, nevertheless proposes a technology-based Information Marketplace that will bring, among many other benefits to education, a sort of "distributed world library."

We can't even begin to imagine the great benefits to learning, to the appreciation of great literature hence to improvements in the written word, and the enjoyment of knowledge that could flow out of such an incredible collection, available to everybody, everywhere, at any time. (p. 188)

Indeed, such a collection might be valuable to various people at various times (I certainly have no hopes of getting through all of the great literature in my small public library in my lifetime, much less that of the entire world). But the fact that it is available to everybody (who has high tech equipment), everywhere (that there is telecomputing equipment), at any time
seems to be the key issue. Once again, we see the interplay of technology and commodification at work. We have already seen how the drive to develop devices that will make everything available to us effortlessly also deprives us of the deep relationships that connect us meaningfully to our world. In *The Gutenberg Elegies* Sven Birkerts asserts that the computer has accelerated a course that reading has been on for centuries: "...the gradual displacement of the vertical by the horizontal - the sacrifice of depth to lateral reading..." (1994, p. 72).

Birkerts notes a trend that most of us who use e-mail and read on-line text should have no trouble recognizing which turns Dertouzo's utopian vision back on itself:

In our culture access is not a problem, but proliferation is. And the reading act is necessarily different than it was in its earliest days. Awed and intimidated by the availability of texts, faced with the all but impossible task of discriminating among them, the reader tends to move across surfaces, skimming, hastening from one site to the next without allowing the words to resonate inwardly. The inscription is light but it covers vast territories: quantity is elevated over quality. The possibility of maximum focus is undercut by the awareness of the unread texts that await (1994, p. 72).

And what is the outgrowth of this shallower wading into reading waters? According to Birkerts it is precisely the loss of what once was judged the highest purpose of education:

We are experiencing in our times a loss of depth - a loss, that is, of the very paradigm of depth. A sense of the deep and natural connectedness of things is a function of vertical consciousness. Its apotheosis is what was once called wisdom. Wisdom: the knowing not of facts but of truths about human nature and the processes of life. But swamped by data, and in thrall to the technologies that manipulate it, we no longer think in these larger and necessarily more imprecise terms. In our lateral age, living in the bureaucracies of information, we don't venture a claim to that kind of understanding. Indeed, we tend to act embarrassed around those once-freighted terms - *truth, meaning, soul, destiny*... We suspect the people who use such words of being soft and nostalgic. We prefer the deflating
one-liner that reassures us that nothing need be taken that seriously; we inhale the atmospheres of irony (1994, p. 74).

This is the surface character of commodities of technology brought into the realm of learning. Like the Alpine visitors mentioned earlier, our technological orientation encourages students to tour the literature, even the entire curriculum, taking snapshots of the most important material, not out of an inner sense of awe or inspiration, but in order to accumulate enough frequent flyer miles to cash in on trips to ever more exotic curricular lands - or eventually a job, for which they will be well trained for the pursuit of ever higher salaries and positions. This is an educational system geared to the pursuit of success, not truth; guided by efficiency, not profound ideas; designed to excite the nervous system not nurture the soul; assessed by the accumulation of discrete, measurable bits of knowledge, not by depth of insight into the ambiguity of the rich relatedness of the world. It is education as commodity and it is ideologically technological through and through.

Because the ideology preceded the machine that embodies it, many of the most important questions concerning the computer's impact on education have gone unasked. The questions that have received by far the most attention from the educational community have been those concerning whether the computer can do things better, not whether they are worth doing. These are methodological questions that imply a separation of means and ends, one of the characteristics of commodities. They allow us to focus on narrow objectives while putting out of focus the more holistic concerns of how these various means affect the structure of the learning environment and the way in which young people come to see the world. Two examples from my own experience can serve as illustrations here.

For one semester a couple of years ago I observed the use of computer technology in a second grade classroom. The class had four networked computers which together served as one of five stations in an "integrated learning system." Students moved from station to station at regular intervals throughout the morning, working on activities that were all related to each
other. We might expect that such an approach to using computers would have precisely the opposite effect of commodification, as the “integrated” implies. And, indeed, the computer activities I observed were closely related to those at the other stations.

This integration, however, provided a connectedness in only a very narrow sense - amongst the activities taking place in the classroom. In the broader sense of what was going on in the students lives, just the opposite seemed to take place. The programmed activities on the computer could not, of course, respond to the particular experiences that the individual child brought to it. And because those activities were linked to what the children did off the computer, those non-computer activities tended to keep those issues out of focus as well. Thus, during all of my visits I never witnessed a personal concern studied in any way at any of these stations; I never observed an exercise designed to draw on the children’s own unique experiences outside the classroom walls. What I did witness was a rapid succession of abstract, self-contained mini-lessons, completed and tallied, as students worked their way through the various skill levels both on and off the computer.

This apparent fitting of the curriculum to the capabilities of the computer is an example of what Langdon Winner (1977) calls reverse adaptation, in which, once a technology is adopted, we as humans are forced to change our behavior to accommodate it. Winner claims it is a feature of all complex technologies. Roszk (1986) applies it to education and dubs it “the grand reductive principle: If the computer cannot rise to the level of the subject, then lower the subject to the level of the computer” (p. 78). In this case lowering it to the level of the computer entailed turning it, both conceptually and substantively, into a commodity. When, in the middle of the semester, the server crashed and all of the students’ records were lost, I didn’t hear one student complain about the loss of all their work, but many agonized over trying to remember what levels they had achieved in the various programs prior to the crash. Each level, and it appeared each lesson, had become merely a commodity to them. Their year long objective was to consume as many of those commodities as possible.
Even in more open computer activities we can observe technology contributing to a commoditized learning environment. Last winter I participated in an Iowa Public Television panel discussion which focused on technology uses in the classroom. As part of the introduction a videotape was shown of a 3rd grade class that used the computer to produce an electronic “hyper”-book report on *Charlotte’s Web*, the charming children’s classic that teaches about living and dying, friendship and community. The video showed three of the students proudly demonstrating their work - which included a computer drawn “spider” which jumped across the screen - and discussing the important social lessons they learned - always be nice to each other and help one another. The teacher then explained that her students were so enthusiastic about the computer project that they stopped going outside for recess, preferring to stay in their seats working on the project (this echoes a recent advertisement by IBM (1997) which tries to impress the reader with the same message). Clearly, the messages conveyed by this video were designed to resonate with the most common concerns of teachers and parents: 1. The computer can motivate students; 2. The computer helps children learn by doing; 3. The computer does not foster anti-social tendencies - in fact, it can be used to learn about community. The teacher’s enthusiasm was contagious and my colleagues on the panel were uniformly impressed. And there is no denying that those ends were accomplished in that class. But as we discovered earlier with the microwave, if we look at this experience from a different perspective, one not governed by the technological ideology, we see a very different picture.

If we approach *Charlotte’s Web* in a manner similar to the hypothetical meal prepared from scratch we find ourselves wondering if the teacher and her students really got the message of the book at all. The story is about the trials of a little pig growing up in a barnyard community where he has to learn how to negotiate relationships with all the other animals and eventually learns just how important a community, and even the rats in it, can be. In a school it is on the playground that children are most free to negotiate their own social relationships. It is there that they exercise not just their minds but growing legs and arms, not to mention lungs, hearts,
vocal chords, and, yes, fists, and tear ducts. Only there do they come close to being able to be, not just learn about, their own community. Talbott's (1995) observations concerning telecomputing is just as valid in reference to in-class computing. "If I need to find out whether [a child] will become a good world citizen, don't show me a file of her email correspondence. Just let me observe her behavior on the playground for a few minutes" (p. 139). Yet, this teacher was exuberant that her students stayed inside during recess, hunched over a 10" X 12" screen rather than getting out and trying to live the lessons the book tried to teach. The teacher's fascination with the computer seemed to blind her to the learning needs of the body, the emotions and (in the broadest possible sense) the spirit. It is just these aspects of a child's learning, not the intellect, that generate connections to the rest of the world. Howard Karger (1988) argues that this willingness to turn even play into computer activities is symptomatic of a commodified view of life that expropriates childhood.

In a highly competitive labor market marked by differential access to opportunities, only a select few will be in a position to fully enjoy the fruits of mobility and consumption. Most parents are painfully aware that economic opportunity is fast becoming a scarce commodity. In a capitalistic economy which underscores productivity, the play of children takes a new meaning. Seeing one's child in "meaningless" and unstructured play appears, at least to the production and achievement-oriented parent, as a waste of valuable time. Even child's play in our society must furnish a commodity, or, at least, lend itself to the future goal of production. (p. 9)

It was clearly far more important to the teacher in the video that her students produce their hyper-book report than to go out and engage in unstructured play. That they did so voluntarily indicates the extent to which computer technology has been able to be employed in commodifying even play. The success with which computers accomplish this voluntary participation in organized, productive activities should not be especially surprising. The entire consumer culture revolves around creating, and then fulfilling desires through the production,
selling and consuming of commodities. Once this mindset is well established in an elementary classroom, it then becomes just a matter of designing the software that will generate the necessary desire in the students to use it. This is the vaunted motivational power of computers. But the computer itself is no more motivating to a child than a stick (far less so considering the stick's much greater availability to take on imaginative roles in children's fantasy play). It is the software that must reel the children into the computer's environment, and every effort is made by its producers to create the desire in children to use it. And, of course, the easiest way to accomplish this is to create an atmosphere of play. But as Karger argues, this alters the way both adults and children come to view play, which, in turn has serious consequences for childhood itself.

The usurpation and transformation of unstructured playtime into producer related activities represents the commodification of play. As play becomes reified, and learning becomes a commodity designed solely to foster future economic mobility, the child's unstructured discovery of their [world] is sacrificed at the altar of market relations. The commodification of play robs the young child of a childhood unfettered by economic expectations, and hence cheats him out of a portion of his childhood. (p. 9)

By organizing unstructured play into highly organized work, computers facilitate the commodification of a facet of child life both inside and out of the classroom. The child comes to see even their play as a necessarily productive or consumptive activity and gravitate ever closer to a life of shallow consumption.

The children who proudly displayed the electronic book they "published" have begun to learn how to be part of the commodity production process. What they sacrificed is time to be alone in reflection, together in community, idle in reverie; in other words, the opportunity to learn how to be.

Sacrificing self-directed play at the altar of commodity production isn't the only way in which this computer activity commodified student learning. Looking at this example outside the
ideology of technology we might ask why the teacher chose to encourage her students to take pride in the jerky animated movements of a coarsely drawn oval with eight lines sticking out of it rather than help them develop a sense of wonder through observing real spiders spinning fluidly in a terrarium? Why, in studying a story that conveys dignity and meaning to the life cycle, the children spent their time working with machines rather than visiting elders and infants in the community? Why, in studying a story that focuses on farm life, they preferred to stay in their classroom rather than visit local farms?

I think at least one way to answer these questions will lead us to see the computer in a very different way than as the revolutionary device it is so often touted to be. In this classroom the world of *Charlotte's Web* was presented as the same old decontextualized, abstract commodity that reformers have for decades complained about. But this disconnectedness is reconstituted into a virtue by adding the intriguing feature that the child, who once merely consumed those abstractions, can now be part of the production process as well by *manipulating* them using the computer, drawing the abstractions ever more tightly under her control. This is the real motivating feature for young children of computer technology - the offer of “empowerment” through the ability to control and manipulate colorful images and objects. Of course, this requires that what the children encounter be objects, for controlling and manipulating real things and people would be difficult and bring into play issues of ethics. Consider, for example, the alternative activities posed in my earlier questions. In this situation the world comes to the child as others - autonomous people and things - which *relate* to and engage the child on their own terms. Their very aliveness make demands, moral and ethical, on the children and their teacher. Manipulation and control are precisely what is not, or should not, be the motivation behind this kind of engagement. Student motivation and satisfaction must come from something other than the production of a commodity. It is likely that it would have to emerge from the relationships developed with those others, something that could not be easily
I have used this one supposedly exemplary model of classroom computer use to contrast fundamentally different ways to approach learning, and life. One stresses control and manipulation of objects, reduced to abstract images - the world as commodities serving us without making demands on our character. The other forges connections between the child and his immediate, personal, concrete world, and invites the child to become involved, with all the potential suffering and uncertainty and joy and wisdom that involvement may bring. Both promise to spark interest in a child. But the former does so through imparting the power to control and manipulate a device, while the other reaches the mind through the heart. The former can be fun and enriching, but only the latter can be deeply fulfilling, for the former is ultimately dehumanizing, the latter precisely its antithesis.

What was most revealed by this video was the ideology of technology at work. This is why it does no good to say that the teacher could have balanced the computer work with some of the other activities I have mentioned. They are unlikely to come to mind, and if they are suggested there will be found sufficient reasons to not carry through on them. Recall from the Introduction Palmer’s (1998) observation that we train “teachers to master techniques but not to engage their students’ souls” (p. 19). He believes that this drive to control and manipulate our learning environment is the result of technological objectivism which has generated a growing fear of engaging the world and those in it. This fear feeds on itself as our technologies further disengage us from this already alien environment.

So objectivism, driven by fear, keeps us from forging relationships with the things of the world. Its modus operandi is simple: when we distance ourselves from something, it becomes an object; when it becomes an object it no longer has life; when it is lifeless, it cannot touch or transform us, so our knowledge of the thing remains pure. (p. 52)
We witness here echoes of Fromm’s lifeless world of commodities, brought into the realm of educational practice. The computer’s most important contribution to education is its ability to empower students to manipulate a complex environment. But nothing can enter that environment without first being objectified through abstracting it (Bowers, 1988). Once that distancing is accomplished it can then be brought back into the sphere of the child as hers to use. But an object that is available to be manipulated is no longer free, it has no life of its own. It is possessed by the child, who may, in turn, feel empowered and even euphoric by this newfound sense of control, but the opportunity to develop a relationship - and learn - with the thing itself has evaporated and what is distilled out is another disconnected commodity.

This thoughtworld is in no way limited to the computer uses in the elementary classroom. Because it is subtle and seductive and, as Roszak points out, all too often operates just at the edge of our consciousness, it tends to sneak up on us even when we work hard to thwart it. I discovered this several years ago in the aftermath of the most successful telecomputing project in which I have been involved. In 1994 I helped coordinate The South African Election Internet Project, the only Internet project that actually brought students from around the world into direct contact with students in South Africa during their historic elections. The project was a profound experience for many of us, and raised hopes that it could serve as a model for future projects. In the semi-euphoric afterglow there was talk by some participants of locating another big global event and studying it. Bosnia was mentioned. Having recently visited Hong Kong, I suggested that we might plan on studying its return to China in 1997. But these proposals began to fade as the implications of the attitude we were developing began to dawn on us.

At the time I was reading the draft of a chapter from Talbott's book, *The Future Does Not Compute* (1995). The chapter was titled "Impressing the Science Out of Kids." Talbott’s basic argument was that motivating science students with awe-inspiring multimedia programs (the "wow" factor) is counterproductive.
There is a difference between "special effects wonder" and the true wonder that leads toward a devout scientific curiosity. The latter... grows from an awareness of one's immediate connection to the phenomenon - from a sense that the inner essence of what one is looking at is somehow connected to the inner essence of oneself. But this connection - despite all the academic talk of how we ourselves "construct" the world - is something scarcely experienced any longer. The world has become alien and our science a basket of abstractions - equations and particles, fields and statistical distributions. (p. 146)

Talbott goes on to argue that substituting the dazzle of special effects on a computer for a child's deep connection with the actual phenomenon will only result in the child being attracted to the special effects, not the phenomenon itself, nor science at all. In contrast to the fast moving, entertainment saturated computer simulation, the much slower moving, more subtle, less controllable real world strikes the child as mundane, boring, incapable of inspiring awe and excitement.

These observations seemed applicable to our work in global telecomputing. A concentration on the sensational, whether artificially produced or not, distorts the level of student expectations with regard to learning. Pulling them back down to the earth of their immediate surroundings inevitably results in a feeling of boredom and disinterest. Students become big event junkies, and in order to keep them engaged classes have to be conducted with all the multimedia sensationalism of the nightly news (which is itself responding to the same chronic condition in its adult viewers).

The Internet provides the opportunity to cruise the world, dropping in on whatever happens to be the Big Event of the semester. No matter how well prepared, how pedagogically well designed, the activities might be, the cumulative effect of this consumer approach to learning is deadening. Activities like the South African Election Project affected students so strongly, in part, because they had never experienced anything like it in their high school careers. But what if students are raised on a steady diet of virtual trips to the Antarctic, virtual climbs to the
summit of Mt. Everest, and virtual trips into orbit? These are now common fare and schools are clamoring to participate. In a commodified learning environment these activities represent one feast after another for students. But the thrills that draw the students into these adventures are vicarious thrills, and therefore must be hollow, for they can't, as Talbott puts it, “connect to the inner essence of oneself.” The student doesn’t climb Everest, doesn’t reach the North Pole, doesn’t soar into orbit. She is filled, but not with the sense of well-being that comes from finding the courage, determination and stamina within herself to accomplish a difficult task, but rather a deluge of externally generated thrills. We have to ask what chance the student has to develop her own inner resources when she spends so much time “watching,” at home and at school, isolated in her private sensory world, all the sensational things done in the world by a very few people. Inspiration may be valuable, but Edison was right in claiming that perspiration was much more important, especially to young people.

We also ought to ask how appetizing these sensation gorged students will find their own lives, or that of the local role models like their parents who do nothing but go off each day to work to provide for their families' basic needs? Can we expect them to develop the inner essences and desire to engage fruitfully in these immediate, demanding, ambiguous but all too ordinary seeming relationships? Or will our students become in everyday life like the Alpine bus tourists? Having myself lived for several years in one of the most beautiful and exotic countries on Earth, I have encountered far too many of these snapshot tourists who carry their "been there, done that" philosophy around in their fanny packs. They don’t come to learn. They come to consume. And when our educational environment begins to not only resemble commercials but displays the attitude promoted by commercials then we may be sure that Fromm’s observation concerning the desperate attempts to reconnect to an alien world by trying to have it is applied as appropriately to education as to society at large.
Teaching in a Commodified Environment

I am led by all of this to ask if perhaps our efforts to make learning exciting through the constant consumption of computer mediated experiences is really just a ratcheting of our decades long attempt to keep from having to confront the emptiness of the lives our students bring into our classrooms and our own helplessness in knowing how to help them overcome it (Friedenberg, 1965; Goodman, 1960). We are helpless, in part, because, institutionally if not personally, we have bought into the technological ideology that sanctifies this view of education and life. The same ideology that raises power and control by students to the apex of teaching methodology is also what encourages the math supervisor in my school district to send out detailed daily lesson plans to all the high school teachers at the beginning of each school year; that guides our view of academic excellence according to scores on standardized tests; that influences our colleges of education to pay enormous attention to the “how-tos” of methodology that help aspiring teachers with issues of technique and almost no attention to the “whys” which address issues like commitment, meaning, purpose, identity, freedom, responsibility, morality and ethics - the very issues with which young people, and teachers as well, seem most confused.

Our tendency to reduce teaching to questions of technique is one reason we lack a collegial conversation of much duration or depth. Though technique-talk promises the “practical” solutions that we think we want and need, the conversation is stunted when technique is the only topic: the human issues in teaching get ignored, so the human beings who teach feel ignored as well. When teaching is reduced to technique, we shrink teachers as well as their craft - and people do not willingly return to a conversation that diminishes them. (Palmer, 1993, p. 145)

Technique and computer technology both increase certain pedagogical powers. But unless they are deeply embedded in a philosophical foundation that gives them direction and imposes limitations, they will also serve to isolate and empty our professional lives and those of our
students in an environment full of commodities and black boxes. And what we gain in the long run is the teacher, who is regarded by even the more sober technology advocates as the most important element in learning, squeezed ever more tightly into a lesser role.

Apple (1986) has for some time warned that this uncritical, philosophically unanchored embrace of computer technology represents the latest in the long running trend of deskilling teachers that accelerated with the imposition of "scientific management" onto the classroom. For example:

The reliance on pre-packaged software can have a number of long-term effects. First, it can cause a decided loss of important skills and dispositions on the part of teachers. When the skills of local curriculum planning, individual evaluation, and so on are not used, they atrophy. The tendency to look outside of one's own or one's colleagues' historical experience about curriculum and teaching is lessened as considerably more of the curriculum, and the teaching and evaluative practices that surround it, is viewed as something one purchases. In the process - and this is very important - the school itself is transformed into a lucrative market. (p. 163)

Once again we see technology linked with commodity culture to disconnect education from its personal, historical, local contextual roots. This has a significant impact on power relations within schools, a topic we will discuss in the coming essay on oppression. For our purposes here what is important to emphasize is that in schools the relationship between technology and commodities is not limited to student learning. It also strikes at the very foundations of teaching, with the same ambiguous results: It relieves teachers of a number of burdens, brings a certain kind of pedagogical power under their control, and makes available powerful new means of delivering information to their students. In the process, it also cuts teachers off from the necessity and opportunities to bring all of their personal and professional abilities to bear on the learning process, encourages them to develop a dependent relationship with the high tech
merchants and discourages them from formulating their instruction around the unique relationships available in the local community.

This is why the popular aphorism I hear bandied around every computer conference I attend - “Get the sage off the stage to be the guide on the side” - is not so much trite as it is revealing. Relegating the teacher to being merely a guide denies the profound responsibility teachers have to connect their students with their (the students’ and the teacher’s) shared world. It implies that there is no place in the classroom for adult wisdom (what is a sage but a wise adult) - an incredibly anti-educational attitude. More importantly, it reduces the student-teacher relationship to a superficial, impersonal level. A guide is a hired-hand whose job it is to take clients on a tour, showing the way, providing information and even giving advice. She can lead her clients on an expedition into an adventure and make sure they get back out again. All of these attributes of a guide are also important characteristics of a teacher, or a parent or a mentor. But in each case the role of guide is not deep enough or personal enough to fully describe the needed relationship (nor is the term “facilitator,” which lacks in the same way). This is because the guide/client relationship is essentially a service/consumer relationship. Once the tour is over, the relationship is too. The adage is so popular in the educational technology community because the ideology out of which it works allows its members to assume, wrongly, that learning is a commodity and the guide essentially another tool, contracted for a purpose that is constrained by the commodity being pursued. A guide doesn’t help the adventurer fit her experience into the rest of her life. A guide isn’t charged with developing experiences that are meaningful in the context that the adventurer brings to the tour. Moreover, life is not a tour, and education is not a guided tour - it is the development of a human being in relation to the rest of humanity and the world and the teacher’s role has to be much more than a tour director.

Still, with a technocratic administration stripping control from without and both programmed instruction and global access sucking away control from within, many teachers
gladly seize the opportunity to reconstitute their power in the classroom by becoming reskilled in using the technology itself. In doing so, the teachers regain lost respect, access to resources and support they wouldn’t get otherwise, and a renewed sense of purpose as they become motivated learners themselves once again. They also become allied with the very forces that diminished their respect, resources, support, purpose and motivation in the first place. In reskilling they regain a measure of power and control, but this new power comes through the machines, and the nature of this new power is very different from the legitimate and important power that flowed through the relationship teachers developed with their students as they pursued contextualized learning. This power was difficult to achieve as it required the development of exceptional insights on the part of the teacher into the lives of her students. But once achieved the power was truly reciprocal and enduring. The new power is much less demanding of insight into what is going on in the inner life of the child, but it is exceedingly tenuous: it must constantly be renewed through the consumption of more technical learning and the production of ever more impressive computer mediated commodities displayed as educational outcomes to technologically enthralled administrators and parents. It can only be used to provide students with a constant flow of commodities, usually packaged as information, not asserted as a means to inspire honesty, industry, compassion, ethical behavior and self-discipline - in other words, to help students develop character. It is, in a sense, a weak power, in that it doesn’t carry a moral force through which it can demand anything of students. The role of the computer reliant teacher is of the same order as a stock broker, auto mechanic, waiter or, of course, tour guide.

Here we see again, as we have seen throughout this essay, the difference between the radical separation of means and ends in the teacher as guide, and the integration of means and ends through social engagement. In the former, the teacher herself becomes a machinery, used by students but capable of demanding nothing more than appropriate use. In the latter, the
teacher's role in educating students cannot be fully differentiated from her personal and professional behavior and her own character becomes intertwined with those of her students.

What is crucial to understand is that this new service technician role of the teacher is indispensable to the technological enterprise applied to education. Without reconceiving the teacher as a sort of machinery, preparing teachers for the classroom could not concentrate on methods, but would have to undertake the much more arduous and ambiguous task of improving prospective teachers as human beings. Administrative supervision could not standardize instruction but would have to allow learning to grow organically out of the shared experiences of the teacher and his students. Credentialing agencies would have to recognize the contextuality of knowing and the impossibility of reducing an aspiring learner to a set of scores and grade point averages (themselves commodities which students are required to market at every level of their learning process).

Without reducing the teacher to technician society in general would have to recognize something like Palmer's claim that, "The hallmark of the community of truth is in its claim that reality is a web of communal relationships, and we can know reality only by being in community with it" (1998, p. 95). It is through the technological reduction of learning to a commodity that we are able to put truth entirely outside our frame of educational concerns, and, thus, any sense of necessity for developing the communal relationships that could cultivate the search for it.

Of course, it is argued that the computer, through its Internet connections with the world, does cultivate a kind of communal search, and actually moves it out into a much broader, richer context than any teacher can provide alone. And in a sense this is so. But as the examples I have cited testify, this conception of communal is not made of the same deeply relational stuff that Palmer is talking about; the breadth of the searching leads to superficiality of thought, and the richness of the resources is strictly of a quantitative nature, not at all like the qualitative richness of long term, committed personal involvement. In exchanging a broad but superficial
connectedness to the external world for the far richer relatedness generated by contact with an immediate world that connects with an inner essence, those internal resources are likely to be stunted or to atrophy. Here the metaphor of the electronic superhighway is apt. The young person finds himself in a position similar to someone driving alone a busy freeway, encased in his sealed machinery staring out at other mobile packages with whom he shares only a fleeting commitment. Given this isolation amidst other isolates, with little inner discipline or close communal restraints, it should come as no surprise that the phenomenon of flaming exhibits much the same character as road rage.

The Living Commodity

We are, finally, led back to Cubberley's vision of mass education. Our students themselves are gradually being again (or more intensely) conceived as commodities: Rootless consumers, programmed to cruise the global electronic bazaars, accumulating isolated skills and information until such time as they have gathered enough to offer themselves as products. Whatever computer technology may be doing to benefit education, it has also seriously intensified the century long degradation of learning and the learner into a commoditized ideal. It is a degradation our students will find more and more difficult to escape as we convince them that they must be life-long learners, which in reality means infinitely malleable corporate instruments, able to repackage themselves whenever the demand for products changes. Like the computer systems they rely on, they must constantly up-grade themselves to compete on the commodity market. Detached from place, time or human community, they take their place along side other information processing devices, connecting and disconnecting with each other, somehow hoping to have a good life, carefully avoiding any opportunities to discover who they might really be.

In his book *The End of Education* (1995), Neil Postman writes, "At its best, schooling can be about how to make a life, which is quite different from how to make a living. Such an
enterprise is not easy to pursue, since our politicians rarely speak of it, our technology is indifferent to it, and our commerce despises it” (p. x). Making a life is a process that cannot be wrapped up neatly in a package and marketed through the Internet or any other technical channels. It grows constantly out of the lived experiences of the person. Education should first of all be about helping young people make sense of their early lived experiences and helping them build the inner resources they need to make sense of and direct their later experiences themselves. Someone who knows how to make a life will find that making a living grows naturally out of that life. Naturally doesn’t necessarily mean easily, but convenience is not the primary concern of someone concerned with being. It is struggle that deepens meaning and the struggle to learn is deeply fulfilling to someone seeking to make a life. Commodification is the process of eliminating struggle. It seeks to give us what we seek. But nothing can give us ourselves. In a commodified learning environment children are denied the opportunity to seek themselves. Their attention is given over to what they can have. Computer technology in this environment becomes the most efficient tool for helping them have what they desire with as little struggle as possible. It raises commodification of learning to new heights and in so doing diminishes the pursuit of meaning to new lows. Langdon Winner (1977) says that technology is all about letting us forget about the origin of things. In education computer technology lets us forget that young people will only learn what they need to have when they know who they are to be.
COMPUTER TECHNOLOGY’S CONTRIBUTION TO OPPRESSION IN
AND THROUGH EDUCATION

From his position as professor of computer science at MIT in 1976, Joseph Weizenbaum (1976) surveyed the rapid expansion of computer technology into all areas of life and issued a warning to his fellow teachers of computer science. The computer, he wrote, “enslaves the mind that has no other metaphors and few other resources to call on” (p. 277). What Weizenbaum was calling attention to was his observation that many people who work with computers seem unable to understand the workings of the world in any way other than the way computers themselves work. He was worried that the general computerization of society would result in a populace unable to see the world in any other terms.

Weizenbaum wasn’t the first to draw an association between high technology and oppression. Twelve years earlier German philosopher Herbert Marcuse (1964) and American social critic Lewis Mumford (1964) had each argued in separate books that technology in general had become an oppressive force in society. Probably not coincidentally, that same year French sociologist Jacques Ellul’s massive critique on the oppressive quality of modern technology, *The Technological Society* (1964), was translated into English. Writing a decade earlier, Ellul expanded the idea of technology to *la technique* and minced no words about its character: “Technique cannot be otherwise than totalitarian” (p. 125). Moreover, the theme of technology-as-threat-to-humanity in Western literature dates back at least to Shelley’s *Frankenstein*.

But Weizenbaum’s book was different. It’s warning was directed at the computer - a specific and relatively new kind of technology that was being heralded everywhere as a tool of liberation. Not only did his warning contradict popular perception, it suggested that the oppression would not manifest itself in the physical realm, but in the psychological. And the oppressed would not be those against whom it would be used, but those who used it.
That Weizenbaum’s warning has gone unheeded hardly needs to be stated. American society (and much of the rest of the world) has been transformed by the computer and its attendant technology (what I will here refer to as “high technology”). The pejorative connotation of the title of Ellul’s book is now the hopeful description of a new and exciting era and today’s schoolchildren are indeed encountering the computer as the predominant metaphor and key resource for their comprehension of the world and even themselves. It is something that is celebrated and promoted all across this and many other nations.

Yet there are those, myself among them, who believe that Weizenbaum was right - that high technology is an oppressive force in the world and most especially to the children who are exposed to it constantly both in and out of our schools. This essay is an attempt to explain that belief and in doing so challenge the popular notions about the merit of computer use in education today.

The Dialectic of Liberation and Oppression

It is important at the outset to acknowledge that educational high technology is a force of liberation. This may seem contradictory to the claim I just made. But recall from the Introduction the ambiguous character of technologies. Not only do they bring benefits and detriments, the qualities of these benefits and detriments may be polar opposites of each other. What is used to liberate in one realm may prove to be oppressive in another. For example, the power loom liberated the textile industry from the stranglehold of guild society and helped launch the industrial revolution. Yet its implementation led to the infamous sweatshops of 19th century England and the eventual oppression of masses of workers all over the world. Moreover, even as the industrial revolution liberated much of humanity from the miseries and toil of pre-industrial life, this same historical period has been consumed by efforts, through unionization, Communism and other political and technological efforts, to overcome this oppressive aspect of technological change.
I don't believe it is necessary to disavow the liberating qualities of high technology to argue that they also bring to bear oppressive qualities to education. Neither do I feel compelled to list all of those liberating qualities in an effort to present a balanced picture of the impact of high technology on education. Those qualities have been trumpeted, and for too long uncritically accepted, by technology advocates, industrialist, politicians, and, shamefully, far too many academic researchers. The literature is awash with liberative rhetoric, rarely accompanied by any serious attempt to examine the other pole of the dialectic. It is not difficult to find such literature, and I will leave it the reader to make that effort.

Having said that, I hasten to add that many of those liberative claims will be taken up in this essay, but within the context of my argument. What is important about the liberative qualities is not so much whether they generate a favorable balance to the oppressive ones, but in what realm they are manifested, who they serve, and what ideology they promote. As I hope to show, not only are there significant ways in which educational technology oppresses, there are many instances in which what has been touted as a liberating quality of educational technology, is, if viewed from a different ideological perspective, oppressive.

**Oppression as a Theme in Education**

Oppression is a term that has been trivialized in American society to the point that it is probably best to offer an explanation of my own use of the term. I do not include in the term here those states of temporary discomfort which are sometimes referred to as oppressive, whether it be oppressive heat or oppressive secondhand smoke or an oppressive professor who refuses to allow students to voice opinions that differ from hers. Oppression as I wish to use it here refers to a condition of unending domination by an other or others that prohibits the oppressed from acting in the fullness of their humanness. It is often a political condition, one which I witnessed in its extremity while living in South America, where severe oppression has a long and unhappy history. It therefore should not be surprising that it coincides with the view
taken by Brazilian educational philosopher and activist, Paolo Freire in *Pedagogy of the Oppressed* (1996). It is significant that Freire begins this book by emphasizing the central role that “humanization” plays in his view of oppression. Humanization is “the people’s vocation” and “it is affirmed by the yearning of the oppressed for freedom and justice, and by their struggle to recover their lost humanity” (p. 26). Later he reiterates the same idea as a positive directive, “At all stages of their liberation, the oppressed must see themselves as women and men engaged in the ontological and historical vocation of becoming more fully human” (pp. 47-48). What is important to recognize here is that this view of oppression is not limited to simply a lack of freedom. It involves a mental state, a way of relating to other humans and the world. Freire gets at this relational quality most directly by describing the consciousness of the oppressor:

> The oppressor consciousness tends to transform everything surrounding it into an object of its domination. The earth, property, production, the creations of people, people themselves, time - everything is reduced to the status of objects at its disposal. [emphasis added]. (p. 40)

Dehumanization is an essential ingredient in oppression. But this objectification goes beyond merely treating fellow humans as things. It represents a particular “consciousness,” a lens through which the oppressor views the world. Through this lens whatever the oppressor encounters is interpreted as an object, a thing; but not just a thing - a thing to be dominated, controlled.

In this we should recognize a clear parallel with Francis Bacon’s original technological vision. Technology will be used to dominate nature, control the environment. The resources of the world are to be brought under the dominion of society and placed at its disposal. Of course, this is for the benefit of humanity. But the theme of domination and control and use is the same. What (and in oppression human beings are viewed as “whats” not “whos”) is dominated and controlled is different but the relationship is essentially the same.
Freire is not alone in this view of oppression. In fact, he is following a fairly long tradition of criticism of instrumentalism. Herbert Marcuse (1964), mentioned above, draws on the even earlier observations of French philosopher Francois Perroux (1958), to summarize the modern nature of servitude. Perroux observed that slavery is determined, "neither by obedience nor by hardness of labor but by the status of being a mere instrument, and the reduction of man to the state of a thing" (Marcuse, 1964).

What all three of these social critics are telling us is that oppression is no longer a state of affairs that can be determined solely by objective, material circumstances. It is here that Freire reveals one of his great insights - that it is not enough to merely overthrow the oppressors and redistribute the wealth. The oppressed must also recognize that in being treated for so long as things, they have internalized that view of themselves as well and their own sense of humanness has been destroyed.

The oppressed have been destroyed precisely because their situation has reduced them to things. In order to regain their humanity they must cease to be things and fight as men and women. This is the radical requirement. They cannot enter the struggle as objects in order later to become human beings. (p. 50)

It is just here that education assumes its crucial role in the liberation process. "Propaganda, management, manipulation - all arms of domination - cannot be the instruments of their rehumanization. The only effective instrument is a humanizing pedagogy..." (p. 50).

**Linking Technology and Oppression**

Freire’s linkage of oppression to dehumanization tempts us to leap immediately to the argument that has long been made against educational technology. The argument goes

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11 In saying that oppression is not determined by material circumstances I do not want to leave the impression that I equate the consequences of the oppression of those held in abject poverty and servitude all over the world with the kind of psychological oppression I will be claiming to afflict even the wealthy of this society. Oppression has many faces and many degrees of severity, and many consequences. I can only emphasize that in pointing out this particular face I in no way wish to diminish the plight of masses of desperate people all over
something like this: Computers are machines. They don’t take into account such things as emotion, intuition, etc., which is what helps to make us human. When employed as an educational device they establish the opposite of “humanizing pedagogy.” Therefore, they are useless as tools of liberation, and probably, through their dehumanizing qualities, contribute to oppression.

I have heard and read this argument many times. It seems to be voiced more often as computers invade areas of education where they have not been gladly embraced. I admit my own sympathies for this view, for I believe that it does intuitively apply Freire’s observations accurately to our relationship with educational high technology. Unfortunately, this argument is as full of unexamined assumptions and vague generalizations as many of the arguments for the use of educational high technology that I have criticized in other places (Monke, 1998a; Monke, 1998b). What is it about the computer that sets it apart from other tools in its oppressive potential? After all, a pencil is a tool and even does similar things as a computer. Does it therefore dehumanize? Do all educational activities have to be humanizing? Aren’t there some realms where learning can take place without concern whether it might be oppressing someone? Does dehumanization necessarily lead to oppression in a society like the U.S. where equal opportunity is an educational mantra? And aren’t there ultimately always human beings behind the machines who are responsible for whatever dehumanization and oppression might occur?

These are legitimate questions that must be addressed if the charge that computers oppress is to have any bite. I think we can best get at those questions, and in so doing both deepen and modify the argument, if we begin by separating our investigation into two parts, along the lines of the “we use it/it uses us” dichotomy: we will first look at how high technology is used by some people to oppress others in and through education; then we will examine how the technological system itself oppresses within the learning environment. As before, we must

the world for whom Freire spoke most eloquently.
keep in mind that these are not entirely distinct realms. They are useful for organizing the investigation, but in reality the dichotomy is a false one and we have to be careful to not blot out the effect of one on the other as we examine each in turn.

The Oppressive Use of High Technology in Education

One of the most seductive factors that drew me into the area of K-12 computer education in the early '80s was the inability of anyone to tell me what to do with them. No one was able to fit them into the curricular straight jacket. Even during the period when schools were setting up separate computer literacy labs no one was successfully prescribing the instruction that went with them. Those of us who jumped into teaching with and about computers early on were able to pretty much call our own shots. We ran our programs in the sort of neutral zones that existed between the well-defined borders of a Balkanized curriculum that had ossified long before we were born. Many of us were ceded a large degree of autonomy by administrators who had no idea what these machines might be good for (which is not to say that we did). Perhaps this is why there is such a revolutionary atmosphere at educational computing conferences. Many had gravitated to the computer out of the same sense of frustration I had felt and their new found freedom had further convinced them of the need for real change in the way we educate our children. Teaching in the no-man lands of schools demanded that I rethink almost everything, which was confusing and demanding, but also liberating, for I began to understand how restricted the role of the teacher had become in the traditional classroom setting. I began to recognize that most teachers have little authority to really shape learning according to the individual and group needs of their students.

It is doubtful that many, if any, of us involved with computer teaching at the early stages were aware that a substantial body of criticism had been accumulating that tied that same rigid, bureaucratized school structure we sought to escape to the technological ideology itself. Callahan (1962) and Tyack (1974) had long since written histories chronicling the wave of
Taylorism that swept over education early in the century. Michael Apple had already published *Ideology and Curriculum* (1990) and *Education and Power* (1982) both of which contained sustained linkages between the use of technology and the very oppressive power arrangements I believed the computer was liberating me from. Even Freire, in his earliest edition of *Pedagogy of the Oppressed* (1973) declared that, “More and more, the oppressors are using science and technology as unquestionably powerful instruments for their purpose: the maintenance of the oppressive order through manipulation and repression” (p. 42).

The critiques leveled by these and other educational scholars were rarely aimed directly at the computer, or even what we now call “high technology.” It was more generally directed at Technology, that instrumental, rationalizing worldview that I sketched in the introduction. Apple especially focused on this theme (though from a heavily Marxist perspective) as a tool of oppression. In *Teachers and Texts* (1986) he summarizes parts of the more detailed analysis undertaken in his earlier books and reapplies it to the new technology, instructional computers, that at the time were just beginning to make an impact in schools. He begins by citing the intensifying pressures to technologize classrooms which he argues is another round in the old process of “the rationalization of teaching and curricula in general.” He then goes on to suggest that, “One of the major effects of the current (over)emphasis on computers in the classroom may again be the deskilling and depowering of a considerable number of teachers” (p. 162).

Deskilling and depowering go together for Apple and comprise a major theme in his writing. Though here he uses a cautious “may” to describe the impact of the newest technical innovation, there is no such equivocation in his summary of this general deskilling process, as described earlier in *Education and Power*:

As the procedures of technical control enter into the school in the guise of predesigned curriculum/teaching/evaluation “system,” teachers are being deskilled. Yet they are also being reskilled in a way that is quite consequential. We can see signs of this at both teacher training institutions, in in-service workshops and courses, in the journals devoted to
teachers, in funding and enrollment patterns, and not least in the actual curricular materials themselves. While the deskilling involves the loss of craft, the ongoing atrophication of educational skills, the reskilling involves the substitution of the skills and ideological visions of management. (1982, p. 133)

What Apple describes in the rather sterile language of academic analysis, I have endured for nearly two decades as a mathematics teacher in six different schools in three different countries, all operating under the same basic organizational structure. I am still not fully immune to this mind-numbing subservience. Each year, along with my computer classes, I usually teach one or two Gifted and Talented Math classes at my high school. At the beginning of each year I receive not only the district adopted textbook and its massive bulk of supplemental material, but also a full set of daily lesson plans covering the entire year's curriculum. Though I have been assured that I am free to deviate from this structure, having been anointed as an "innovative" teacher, I pity the poor teachers not so labeled - and their students.

In moving to computer instruction I was able to flee the oppressive conditions of the typical classroom, but I had not yet understood its association with "procedures of technical control" that essentially sought to turn me into a technician, someone only able to negotiate the "hows" of teaching and learning, not the "whys" and "wherefores." If I had recognized that at the time, I would have understood that my freedom was only temporary and I would not have for some time sympathized with those colleagues who continue to believe that just because the computer has allowed them to slip into their own gaps in the curriculum, spreading the use of them all over the schools will somehow result in fostering the needed revolution. What liberated us was not really the computer itself but its newness to education, a feature that always causes problems for rigid bureaucracies - for awhile. As I watch the way computers are being deployed in schools today I see that the managers are beginning to catch up to the computer. Apple's (Michael's, not Mac's) predicted scenario is beginning to be played out, though not entirely as he suggested.
Certainly in my school district the trend (and we have made a point of being trend followers, not trend setters) toward networking classrooms and buying server-resident software so that each class has access to the same district selected curriculum-integrated software is another means of standardizing instruction and further depowering the classroom teacher - in a certain way. We must remember that this technology always shows two faces. While its standardized deployment takes the power of curricular design and even much pedagogical choice out of the hands of the classroom teacher, it offers in exchange a powerful new technical means of instruction. This is the Faustian bargain that Apple fails to mention but that has accompanied all technology infusions into education: The teacher gives up a measure of autonomy and personal identification with her labor for additional mechanical instructional power (this power is not to be confused with effectiveness - an enormously complex issue we will steer clear of here). It should come as no surprise, given the little maneuvering room they have left, that many teachers I talked to during a two year study of the infusion of computers into my school district found this trade-off to truly be a bargain. Being already bound tightly to standardized text materials and highly specific curriculum guides, they had little autonomy left to give up. Like the frog in the gradually heated pot of water, they didn’t even notice the heat being turned up one more notch.

This is not generally the situation at the university level and the deskilling and depowering trend predicted by Apple has not been so gladly accepted as the price of technological empowerment, especially when faculty have not shared in that empowerment. One of the leaders of the on-going effort to keep high technology from becoming a major part of college learning, historian David Noble, has attacked the efforts by universities and industry to move in this direction because, as he puts it, “education, again, is not what this is all about; it’s about making money. In short, the new technology of education, like the automation of other industries, robs faculty of their knowledge and skills, their control over working lives, the product of their labor, and ultimately, their means of livelihood” (1997).
The scenario Noble describes in which the clearly identified oppressors - an alliance of university administrations and private industries - essentially use the Internet and other distance education technologies to strip professors of their autonomy, control over their intellectual property and even their jobs reads remarkably like Apple's prediction a decade and a half earlier.

With the commoditization of instruction, teachers as labor are drawn into a production process designed for the efficient creation of instructional commodities, and hence become subject to all the pressures that have befallen production workers in other industries undergoing rapid technological transformation from above. In this context faculty have much more in common with the historic plight of other skilled workers than they care to acknowledge. Like these others, their activity is being restructured, via the technology, in order to reduce their autonomy, independence, and control over their work and to place workplace knowledge and control as much as possible into the hands of the administration. As in other industries, the technology is being deployed by management primarily to discipline, deskill, and displace labor...

Once faculty put their course material on-line, moreover, the knowledge and course design skill embodied in that material is taken out of their possession, transferred to the machinery and placed in the hands of the administration. The administration is now in a position to hire less skilled, and hence cheaper, workers to deliver the technologically prepackaged course. It also allows the administration, which claims ownership of this commodity, to peddle the course elsewhere without the original designer's involvement or even knowledge, much less financial interest. The buyers of this packaged commodity, meanwhile, other academic institutions, are able thereby to contract out, and hence outsource, the work of their own employees and thus reduce their reliance upon their in-house teaching staff. (1997)
The major difference between Apple's earlier claims and Noble's more recent ones is that Noble documents that this is occurring right now.

None of this is speculation. This Fall the UCLA faculty, at administration request, have dutifully or grudgingly (it doesn't really matter which) placed their course work - ranging from just syllabi and assignments to the entire body of course lectures and notes - at the disposal of their administration, to be used on-line, without asking who will own it much less how it will eventually be used and with what consequences. At York university, untenured faculty have been required to put their courses on video, CD-ROM or the Internet or lose their job. They have then been hired to teach their own now automated course at a fraction of their former compensation. The New School in New York now routinely hires outside contractors from around the country, mostly unemployed PhDs, to design on-line courses. The designers are not hired as employees but are simply paid a modest flat fee and are required to surrender to the university all rights to their course. The New School then offers the course without having to employ anyone. And this is just the beginning.

Noble goes on to cite a number of other examples of ways in which this administrative-business alliance is using technology to undermine the once relatively autonomous profession of higher education teaching. One is left with the impression that university teaching is in danger of becoming a sweatshop industry.

What Noble doesn't include in his article are references to the ways in which university faculty are themselves using technology to create oppressive conditions for their own colleagues. Perhaps Noble doesn't want to blur the us-against-them battle lines. But in depicting this as primarily a management-labor dispute, Noble glosses over the more fundamental issue: the imposition of the technological ideology on the very structure of academic life.
A recent article in the *Chronicle of Higher Education* (Kieman, 1998) provides a good example of faculty collusion in this process which promises to force, albeit in a much gentler, subtler way, the artisans of academia out of their craftshops and into the electronic mills. In the article, which describes the difficulties remote universities are having getting connected to the faster Internet systems being developed, considerable attention is given to the necessity of getting all universities connected to the faster system. Terence Rogers, director of one of the high speed projects, made connecting to the system, no matter what the cost, seem like an imperative for survival. "For the have-nots, the problem is going to get worse," he said. He added that have-not institutions "better make it happen" as soon as possible" (p. A23). Why? Because, according to John P. Miller, professor of biology and director of the Center for Computational Biology at Montana State University at Bozeman and member of the President's Information Technology Advisory Committee, without the new technology they will simply not be part of the academic community.

"If you're not on the Internet, you're going to be out of the new loop," Mr. Miller told the audience. How much does it cost a college or university to connect to the Internet? "The short answer is a lot," said Mr. Miller. "But you have to remember there is no alternative." (p. A23)

There is no challenge to this statement in the article - no balancing argument against what could be viewed as technological blackmail; only a report of wringing of hands by those who are having difficulty coming up with the funds to move within the walls of the new gated academic community. Of course, this is to be expected when everyone involved, including the reporter, share common ideological assumptions: There is no need for, not even a thought of questioning why this has to be done, only how to do it. While there may not be any debate, there is resistance. But this is portrayed as a "problem" to be solved (as any other technical difficulty) rather than a matter of disagreement to be resolved among thoughtful colleagues.
Unwillingness on the part of some professors still holds back the use of information technology at some institutions, Mr. Dennison said. "We still have large pockets of resistance on the campus." Changing instructional patterns "causes a great deal of resentment," he said. "We need a new approach to all of this." That new approach, he said, should include professional-development programs for faculty members that teach them how to use information technology. "The faculty themselves are having a very difficult time thinking about different ways of instruction," said Christine M. Reed, associate dean for graduate studies and research at the University of Nebraska at Omaha, during the meeting of the working group on research. (p. A23)

The attitudes displayed in this article are typical of most technological change ventures with which I have been associated in education. Proponents seem unwilling to see the resistance to their new technologies as anything other than a sort of stuck-in-the-mud recalcitrance that would evaporate if only these stubborn old-fogies would learn how to use the new tools. Like Frazier in B.F. Skinner's *Walden Two* (1948), they view aberrant behavior as something to be treated rather than negotiated with. The "pockets of resistance" have to be overcome rather than engaged in dialogue. The attitude is more reminiscent of Vietnam-style pacification than a genuine attempt to resolve conflicting yet legitimate claims. It builds its knowledge through the inexorable logic on which it relies. Ellul (1964; 1990) and Marcuse (1964), among others, have argued that this way of engaging the world is ultimately totalitarian, as it admits to no ambiguity which would, if acknowledged, leave open the question of value, and because it disavows the pursuit of truth as separate from pursuing power over whatever situation (and opposition) is encountered. Palmer (1998) claims that in the realm of education this worldview promotes an agenda in which the drive "is not to tell the truth about knowing but to shore up our self-aggrandizing myth that knowledge is power and that with it we can run the world" (p. 56). Of course, power is not concerned so much with dialogue as acquiescence and control, which is why technologists speak as easily about "pockets of resistance" as an army general.
This rationalization of what should be a political and social negotiation can be found not only in large scale operations but in small, local organizations as well. Four years ago the Des Moines Public Schools decided to install a new “enterprise system” so that all district recordkeeping could be organized into one complex, relational computer database. Whereas before such aspects as student recordkeeping and accounting used totally separate computer programs, now every bit of data entered into the mainframe would be available to any part of any component. The greatest beneficiary of this new system, of course, was the central administration, the only segment of the school community with a need to access information from all parts of the operation. They now had it all “under one roof.” The software package that was selected best met their integrative needs even though the component that most directly touched on education, student recordkeeping, was clearly clumsier, slower and less robust than the system it replaced. It contained features counselors and school secretaries didn’t need but couldn’t bypass and worse, it didn’t have a number of categories that were considered essential to the student records.

Of course, its installation touched off a long and bitter protest from school staff, who found that the new system required a significant increase in their work load and often an even greater increase in their level of frustration. Counselors especially complained about the intensification of their work and the reduction of their ability to work effectively with students.

In studying the administration reaction to this situation I found that generally the farther I moved away from the people actually affected the more I heard what has become one of the most common and, as we will see, most revealing reactions: The call to adapt to a changing world. One high level central administrator typified this attitude in assuring me, “This happens in the business world all the time. These school people are going to have to learn how to adapt. The culture has to change.” Here we encounter Winner’s concept of reverse adaptation as a justification of technologically imposed degradation of working conditions. This is the way things have to be, and more and more it will be the way of the future. We have to adapt to it.
Some administrators wielded the concept like a club. Others suggested it with a resigned fatalism. Most claimed that in any case there was not much that could be done now in terms of program design. The district had forked over a phenomenal amount of money (nearly $4 million) on the program because it was not supposed to need further expensive customization. And because the program was so massive and complex it would now be far more expensive to tweak than had been the stand alone products it replaced.

I will have more to say about the reaction of decision-makers to this situation in the next section. What I want to focus on here is the action they finally decided to take. The strategy settled on for addressing these deficiencies was extensive training of the staff, apparently under the belief (shared with the university Internet promoters mentioned earlier) that if the end users were just turned into experts, their proficiency would somehow overcome the inadequacies of the system. In other words, if you can't adapt the machinery to the people, adapt the people to the machinery (implied in this, of course, is the replacement of those who can't adapt). In fact, each time serious problems have been exposed in the system a new round of training has been undertaken to improve the ability of these educators to get more out of their crippled workhorses. And so we witness the strange but typical sequence of events in which workers are first forced to work harder and longer because of the imposition of a technology they neither need nor want, with the only hope of even partial relief requiring even more investment of their time and skills in the offending machinery.

As Freire emphasizes, the role of education is crucial not only in the liberation process but in the domination process as well. But education as a direct tool of oppression has mostly been viewed as an absence. It is the lack of education that facilitates the oppression of the ignorant. From the founding of this nation Americans have mostly held to the belief that freedom depends on education. Certainly Freire, along with Dewey and many other philosophers of the twentieth century, have added their intellectual weight to this argument. But what I think we
see in the two examples I have just cited is a relatively new (20th century) and troubling phenomenon - the use of education in the service of oppression.

This is an argument advanced by Ivan Illich in his book *Deschooling Society* (1971). But unlike others who attribute the cause to a variety of political and social agendas, Illich maintained that this trend is tied very closely to Technology's unquenchable thirst for growth. In his follow-up book on technology, *Tools for Conviviality* (1973), and long before the term "world-wide web" was coined, Illich anticipated a global educational network, not as a means of liberating humans from a stiflingly parochial educational system, but as an oppressive tool to force humans to adapt to the unnatural demands of technological "progress."

Since man's tolerance would become the most serious limitation to growth, the alchemist's endeavor would be renewed in the attempt to produce a monstrous type of man fit to live among reason's dreams. A major function of engineering would become the psychogenetic tooling of man himself to a condition for further growth. People would be confined from birth to death in a world-wide schoolhouse, treated in a world-wide hospital, surrounded by television screens, and the man-made environment would be distinguishable in name only from a world-wide prison. (p. 101)

According to Illich, the accelerating pace of technological change and its attendant removal of humans from the natural rhythms of life creates enormous stress, which can only be endured (though never fully accommodated) via massive efforts of psychological adaptation. In this Illich echoes Ellul (1964), who finds little maneuvering room for humans in a society in which technological change is the given:

Only two possibilities are left to the individual: either he remains what he was, in which case he becomes more and more unadapted, neurotic, and inefficient, loses his possibilities of subsistence, and is at last tossed on the social rubbish heap, whatever his talents may be; or he adapts himself to the new sociological organism, which becomes his world, and he becomes unable to live except in a mass society...But to become a mass man entails a
tremendous effort of psychic mutation. The purpose of the techniques which have man as their object, the so-called human techniques, is to assist him in this mutation, to help him find the quickest way, to calm his fears, and reshape his heart and his brain. (p. 334)

Ellul provides the most surprising of examples in his discussion of education’s contribution to this process: the philosophy of Maria Montessori. He acknowledges her efforts “to free the child from the slavery of school and family” as it existed at the end of the 19th century. “However, this freedom consists in a profound and detailed surveillance of the child’s activities, a complete shaping of his spiritual life, and a precise regulation of his time with a stop watch; in short, in habituating him to a joyful serfdom” (p. 347).

Here again we encounter the apparent paradox of liberation and oppression occurring at the same time. And like Freire and Marcuse, Ellul emphasizes that this form of oppression is not determined by any level of physical misery. “The technique permits the broadening of the child, the development of his social personality and happiness, and consequently, of his equilibrium” (p. 348). In fact, this is just the point. The individual must be helped to become well-adjusted to society. But all of this is in response to a technological tyranny that creates the need for these kinds of techniques of social adaptation in the first place.

I have no doubt that it makes men better balanced and “happier.” And there is the danger. It makes men happy in a milieu which normally would have made them unhappy, if they had not been worked, molded, and formed for just that milieu. What looks like the apex of humanism is in fact the pinnacle of human submission: children are educated to become precisely what society expects of them. (p. 348)

All of this may seem over-wrought, until we recall, from the Introduction, my student lunch companion who is trying to kick Ritalin. Schools (and real prisons) are filled with young people who are struggling to conform to the demands of a society in which technical demands in nearly every facet of life take precedence over individual human peculiarities. I have read by now hundreds of articles, both in the popular press and in academic journals, concerning the
use of high technology in education, and the rarest of finds is the essay that expounds on how computers can be used to facilitate idealism, the struggle for self-knowledge, the strength to follow one's own vision if it is in opposition to the technological worldview. The most common is the essay that focuses on how the computer can help students prepare for what is, or will be. "Preparing for the 21st century," is the goal, but nowhere is there mention that the generation we are preparing might not want the frenetic high tech society we have determined is in store for them; that they may want to take their century in a different direction and we should perhaps be preparing them for that. Ellul writes, "Despite all the pretentious talk about the aims of education... it is not the child in and for himself who is being educated, but the child in and for society. And the society, moreover, is not an ideal one, with full justice and truth, but society as it is" (p. 348). His point is the same one made in stunning frankness by the slogan for the 1933 Chicago World's Fair: "Science explores, Technology executes, Man conforms." The role of education in this endeavor is not just to help young people conform, but to see to it that they find that conformity comfortable, if not downright satisfying. In this, both Ellul and Illich are merely explicating what was understood and depicted all too accurately by Aldous Huxley in *Brave New World* (1932). The central message of that novel, and Huxley's greatest insight, was that the most effective means of oppression in a technological society is not fear and violence, but affluence and psychological techniques delivered as education. Through this method, Huxley wrote, "Managers control a population of slaves who do not have to be coerced, because they love their servitude" (p. xv).

Whatever the high-minded rhetoric coming out of academia, all of my experience working with computer using teachers tells me that by far its most important feature is its ability to motivate otherwise uninterested students. The teacher is powerless to change what the student has to learn - that has been settled by a curriculum committee in response to available resources from national textbook publishers in league, at least at the higher grades, with national testing
agencies. All the teacher can do is employ technologies that will help the student love (or at least tolerate) what he or she has to do.

All of this takes constant monitoring, adjusting, and most importantly, upgrading of the technology. As both Ellul and Illich testify, it also requires constant monitoring of the student. Here too, the computer is beginning to play an important role.

A year ago I attended a special meeting of the Technology Steering Committee for the Des Moines School district. I had been a member since its organization the previous year, but this was the first meeting which a number of school board members attended. They had been invited to participate in the process of giving the Technology Department direction for their operations for the next three years. The meeting began with an exercise in which each person in attendance - about twenty of us - eventually specified one thing he or she would like to see accomplished by the Spring of 2001. As might be expected, a wide variety of goals were offered, reflecting the diversity of the areas of the school community represented. I was accustomed to the enthusiastic proposals for extending the use of technology that typically emanated from this committee, but one proposal, this by a school board member, made me blink hard. Given the new massive storage capacity of the new enterprise system, she said, “I would like to see us put in place a database that will maintain a complete student profile from the time they enter school until the time they graduate.” When asked what this profile would contain, the board member suggested that it should include scanned copies of much, if not all, of the student’s work, along with all the formal and anecdotal records they accumulate during their student careers.

This suggestion met with widespread approval and stirred considerable comment, most of it expressing the benefits this would bring to students. Not only would the student be able to take a massive portfolio of accomplishments away from the school to use in seeking employment or further education, the extensive, unbroken longitudinal record of behavior would prove invaluable to providing accurate “diagnosis” and “treatment” to those who
encountered trouble along the way. In fact, this information could be used to anticipate problems and get students help before those problems became acute.

Coming right on the heels of the counselor uprising over having to spend so much frustrating time using this same enterprise system, I had to wonder who was going to constantly monitor these profiles looking for early warning signals from students? Would these beleaguered counselors and school psychologists soon be spending their nights pouring through years of student records in order to find hidden cries for help? Of course not. But what if a child comes to the counselor for help and that counselor is in one way or another compelled to review all of the data on that child (after all, if the school goes to the expense of compiling and storing it, it should be used)? To what extent will that information color the counselor's relationship with the student? Could a misevaluation or teacher vendetta plague the student forever like a mistaken bad credit report? There are all kinds of ethical issues that would have to be sorted out. This is nothing new to the counseling business. But a different circumstance is new: the sheer bulk of information. At least one counselor quit over the previous enterprise fiasco, citing the decreased percentage of time she was able to spend working directly with students. As she explained it to me, she had to have the time to get to know the students in order to help them, and to her that meant talking with them. Would this continue to be the case when the counselor seems to have the student's whole life history available at a mouseclick? Under increasing time pressures would she continue to work to develop an open relationship with the student or would the student she knows come to be much more the one she reads off the computer screen? And if so, what is the chance that she would help a student go through the pain and suffering of a heart-felt opposition to societal pressures rather than seek to help that student adjust to what exists and can’t be changed.

As I sat in the conference room listening to the discussion, those ideas were just vague pangs of discomfort that I couldn't articulate. A second idea, however, hit me full blown, and it is what made me blink. It was the panopticon, conceived by Jeremy Bentham in the 18th
century as a means of maintaining order in prisons with a minimum number of guards. Bentham’s idea was to design the prison so that the inmates’ cells formed a circle around a glassed-in hub, from which, with the aid of proper lighting, a few guards could observe everything the inmates did without themselves being seen. The genius of the design was the invisibility of the guards, for then the inmates never knew for sure whether they were being watched or not. Just knowing that they might be resulted in a self-imposed inhibition that allowed one guard to effectively control a large number of prisoners.

A number of social critics - Foucault (1977) perhaps most prominent among them - have extended the idea of the panopticon to society in general. The ability of institutions to use high technology as a means of surveillance results in a high degree of behavior control even if there is no Big Brother actually watching all the time. As Howard Rheingold (1993) has observed, “When you can induce that state of mind in a population, you don’t need whips and chains to restrain them from rebelling” (p. 289). As I listened to the enthusiastic endorsements for building massive dossiers on every child who enters the Des Moines Schools, I wondered what state of mind this recording of every event (especially the bad ones) in a child’s life would induce. I’m still wondering. And it has set me to wondering just how far we in education are willing to go, what techniques we are willing to employ, to “help” our students adapt to society, no matter how corrupt, psychologically stressful, emotionally deadening, community fragmenting and intellectually sterile it may become. Freire writes, “The oppressors are the ones who act upon the people to indoctrinate them and adjust them to a reality which must remain untouched” (p. 75). How far are we as well-meaning educators willing to go to adjust our students to a social reality that is receding further and further from human touch?

**Educating to Oppress**

Up until now I have applied Freire strictly to the situation as I find it in the U.S. Though I believe he has much to say to us in terms of the general character of oppression, which can be
applied to education here, U.S. teachers and students are not the audience he wrote for.
Consider the following passage in which he describes the condition of a group of hypothetically deposed oppressors in relationship to those they once oppressed:

Formerly, they could eat, dress, wear shoes, be educated, travel and hear Beethoven; while millions did not eat, had no clothes or shoes, neither studied nor traveled, much less listened to Beethoven. Any restriction on this way of life, in the name of the rights of the community, appears to the former oppressors as a profound violation of their individual rights - although they had no respect for the millions who suffered and died of hunger, pain, sorrow, and despair. (p. 39)

If we all now live, as the technologists insist, in one global community, to which group, oppressor or oppressed, do we belong? With our growing use of satellite communications, the Internet and other globe girdling technologies to “bring the world into the classroom,” it is becoming, it seems to me, more and more difficult to stand apart and say neither. How do we in good conscience condemn the wearing of sweatshop produced clothing on the one hand while facilitating telecommunication with the mostly private schools which serve the oppressing elites on the other. It seems to me that bringing global communications into the classroom presents educators with a new and enormously complex moral and ethical situation. Not only is there the issue of equity and possible misrepresentation of life in other countries that is fostered by an electronic silence imposed on a large portion of the world’s population, the impact of high technology on indigenous cultures, whether they participate in its use or not, has been, for the most part, disastrous. Jerry Mander, (1991), Stephen Hill (1988) and many others have chronicled the destructive effects of the introduction of high technology (often against their will) on many indigenous cultures. Yet as the number of teachers and students in this country establishing global connectivity explodes there seems to be no effort to protect the autonomy of these threatened cultures. Indeed, the effort is to “visit” as many exotic locales as possible with little or no regard for the impact of our virtual tourism. I have already discussed
in the previous essay how this degrades education. It also raises serious ethical issues related to oppression.

I have before me an article from the *Des Moines Register*. It tells of Johnston school’s participation in a project called AfricaQuest, a bicycle exploration of the Great Rift Valley, portions of which are being piped via Internet to classrooms in the U.S. Here is the description of what the students saw on their video monitors:

In Kenya, Dan Buettner, a nationally known educator, journalist and record-setting bicyclist, staged his first satellite feed as a group of Turkana tribesmen tried to make sense of what was taking place. “I don’t think they have any idea we’re connected to a place 10,000 miles away in a whole ‘nother world,” Buettner said, surrounded by more than a dozen members of an extended family from the village. (Villanueva, 1998)

There is something reminiscent of the Great White Hunter stories here. A Westerner travels through a remote region of Africa and sends back images of exotic scenes with exotic people, many of whom seem confused and awed by the magical tools the traveler possesses. It is exactly here that commodification and oppression fuse. The students in the class at Johnston schools don’t experience the villagers as real people. They experience them as *things* - exotic, living, moving objects - props animating an exotic landscape, consumed as part of a commodity packaged as AfricaQuest. These props aren’t engaged by the students. They are hardly engaged by the explorer. They are used as educational information; part of the package delivered to the students’ air conditioned classrooms. Is anyone troubled by the exploitation of these villagers? Is anyone disturbed by the enormous expense involved in this kind of educational “travel” when the people who make it all worthwhile can’t afford to travel any further than their two legs can carry them? Apparently not. At the end of the article one student is quoted as enthusing, “It was awesome. I liked just seeing what the people really looked like and to see where they lived.”
Such is the depth of learning procured by the invasion of distant cultures by high technology. Could it be different? Of course. Telecomputing could be used to call attention to the poverty and oppression that is encountered on these travels. But it is unlikely that these events would even take place if that was the intent. The same governments, agencies and corporations who are responsible for allowing these villagers to be treated as zoo creatures control access to the technology, or at least its use within their territories. We may reassure ourselves of the liberating qualities of global communications by citing the faxes and Internet traffic that informed the world of Tiennaman Square, but this was, most likely, like my computer teaching experience, an aberration caused by the newness of the technology, which any tyranny worth its salt will have now learned it must control. The media manipulation by the U.S. military during the Gulf War provides a longer, and less comforting view. A new technology, television, had undermined its efforts in Vietnam and it was determined to control it in the Gulf. It succeeded spectacularly despite all the advances in grass roots communication technology in the intervening years. As Langdon Winner (1986) has observed, “Using a personal computer makes one no more powerful vis-à-vis, say, the National Security Agency than flying a hang glider establishes a person as a match for the U.S. Air Force” (p. 112).

Perhaps it is the illusion that the personal liberation some of us have experienced somehow translates into liberation for all people that lets otherwise conscientious teachers jump into using high tech devices without a thought of its consequences to others. Perhaps. But I think there are at least two other factors that play a very crucial role in our willingness to employ tools without much worry over whether they may oppress others.

**Domination and Manipulation**

The first factor is our relationship with the computer itself. It is well documented that hard-core programmers are driven by the desire to dominate this complex machine (Turkle, 1995; Weizenbaum, 1976). But in truth, there really is no other way to deal with the computer except
through a domination-submission process, and it works both ways. It is impossible to work with a computer without controlling it. At the same time I must submit to its relatively narrow operational parameters if I am to get it to work at all. In this the computer is no different than any machine. But does that justify its use in the classroom? Most of us live in such a machine saturated environment that we simply assume that machines are benign. One person who doesn’t accept that assumption is Wendell Berry (1996) and his observations about the differences between working with machines and living things (in his case tractors vs horses) is radical in the sense that it brings us back to the moral foundations of our relations with other living beings.

It is more difficult to learn to manage an animal than a machine; it takes longer. Two minds and two wills are involved. A relationship between a person and a work animal is analogous to a relationship between two people. Success depends upon the animal’s willingness and upon its health; certain moral imperatives and restraints are therefore pragmatically essential. No such relationship is either necessary or possible with a machine. Within the range of the possible, a machine is directly responsive to human will; it neither starts nor stops because it wants to. A machine has no life, and for this reason it cannot of itself impose any restraint or any moral limit on behavior. (p. 93)

We don’t have to accept Berry’s farming philosophy to acknowledge the truth of his observation regarding the difference between dealing with humans and dealing with machines. In the realm of education this difference, with its moral ramifications, should be enough to give any teacher pause. The argument whether computers are dehumanizing has long been limited to whether they inhibit socialization, something many good computer teachers can justifiably deny. But Berry shows us, I believe, that the concern runs deeper than merely a matter of how much conversation students have while using the computer. The machine doesn’t dehumanize the user so much as it encourages dehumanizing by the user. This characteristic is particularly applicable to the computer, for the computer relates directly to our mental processes and our
relationship with it takes on a much more influential psychological character than with any other machine. And it is heightened by the power of the computer to symbolize just about anything we encounter in the physical world. We can symbolize sound, text, images (and thereby things, animals, people, etc.). And we can manipulate all of it. In fact, that is the great power of computers - its ability to manipulate symbols.

In our schools the vast majority of work students do with computers is symbolic manipulation, moving or setting in motion words, pictures, and other representations. As I have watched young people work with computers over the last fifteen years I have become convinced that what stirs them most, what other teachers call the computer’s “motivational power,” is their ability to demonstrate their control of these powerful machines through manipulating what goes on inside of them.

I’m not at all alone in this belief. Seymour Papert (1993), for one, promotes this view and suggests that it provides a paradigm that can empower students in their relationship with the rest of the world. And this is precisely where the real trouble begins. Young people are in the process of formulating their way of relating to the world. Papert rightfully understands that the way they relate to their learning environment will have a great influence on how they relate to the world in general. So we may ask, What should we expect in the way of relationships with the world from students whose primary learning orientation is manipulation and control? When everything he encounters on the computer is his to use, can we expect the computer immersed student to treat others he engages through computer technology as autonomous individuals and not as things to use as well? Recall our discussion in the previous essay of human networks, in which other human beings are gathered to us as things for use. In a society that is so heavily instrumental as to view humans as things to use, why wouldn’t teachers and students use computers to get what they want from strangers who are encountered only as symbols on a screen at the end of a telecommunications link? All of the symbols a student manipulates on a computer screen are things in the same sense of the word used by Fromm (1976) in the
previous essay and Freire here. They have no life of their own; they have been pried loose from any physical context; they can be used, discarded, distorted without regard for their welfare. This is what really occurs when students take control of their learning by learning to control the computer. They are initiated into a way of acting and thinking that raises domination and manipulation to the highest good. As Papert so joyfully attests, it is a very short step, especially for a young ego-centric student, to extend this instrumental orientation from the symbols to the objects - including people - that they represent.

The Magic of Learning

What I have just described is a quality that is inherent to the computer. It is part of the ideological bias that has been built into the machine. As such, it is not a matter of how one uses the computer - it is a matter that one uses it. There is one other example of an inherently oppressive quality of computer technology that is important to explore here, as inescapable as the previous one.

When I first started teaching with computers I pushed hard to get administrators to recognize their value as a tool, rather than an object of study. My argument went along the lines of most teachers I talk to today: I don't care how it works, I only care that it works to help students learn. Today this attitude strikes me as profoundly anti-educational, and I plead guilty to past crimes against student enlightenment. How can we on the one hand look upon the art of teaching as the gradual revealing of the world to our students while on the other tell them that the tool that they will use to pry open that world is itself immune from their comprehension or even inspection? Assuming that most teachers are not hypocrites (I certainly didn't consider myself to be one), I think what we encounter here is a consequence of the radical severing of our pedagogical means from our educational ends. We have become so caught up with using this tool to open up the world for our students that we no longer recognize that the tool itself is reshaping the world so we and they cannot know it.
The computer is the quintessential black box: Its workings do not reveal themselves to ordinary inspection. In fact, they don’t reveal themselves even to expert inspection. Probably no one can physically trace the activity that takes place in a central processing unit even with the most advanced electronic equipment. “Memory” banks show no changes in state, hard disks, floppies and CD ROMs exhibit no indication of what it is that resides in their binary coded molecular arrangements. Even monitors and printers are so complex that their operating principles lie beyond the comprehension of the millions of children who use them. Even in my Advanced Computer Technology class it only takes about a half hour to examine the innards of a computer. Almost nothing moves, everything is opaque. Electricity flows in invisibly and flows out again, transformed but unobserved. That teachers, whose job it is to make the world comprehensible to their students, would so eagerly hand them devices whose inner workings none of them can comprehend speaks of a willingness to restrict their role as teachers to helping their students accumulate power and control over the ends they can procure through these devices while remaining ignorant of how the means operate behind the scenes. This approach condemns not only the students but their teachers to the kind of “freedom” Roszak (1986) recognized in Papert’s promotion of the use of Logo across the curriculum: “As I read Papert’s words, I found myself haunted by the image of the prisoner who has been granted complete freedom to roam the ‘microworld’ called jail: ‘Stay inside the walls, follow the rules, and you can do whatever you want’” (p. 75).

The current effort to integrate the computer seamlessly throughout the curriculum results in removing the most important, most powerful, most ideologically freighted device in our world today from our students’ frame of concern and learning. Perhaps this is necessary. Certainly much has been made of the geometric explosion of “knowledge” and the ensuing need of computer technology to keep up with emerging developments in every field. Perhaps in a different way access to mountains of information will make our students smarter. But Langdon Winner (1977) offers a different view that seems much more in tune with actual experience.
There is a case to be made that this is also an era of rapidly increasing ignorance. It is true that more and more knowledge is gathered through an ever-expanding array of means. Yet mastery of knowledge appears to be waning in the sense that ever less of what is known can be digested, taught, learned, or utilized by any given individual, group, or organization. If ignorance is measured by the amount of available knowledge that an individual or collective “knower” does not comprehend, one must admit that ignorance, that is, relative ignorance, is growing. (p. 283)

Of nothing are we - teachers, students, administrators - so ignorant as the very technology on which our society, and our education, is more and more based. And as we continue our efforts to make the technology in the classroom “invisible” that ignorance can only deepen. Arthur C. Clarke (1962) once wrote that, "Any sufficiently advanced technology is indistinguishable from magic" (p. 36). Magic confers on its user considerable power, but not comprehension - nor, ultimately, control, as the sorcerer’s apprentice discovered.

For those of us in education, this is a Faustian bargain in almost a literal sense, for the power technology confers on students to gather information is paid for by the increased ignorance of the electronic jail in which they are confined. In one sense this is liberating:

It permits us the time to lead lives which encompass a variety of activities in work, travel, communication, and leisure of a scope totally unmatched in previous history. Potentially, at least, a world of this sort opens these opportunities to all persons. Access is really all that matters. (Winner, 1977, pp 286-287)

This access carries a price, however.

Yes, the available technologies do enable members of the society to do a great many things. But the operators of modern gadgetry are almost totally docile with respect to exercising any determining influence upon the design, implementation, day-to-day operation, or choice of outputs of the systems that surround them. Even their notion of active, vital use is more accurately seen as a passive utilization - a totally accepting,
unquestioning relationship with technologies over which they have no real power. This is, after all, what is involved in the variety of citizenship that defines participation as consumption. (p. 287)

So the price of freedom is... freedom. What is gained is the freedom to have what we want; what is lost is our freedom to be who we want. Jefferson's ideal of "life, liberty and the pursuit of happiness" is transformed into something like "longevity, mobility and the pursuit of commodities." The trick, as mentioned earlier, is to get us to enthusiastically pursue the latter so as not to notice that we are being walled off from the former - to frenetically seek external goods so as to not notice our inner emptiness.

This is what the reliance on high technology in education trains all of us to do, regardless of how many times the Declaration of Independence is downloaded. But it is extremely difficult to recognize this form of oppression because our loss is not a material loss, not a painful starvation of our bodies. It is a loss of our inner selves, a just as painful but hard to recognize starvation of the soul. And it is all the more difficult to recognize because there is apparently no oppressor, no one behind the curtain intentionally using us. And in a sense this is true - it is the technological system itself that dominates and oppresses all of us.

**Technology as Oppressor**

To call attention to "the system" immediately draws fire from those who are determined to convince us that we are in control of our own lives. And, indeed, we are not entirely powerless. Yet, it is not necessary to say that we have no power whatsoever vis-à-vis the technological system to acknowledge that complex technologies make their own demands on the structure of our environment, and hence us, apart from the demands of those who would seem to be in control of it. In fact, to a very great extent the demands made on teachers and students in schools, like those of the populace at large, have nothing to do with willful acts of oppression by people controlling the machinery. They are demands made by the system itself,
which, in return for the bounty it provides, constantly requires human adaptation. Just a couple of examples should serve to illustrate the point I am making.

When new computers began flooding into the 30 elementary schools in my district, it quickly became clear that current security systems were inadequate to safeguard this expensive equipment. Most first floors had large windows that would provide easy access to burglars. A number of solutions were proposed, most of which were further technological fixes, all of which were very expensive. The one non-technological fix, which was widely adopted, was to put the computers on carts and require teachers to lock the computers away at night. Of course, during the day teachers who once felt comfortable leaving the door to their rooms open when they left now had to lock them. This is a simple, almost negligible demand on teacher time and a small erosion of the atmosphere of trust in the classroom. But it is far from the only one.

Once the elementary schools were networked, managing all of the various software packages that teachers used became a nightmare - some older software was even found to bring down a whole building network. It was determined that any subsequent software purchases would have to be network compliant. Computers older than a certain age were declared unsupportable because they couldn't handle the networking software deemed necessary to coordinate all the computer operations. Even though they ran the software teachers wanted to use they had to be retired in favor of newer machines that ran newer software selected from a small pool of compliant merchandise.

These small annoyances, and many others, keep coming at irregular intervals. No one of them is enough to cause anyone to give up the machines, but it recalls Ellul's observations of "technical convergence."

It is these small erosions of autonomy that cause teachers and administrators alike to find meetings with our technology staff invariably frustrating. No matter what the issue to be determined, the ultimate question has to be put to the technicians: "Can we do this?" This has nothing to do with the individual technicians (who for the most part try very hard to bend the
system to the will of the educators). The problem is that the system itself has certain
requirements if it is to work at all and educational endeavors simply have to be adjusted to
those requirements. The only ones who know what those requirements are at any given time
are the technicians. The typical situation Ellul (1964) cites concerning political decision-making
in a technological society applies well to the educational institution as well:

When the expert has effectively performed his task of pointing out the necessary ways
and means, there is generally only one logical and admissible solution. The politician will
then find himself obliged to choose between the technician’s solution, which is the only
reasonable one, and other solutions, which he can indeed try out at his own peril, but
which are not reasonable. (p. 258-259)

What Ellul doesn’t say here (but does elsewhere) is that even the technician is not really the
Wizard behind the curtain. He or she is only reading the dials of the machinery, for the
machinery cannot be negotiated with. Yes, the mettle of the technician is his or her ability to
drain every last ounce of performance out of the machines, but their parameters are fixed and
once established, the humans have no recourse but to adapt to it (or upgrade, which merely
results in a new round of demands and adjustments - and endless training).

In a broader context Winner (1977) summarizes the case for what he calls “autonomous
technology” this way:

One can assume that each of the technologies in question - systems of communication,
energy supply, transportation, industrial production - was originally founded upon some
widely accepted purpose: the accomplishment of a particular goal or the continuous supply
of a product or service. But the means to the end, the system itself, requires its own means:
the resources, freedom, and social power to continue its work...the pursuit of means for
the means - the provision of resources and enabling rules - may eventually lead the society
to make decisions and take action far removed from its original purpose. At times these
decisions can be onerous. They may promote a state of affairs that, although not in itself
desired, constitutes a needed step in the development of a technical network society committed to support. (p. 259)

It strikes me that all of the examples I have cited in this essay fit well within this analysis. But the second example I want to give here seems to me to epitomize this means in pursuit of means within the realm of educational technology development.

When the Iowa state legislature decided to provide special funds for the technology purchases in schools, Des Moines Public Schools breathed a collective sigh of relief. We were falling farther and farther behind the suburbs in infusing high technology into the classroom, and were beginning to feel public pressure to address the issue. With equity a guide, it was decided to start by providing a networked computer for every full-time teacher in the district. It has taken three years to attain that goal. During that time each building was required to get teachers "computer literate." At Central Campus nearly half of the in-service activities during the past two years have focused on computer training and issues of distribution and support. The district staff development department has shifted its emphasis so that now over half of its classes are computer training - most them being fundamental software and system training having nothing to do directly with educational tasks. All of the schools have, of course, developed their own informal network of peer support in which those with more knowledge help those with less keep their machines running.

At one point the technology department asked an outside consulting firm to estimate the total cost of supporting the kind of modest networked environment which was planned. The lowest range of its estimate, based on industry standards and similar school experience, was about $2000 per year per computer, or roughly the cost of each computer in the district each year. This past year the technology budget for the district was $5 million, over twice what it was three years earlier. Yet we have approximately 9000 computers in the district now. There appears to be a huge discrepancy between the estimate and the declared cost. But if we consider the enormous amount of time that has been shifted (no one has even hinted that anyone had
extra time that was filled with this work) by teachers, administrators and training staff into support activities (all of which was included in the consultant's estimate) we can gain some appreciation for how much effort has had to be expended by non-technical staff just to get the machines running.

Yet even this has not been enough. At a recent Central Campus Technology Committee meeting a member of the technology department admitted that there is considerable frustration over under use of the computer equipment that has been purchased. Much of it sits idle because teachers have not been adequately trained to use the sophisticated capabilities the networked computer environment offers and because there is a serious lack of on-going technical support available to help keep the machines running smoothly. Of course, the solution to this problem is even more training and more support staff. None of this is easily accomplished, especially since the district has had to eliminate nearly 250 positions in the past two years due to shortfalls in the general budget (a few of these positions were reinstated as administrators found ways to move money around, but the total probably still hovers around 200). The technology department has been able to add some staff during this time but political pressures have kept them severely understaffed. As frustration at the under use of expensive computer equipment grows, pressure is beginning to mount within the schools themselves to pay the price for this support. Some of the push for this is coming from areas hit by staff layoffs. With staff out and the machines in, beleaguered teachers and staff are seeking ways to use the computers to help out. No one pretends that they can take the place of staff, but the remaining staff must use whatever resources are available to get by. What we witness is a strange sort of permutation of the automation process - special funding from an outside source inserts a machine into a vacuum left by a departing human. The remaining humans are left to figure out how to readjust so as to get something out of the trade.

I was drawn into this process early on, and learned a great deal about how the technical system oppresses in the process. Attendance recording at Central Campus, with all the different
schools served, is a nightmare in the best of circumstances. When I first arrived there I was asked to help develop a database system that would record and track student attendance throughout the year. A new very strict, very complex attendance policy had just been established and the attendance personnel needed help if they were to comply. I programmed a database system for them over the course of the year. Though the software was the most powerful relational database available at the time for a PC, there were dozens of times I had to inform the attendance people that neither this program, nor any other program, could do what they wanted - and the policy was adjusted accordingly. By the time we were finished much of the way the attendance office operated had changed to meet the needs of the software - a small price, it was believed, for that enormous tracking power the program provided.

To my now considerable regrets, the program has been extremely successful - as long as the computers are working. When the server goes down, however, attendance taking simply stops. During one of these occurrences I was out of town and couldn't fix the problem right away. When I returned the attendance officer told me that he had never felt so helpless in his professional life. He observed that, "I realized that that computer doesn't work for me, I work for it." Ellul (1990) describes this condition writ large:

The very idea of a fluid, all-encompassing network rules out humanity's dominant position. Human beings are simply within the network. As one network combines with others, their reality reduces both human subjectivity and human independence. We can only rely on the networks, which even as they increase our power reduce our independence, since without them we can literally no longer do anything. (p. 146)

As time went on I realized that my database created problems, at least in my eyes, not just when it didn't work, but when it did. It created such an efficient tracking system that very few students were able to skip classes, roam the halls, get away for a period, show up late or leave early. We had created a rather effective panopticon system of our own, and eighteen year-olds found their activities even more intensely regulated by the stopwatch than before. Of course,
this was viewed with great pleasure by most staff (one year our attendance rate was over 96%), in part because of the astonishing belief that attendance meant learning, but mostly because it meant that our students were learning how to be responsible citizens - adapting to the necessity of showing up for work on time, staying there, abiding by the punctuality necessary to live in a technologically ordered society. In other words, they were learning to accept their subservience to the system.

Perhaps the most important point of this example is that it was the success of the system that made it most oppressive. And it succeeded not just because it did what was intended but because people valued what it did for them. Having internalized the ideology of the Technology the system seemed to be serving them - until it broke. At one point I considered breaking this one little part of the system permanently, at which point Postman's (1993) assertion that new media make war on old media took on a personal meaning - I realized that this technical creation of mine had by then restructured the work environment of many people, and to bring it down would be deemed an act of social terrorism.

**Responsibility Without Being Responsible**

When Joseph Weizenbaum issued his warning he was concerned about the ideology growing around technology, the extension of the instrumental, mechanical way of thinking into every facet of life. He understood that under its sway the power of inexorable calculated reason would reduce human agency to nil.

Technological inevitability can thus be seen to be a mere element of a much larger syndrome. Science promised man power. But, as so often happens when people are seduced by promises of power, the price exacted in advance and all along the path, and the price actually paid, is servitude and impotence. (p. 259)
This is not to say that people would not continue to make decisions. It's just that the decisions would more and more be decisions they had to make because of the calculations and preconditions already determined for them.

Instrumental reason can make decisions, but there is all the difference between deciding and choosing...

...The difference between a mechanical act and an authentically human one is that the latter terminates at a node whose decisive parameter is not “Because you told me to,” but “Because I chose to.” At that point calculations and explanations are displaced by truth. (p. 259-260)

As the Information Age and its attendant complex information technology overtake the educational process, we, like the rest of our society, are finding that it is the machinery that more and more “told me to.” And as this system restructures our organizations according to its own ideology we are coming more and more to teach our children that decisions are made according to data from a spreadsheet, models from a simulation, necessities of logic and a careful calculation of benefits. The machinery tells them what has worked and what will work and they must conform to its organizational demands. Ellul (1964) predicted that in the age of the computer, “Education will no longer be an unpredictable and exciting adventure in human enlightenment, but an exercise in conformity and an apprenticeship to whatever gadgetry is useful in a technical world” (p. 349). That day is close at hand. We rarely expect or even ask our students to use judgment based on a transcendent good, or endure suffering for a noble cause, or make a moral choice in an ambiguous situation. Whatever we do we never encourage them to stand against an unassailable “truth” expressed in quantified data and declare for what Freire called “an untested feasibility.”

No, rather than teach our students to choose who they will be according to the inherent value they find in their lives (which is what grants them their nobility) we teach our students to problem solve; to reduce issues to unambiguous statements to which formal techniques can
then be applied, and which the student can follow to its successful (however ignoble) conclusion and thereby declare herself a success.

Like both Fromm and Marcuse, Weizenbaum believes that the source of liberation from Technology's grip lies not with external actions but rather in transforming our "being."

That so many people so often ask what they must do is a sign that the order of being and doing has become inverted. Those who know who and what they are do not need to ask what they should do. And those who must ask will not be able to stop asking until they begin to look inside themselves. (p. 273)

Weizenbaum was speaking primarily to his own generation of adults who he hoped could rediscover an inner strength that a commitment to computer intensifying faith in technology had suppressed. Would he have the same hope today for young people who have been immersed from an early age in this same environment? How can people look inside themselves when they have for all of their lives been encouraged to look outside themselves for learning, for comfort, for social "adjustment," for success, for self-worth? How can a young man rebuild his inner strength when for his entire life he has been provided with external tools on which to rely in engaging the world rather than being required to develop the self-discipline, courage, trust, determination, endurance and faith that he needs to find when he finally looks inside?

If somehow he does find those qualities of being, his contribution to liberation, according to Weizenbaum, then depends on employing those qualities to accept "the principle that the range of one's responsibilities must be commensurate with the range of one's actions" (p. 261). Again we must ask how a young person who may have never journeyed far beyond his home community can exhibit any appropriate level of responsibility for actions which involve others living in communities on the other side of the world? How can a youngster who has lived within the confines of American technological ideology comprehend, much less feel responsible for, the impact on indigenous cultures of her virtual tourism?
Perhaps most decisively, how can children initiated into the oppressive inevitability of the technological system come to feel responsible for their own destiny, much less the disembodied people they meet on the ‘net, the workers who make their toys and clothes, the corporations they know only by the quantitative value of the stock they will someday own, the pork, chicken and beef whose condition of production they never see nor impact on the environment they ever experience, the death and dismemberment they never witness caused by bombs and missiles they launch at targets they never come near? All of these are conditions of contemporary life in our society enabled by a high technology that is rapidly wrapping itself around the globe.

Of course, the answer to the question posed is that there is little hope that children can respond responsibly to such a state of affairs. Nor can their teachers even if we limit our concern to global communication. The level of responsibility “commensurate with the range of one’s actions” far exceeds the level of responsibility one can possibly assume. Responsibility itself becomes a problematic concept in a wired world. Winner (1977) traces several notorious examples of denial of responsibility based on the argument of being mere cogs in the wheels of a technological system over which they had no control - the inability of the Kaiser to halt the mobilization that set off World War I; the defense at Adolf Eichmann’s war crimes trial that he was a mere railroad technician, updated during the My Lai massacre trial of William Calley.

His defense argued that he could not have been responsible for the killings at the village since he was a mere cipher in the U.S. Army’s vast mechanism. He was, in effect, too close to the deed to be at fault. Calley, it was suggested, was being used as a scapegoat for those higher up in authority. But as one looked upward, one found that the argument was one of diminished responsibility at that level as well. Those in positions of near or distant command did not know (or said they did not know) what was happening. Since they could not control everything that occurred out in the field, it followed that they could not reasonably be held to blame for the events that took place. (p. 302)
Just as with the oppressed of the Freire's third world, in no way do I want to suggest that the oppression that I am arguing for in education is anything close to the magnitude of this example. I cite Winner's example only to get at his perfectly applicable observations concerning the denial of responsibility that characterizes oppression by the technological system:

The logic here, described in full, is a wonder to behold. Both proximity and distance count as excuses. The closer you are, the more innocent; the farther you are, the more innocent. It is a magnificent arrangement in which everyone is safe except the victims. In a system of this kind the very notion of a "deed" seems to evaporate. Difficulties in tracing origins - trivial in the case of one's bank statement - take on monumental proportions when the issue, as with Eichmann and Calley, becomes genocide. (p. 302)

Somewhere between the bank statement and genocide lies educational technology. In schools, as elsewhere, responsibility gets lost in the mechanism. It is a crucial loss precisely because of the centrality of responsibility to learning. No one can learn for someone else. But perhaps more importantly, no one can develop the qualities necessary to overcome the oppressive control of Technology without a deep sense of responsibility for one's life. Winner states, "One primary value of any system of responsibility is that it provides an element of restraint. Excesses which might conceivably occur are limited at their source, the consciousness and acts of individuals" (p. 303). Weizenbaum contends that, "Ethics, at bottom, deals with nothing so much as renunciation" (p. 264). Restraint, ethics, morality all depend on some sense of personal responsibility. In a society so complex in its technological demands that responsibility seems to have no place either close to or far from actual events, those critical elements of human interaction fall out of the picture. And they will no longer matter in the education of our children, as we set them on the grueling life-long march of learning of skills that will serve our (not their) technological society in the twenty-first century.
Perhaps the greatest irony of our age is that just as the drive to liberate our physical dependency on nature’s vicissitudes has finally succeeded in making it possible to at last meet all of humanity’s fundamental survival needs, we find our minds enslaved by that very success. It need not be that way. The new millennium need not be “an apprenticeship to whatever gadgetry is useful in a technical world.” If we are wise and courageous and disciplined and responsible the 21st century could be marked by the liberation of our minds from the technological imperative that has progressively come to limit and oppress it over the last 400 years. How that wisdom, courage, discipline and sense of responsibility can be fostered through an educational system selling itself into technological servitude is difficult to imagine. We can only hope and work to encourage our young students and ourselves to be open to an untested feasibility that awaits their discovery.
PREPARING YOUTH FOR A TECHNOLOGICAL WORLD

That so many people so often ask what they must do is a sign that the order of being and doing has become inverted. Those who know who and what they are do not need to ask what they should do. And those who must ask will not be able to stop asking until they begin to look inside themselves. (Weizenbaum, 1976, p. 273)

Sometimes rhetoric stretches reality so far that the whole fabric of an issue tears apart and one sees far more clearly than ever before. This is what happened to me a decade ago, my first year teaching for Des Moines Public Schools. Returning from a year teaching in Germany I was glad to latch onto any position, even if it was in a tough inner city middle school, even if I got the toughest of the tough students who attended that school. According to a fellow teacher I was the recipient of an administrative ploy to drive my predecessor out of the school by loading her schedule with all of the students who were behavior and/or learning problems. It had worked. And I had inherited a real challenge. One entire 7th grade class was filled with troubled kids from troubled homes who had little or no ability to control their behavior and less ability to concentrate on learning math. Most of these kids, in all of the classes, still had a glimmer of childhood sweetness. But all too often it would dissolve in a rage at another student or me or something I wasn’t privy to on the least provocation. Or there would be tears or distraction or sleeping for reasons equally beyond my reach.

Not much math was learned that year, I’m afraid. Grades didn’t motivate. Neither yelling nor praise nor joking brought order. Suspension just passed the baton to the next student. The problem, of course, was that the students didn’t want to behave the way they did - they couldn’t help themselves.

It was after a particularly tough couple of weeks, when one of the students I had tried hardest to hold onto had been arrested, that I attended an Iowa State Computer Users in
Education conference. I still had this boy on my mind as the keynote speaker jumped on stage, practically vibrating with energy. The first words out of his mouth were: “I hold in my hand a device that will revolutionize education.” What he held was a CD-ROM. I’m normally not very demonstrative, but I couldn’t help myself - I laughed out loud.

It wasn’t loud enough to disrupt the speaker’s performance, which I soon realized had more than one prop. In fact, his entire speech was a series of demonstrations of various high tech paraphernalia, all of which was conveniently displayed (including manufacturer and suggested retail price) in a glossy brochure that came in the conference packet. As I looked back and forth between the catalog and the stage it dawned on me that this PhD from a California think tank was nothing but an intellectual shill - a traveling patent(ed) medicine show for ailing schools.

Two hours later he was heading out of town, no doubt with a bucket full of money (and more to follow). For this he left us the elixir of the promise of technology, a promise that many in that audience drank in great gulps. He was the consummate con artist - his marks never realized they had been taken.

I probably would have been taken too if it hadn’t been for that child sitting in juvenile detention, and all the other seriously unhappy, dysfunctional children I worked with every day. I had taught young people with and about computers for the previous five years. I had earned a masters degree in Computer Applications in Education. Yet, or maybe because of that, I could not see how CD-ROMs, or any other high tech merchandise could help these kids. Love, self-discipline, compassion, trust, respect, a sense of morality - none of these qualities that were so obvious in their absence in these children lent themselves to technical remedies. They were symptoms of a disease of the soul, which was in the process of really revolutionizing education, not coincidentally, at the very time technology was being heralded as the revolutionary new prime mover in our society.
As I write this introductory story it strikes me that perhaps the central theme of this dissertation is just what I have described in the previous paragraph - the sickness of the human soul that has accompanied the advance of Technology in our society and in the world. If so, then this essay may be seen as an attempt to prescribe some ways to help restore a measure of health to that soul. It is a view with which I am not altogether comfortable, for reasons that will become clear shortly. But it gives us a metaphor with which to start working. And I will press that metaphor a bit further here.

The previous two essays were, in a sense, an attempt to describe two of the symptoms of this soul disease. Thus, it is unlikely that simply working against commoditization and oppression will result in real healing. The root cause will remain untouched. So we really have to return to the Introduction, to the causes of the disease, if we are to make headway in returning to health.

No one I have read has summarized the condition we face so well as Stephen Talbott. Recall from the introduction his observation, “What I really fear is the hidden and increasingly powerful machine within us, of which the machines we create are an expression” (p. 36). It is this mechanical, instrumental aspect of us, which has proven so beneficial in so many ways, that has escaped its bounds and is now eating away at our souls. As I have tried to make clear, the computer and all of its attendant technologies are not so much the problem as they are both symbol and embodiment of it. Love, self-discipline, compassion, trust, respect, a sense of morality - none of these or many other human qualities is relevant to this or any other machine, or to machine-like thinking. The more we engage life through this way of thought and through the machines that encourage it, the more those other human qualities will recede from our attention and atrophy. As Weizenbaum points out, the less we are connected with our own being the more frantically we search for something to do that takes us outside of ourselves to make up for it. And in concentrating on these external remedies we further distance ourselves from our being, perpetuating the cycle.
A healthy education under these circumstances becomes a matter of compensation, a conscious effort to get out of that cycle by strengthening those qualities of being that are suppressed by the dominance of the mechanical worldview. The idea of education as compensation is not an original observation. Neil Postman and Charles Weingartner (1969), in their eminently sensible book, *Teaching as a Subversive Activity*, suggested that all education be compensatory, given that society tends toward imbalance in one way or another. In many ways they were merely echoing Dewey’s call for education to prepare young people to improve society, not just fit into its current pattern.

This essay attempts to follow that tradition. I want to present some positive ideas on ways to create a more life-affirming educational environment, ideas that provide some hope for healing the angry wounds opened by the commoditization and oppression I’ve criticized earlier. But offering positive alternatives to the technological imperative is a surprisingly difficult task. It seems that the technological ideology has so thoroughly crushed other ways of engaging the world that there are no longer any powerful words available to speak in other terms. I have used the word “soul” here, fully aware that it has been excommunicated from secular education for decades. It, like dozens of other terms that refer to nonmaterial aspects of human existence, has been driven out of the conversation - existence denied or, at best, imprisoned in an increasingly irrelevant religious realm. In the other essays I have tried to get by with more innocuous terms such as “inner resources” or “inner strength,” but there is an inherent problem with carrying through in this way: it leaves us disconnected from the historical recognition of and references to that which technology denies us today. Plato spoke of the soul; Rousseau spoke of the soul; even Dewey spoke of the soul. None of them used the term in what would have been regarded as a specifically religious manner. Certainly, none of them understood it in exactly the same way. But they did understand it to be an integral part of human life, and a key element in its education. Once we step outside the technological worldview we are free to reconnect to that fullness of life that these and other philosophers have described and relied on.
I choose to do this because I believe it more accurately and fully portrays human existence. And, of course, one cannot stand outside everything. If I have succeeded at anything in these essays I hope it is to destroy the illusion perpetrated by Technology that one can do just that.

So I will be using here terminology that may be disconcerting to some - 'transcendence,' 'nobility,' 'dignity,' 'spirit' - old-fashioned words that have no anatomical existence. But I do not wish the reader to immediately decide that I am therefore proposing a return to the "good old days." I want to connect with the past, not return to it. In any case, I have no illusions that we could do so. What I am hoping to contribute to is popping us out of the other side of the philosophical eddy in which we are currently trapped. And to do that we must expand our language beyond that to which our technological ideology has constrained us.

We must also watch out for other traps the ideology lays for us. It is tempting to advance an alternative "form" of education, a system that can be implemented to overcome the deficiencies of the current system. This is precisely what Ellul warns against. In The Technological Society (1964) he cites Progressive Education as an example of a humanistic alternative to the mechanical factory model. The Progressive model uses much more child-centered methods that have many beneficial qualities, according to Ellul, but "This educational procedure is, however, a highly refined technique, detailed and rigorous; and it makes the most exacting demands on the technician himself, who must indeed be a remarkable pedagogue to be able to apply it" (p. 345). The system employs indirect methods, more subtle techniques that nonetheless manipulate and direct the students’ activities and thoughts as objects, and in so doing ultimately advances rather than impedes the technological cause.

What Ellul is trying to get us to see is that anytime we employ standard methodology to education we initiate the conditions I have been criticizing. Each such move abstracts and objectifies the individual in a way that draws the oppressive noose a little tighter. It also tends to define our teaching role according to the relatively shallower basis of what we do with our students rather than the deeper foundation of who we are. Thus, to talk about real reform it
seems necessary to steer clear of formulas and systems altogether. But we can, I think, discuss approaches, attitudes and relationships. To the extent that we keep the focus in these realms we may elude the technological trap.

Still, it seems to me that the technological worldview is so dominant today that if we are to present any concrete, practical proposals that can address the situation as we find it, we have to risk working within its parameters. We can’t simply separate ourselves from the current environment and start over. So in this essay I will proceed, with full awareness of the box within which I am at times working, to also make some suggestions that are systemic, with hopes that at least they can widen that box a little, or perhaps open windows through which we can glimpse those alternatives we cannot now reach directly.

Read That Mission Statement Carefully

I’ve often wondered why schools have mission statements. They are almost always so vague, so trite, so commonsensical, so meaningless, that no one pays any attention to them except the administrators who spent so much time developing them. Consider, for example, the mission statement of the Des Moines Public Schools:

The Des Moines Independent Community School District will provide a quality educational program to a diverse community of students where all are expected to learn.

I think the reason schools need mission statements is because they don’t really have a mission. And they don’t have a mission because we live in a time and place in which ends have been overwhelmed by means. There are no ultimate ends anymore that guide our lives or our institutions, no set of transcendent goods to which all means must answer and aim. So schools, struggling to figure out what they need to be doing, spend enormous amounts of time and energy devising pathetic paragraphs that supposedly provide a vision they can follow.

This situation is at least partly the result of schools operating according to the ideology of Technology. Technology, however, is actually an anti-ideology, a belief system that denies the
existence of ultimate ends. All tools are means and Technology is all about means, not ends. In Technology there are no ultimate ends, only transitory goals which in themselves serve as further means (which is one reason why we live in a time of constant “progress”). In scorning this elevation of what he calls the “Promethean enterprise” to the level of ends themselves, Hans Jonas (1984) writes, “This would be, then, since there is no limit to it, a ‘utopia’ of permanent self-surpassing toward an infinite goal” (p. 168). It seems to me that this orientation, whether toward education or toward the world as a whole, in which “our potential is unlimited,” in which the goals constantly recede before us, leads us away from the two questions that are most crucial in today’s limitless culture: what is it that is worth learning and why? These are the questions that a school’s mission statement ought to address, not merely whether we believe that all students can learn. What can and should they learn? Why do we believe that they should learn it?

These questions, and the why questions that follow from them, ultimately lead us to a decision as to what is good in and of itself. And it is finally here that we emerge from the instrumentalism of the Technological ideology. It is only when we discover something worth striving for because it is valued solely for itself, not for its usefulness to gain something else, that we have arrived at a transcendent purpose. And only when we arrive there have we established an end to which all means must answer and aim. Only then do we have the guidance to choose means that are so bound to those ends that education can push beyond mere skill building to the level of moral and ethical commitment that can guide a young person’s life. And it is at precisely that point that education infuses profound meaning and direction into the explorations undertaken by a teacher and his or her students.

So what is good in and of itself? There seem to be lots of candidates. Thomas Jefferson handed us a few explicit ones when he declared “that all men are created equal; that they are endowed by their creator with certain inalienable rights; that among these are life, liberty, and the pursuit of happiness” and that these particular truths are “self-evident.” It is that “self-
evident” that distinguished those truths as goods in and of themselves in Jefferson’s mind. They need no justification, no usefulness beyond their attainment. There are other concepts I could list - love, courage, justice, education itself - that could be viewed in the same way. Postman devotes his book, *The End of Education* (1995), to exploring the various “narratives” which bundle groups of these self-evident goods together in ways that could give deep meaning to an educational system that aspired to them. Postman believes that, “Without a narrative, life has no meaning. Without meaning, learning has no purpose. Without a purpose, schools are houses of detention, not attention” (p. 7). It seems to me that in these three sentences Postman has tied together the meaninglessness of commoditized culture with the oppression of contemporary schooling and suggests that the first step toward overcoming both is the development of a narrative (or, as he suggests, narratives) which give meaning to our lives. Though Freire (1996) doesn’t say it explicitly, I am convinced that he would agree that only when such a narrative is widely shared can we hope to have the strength to act on our “untested hypotheses” or, as Talbott (1995) says, “when it comes time to break the machine and declare for the unjustifiable” (p. 40).

It is the ability it gives us to step outside the machinery’s inexorable rationality to consider alternatives to that machinery, that makes a transcendent purpose so important in a technological society and especially in the process of learning. Without it we simply find ourselves trapped inside the social and technical machinery, with our decision-making ability confined to choosing among the options available within the mechanical system itself.\(^\text{12}\)

There is probably no question asked as frequently by decision-makers in schools as “What do our students need to be successful in the world they will face?” This question totally ignores

\[^{12}\text{I fully recognize that I am here providing a use-based justification for having a transcendent purpose and, in a sense, denying it the very transcendent quality I am arguing for. Perhaps I am caught in a paradox here, similar to that of the anti-ideology of Technology (perhaps one stipulates the other). On the other hand, it seems to me that even transcendent ends can serve us, without being defined by its usefulness. In fact, it is through this recognition that something is not just useful that we are able to climb out of the ditch in which instrumentalism traps us. Here again, a transcendent purpose serves to help us.}\]
even the possibility of educational ends that are good in and of themselves. It assumes that providing students with ever improved means is good enough. That it isn’t is testified to by millions of technologically well-endowed students every day. In my computer class there is no high-tech need left unfulfilled, yet many students still come to class bored and remain bored with learning. I used to take this personally and professionally until I realized that these students aren’t bored with me or bad pedagogy, they are bored with life - see no purpose in it, and school is doing nothing to help them overcome it, because we are only dedicated to helping them prepare for jobs or college, another step on an instrumental ladder they are already tired of climbing. Bereft of purposefulness, the only thing that makes learning palatable is if it is accompanied by ever-increasing levels of excitement. In order to keep them engaged classes have to be conducted with all the multimedia sensationalism of the nightly news (which is itself responding to the same chronic condition in its adult viewers). In our desperation to motivate our students we are seduced into thinking that excitement is an adequate substitute for purposefulness. We mistake stimulating the adrenal gland for nurturing the soul.

How different would education be if our schools, from elementary through the university, stopped concentrating so heavily on grooming youth for success, but began seriously asking, “Success at what? What is worth succeeding at?” What would happen if we stopped just teaching skills we think our youth will need, and started asking what skills are worth developing? What if we paid less attention to helping students become good problem solvers, and more attention to helping them determine what problems are worth solving? How much different would education be if our institutions decided to be guided by something like “The world is full of suffering and education should lead to a reduction in that suffering.” Or “The world is full of injustice and education should, as Plato claimed, lead to the just individual and State.” Or “The world is a delicate organism and education should cultivate people who will sustain and nurture it.” I am not suggesting that every school adopt one of these. There is room for great diversity, but the one common element I think must be present in each is that it calls
for us to become better people. Weizenbaum (1976) proposed that “The university should hold before each of its citizens, and before the world at large as well, a vision of what it is possible for a man or a woman to become” (p. 278). We must return to the idea that it is the perfection of people that is the ultimate task of education, not the perfection of our use of machines. Resignation to the belief that we almost certainly cannot succeed at the former has furthered our attempt to accomplish the latter. But it is now clear to me that our success at perfecting the mechanical world could be even more disastrous than our continued floundering toward improving our inner and social selves. Overwhelmed by the sheer wealth of means, we have no firm footing on which to pass judgment on the flood of information, products, opportunities and demands that wash over us. As my telecomputing partner R.W. Burniske once wrote to me, “When you are up to your neck in a river of information, the last thing you need to know is the temperature of the water. What you need is a rock to stand on.”

Yes, I know. For any public school to choose one rock is almost unthinkable. Almost. It would take enormous courage by school leaders, intense political negotiation within the community and probably some very serious restructuring of the school system itself - all of which I would take as merely healthy indications of a real revolution getting under way. Could it all start with a mission statement?

Establish a Community of Inquiry Rather than Empowered Individuals

Probably not. But it might start with classroom teachers who teach out of such a purpose. And such teachers would have - do have, for there are many who already try to teach this way - a very different orientation toward education. Learning in this kind of classroom grows out of the context of the teacher’s professional and private experience and sense of who they are. When Palmer (1998) states that “Good teaching cannot be reduced to technique; good teaching comes from the identity and integrity of the teacher” (p. 10), he seems to be arguing just this approach to learning. In a classroom in which technology is truly subservient to human welfare
it is the teacher, not the resources, who leads her students in the direction, at the pace and through the form, that they find appropriate for their situation. The teacher's leadership and methodology are based on her honest sense of herself, her relationship with her students and the subject they are investigating, not techniques imposed from outside the classroom, whether it be a curriculum supervisor or a computer programmer.

Could computer technology still play a role in this kind of learning environment? Certainly. It seems to me, however, that it would inevitably be a very modest role. I hope I have convinced the reader that the character of the computer precludes its concentrated use as a vehicle for pursuing the perfection of either the individual or communal person. It tends to structure the learning environment in such a way as to draw the user out of himself and into, at best, superficial relationships with others. It is, then, a tool that must be used with great circumspection within the kind of learning environment that seeks the highest development of the child's inner resources.

Of course, it is not nearly enough to simply subtract the computer in order to establish such an environment. It must be positively cultivated. I suspect there are many ways to achieve this task. I will suggest one here, not as a model to follow (turning it into yet another technique) but as my own personal orientation. What is important for this discussion is not that everyone follow this approach but rather that the reader come to an understanding of the attitudes and intentions that guide it.

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13 When I first started my doctoral program I spent an entire summer reading studies on the effectiveness of computers in learning. What struck me most about the comparison studies I found was that they almost always compared learning with computers to "traditional" methods of instruction, which inevitably turned out to be lecture-seat work-paper testing. And when I began raising doubts about the use of computers for learning, the typical response was along the lines of, "You would rather have them sit in straight rows and listen to the teacher drone on all day?" I have never been able to determine whether these researchers and advocates are merely lacking imagination, don't know that teachers all over the country can, and are, doing lots of innovative teaching without computers, or just find it most compelling for their argument to set up this strawman. In any case, it is the unfortunate lot of computer doubters that we are often tagged with the label reactionary traditionalists because we don't want the revolution to go the way technology advocates want it to go.
The orientation I use is "community of inquiry." It is not at all a new invention and I would be surprised if the reader weren't familiar with it. Teachers have worked out of the approach for decades.\textsuperscript{14} It is, ironically, the phrase R.W. Burniske and I used to describe the kind of environment we hoped to establish in our global telecomputing project Utopian Visions.\textsuperscript{15} I employ it here because it strikes me as providing a wide and fertile field of learning in contrast to the arid plots of educational computing. The two operative words - "community" and "inquiry" - are each valuable in their own right and worth investigating separately.

**Community**

Having grown up in a close-knit extended family in a small rural community, I have a deep appreciation for the benefits that real community provides. The intuitive learning that takes place through acceptance, close association, communication and reliance on others is particularly important to young children, who are in the beginning stages of socialization. The willingness to take risks, the qualities of courage and determination, and the sense of responsibility for the welfare of others all are encouraged by a strong, supportive community. These qualities are precisely what is not encouraged through the reliance on Technology for learning. As we have seen in the previous essays, Technology tends to draw our attention away the development of these inner resources. Perhaps that is why so many computer success stories are, in reality, stories of failed community building.

One of the saddest stories I hear about the use of the Internet - and I hear versions of it regularly - is the story of the shy girl (it's almost always a girl) who is drawn out of her shell

\[\textsuperscript{14}\text{ Actually, they have been doing it for millenia - at least as far back as Socrates. Like nearly all "new" educational innovations, community of inquiry has very old roots.}\]

\[\textsuperscript{15}\text{ Each of us has been able to create such environments consistently in our own classrooms throughout our teaching careers, so it seemed natural to try to extend it to our "global classroom." In the six years of continual operation Utopian Visions has yet to even approach the kind of community of inquiry we hoped it would. Perhaps we simply don’t know how to translate our local environment into an on-line environment. If so, we are not alone. Our investigations of other projects in search of clues to aid our efforts have turned up none that we feel have succeeded in what we set out to do.}\]
by the anonymous environment of telecomputing. In this less threatening environment she is liberated to express what she could not share face-to-face in the classroom. What I think makes these stories so sad is that I have never heard anyone involved indicate a recognition that shyness is a social problem that might have been resolved rather than escaped by creating within the class a community for the child that helped her feel safe to express herself there. The safety a child feels in expressing herself on the ‘Net is derived from her ability to hide behind her electronic shield. The safety a child feels in a real classroom community is derived from her recognition that she doesn’t have to hide anymore. The former may empower her to express her ideas but it oppresses her humanity. The latter starts by liberating her humanity and if pursued long and well may liberate her ideas as well.

The stories of children liberated by the ‘Net are, to me, classic examples of our willingness to substitute quick external fixes for the slow, difficult establishment of a secure community that helps children develop the inner strength needed to be part of it. The liberation of the child through telecomputing does not constitute a transformation, merely an escape from one form of oppression to a less obvious one. In the process the social conditions that contributed to her shyness are left intact. Like the doctors of my luncheon companion who is trying to kick Ritalin, teachers of these children are content to locate the problem exclusively in the child rather than in the relationship of the child to a particular social milieu. They thus ignore the capacity of the community itself to help the child and, in turn, the capacity of the child, through her struggle, to help transform the community. In the long run, this neglect itself increases the oppression, for in finding an outlet via the Internet, the child turns further away from the one group with which she most needs to connect, and which needs her in order to mature.

There is no rule that says a teacher must accept the group dynamics that enter the room at the beginning of the year. Many teachers view this dynamic solely as something to get under control (and thus, instinctively are attracted to the computer which is, as we have seen, above all an instrument of control). A sense of community does not enter into the classroom any more
fully formed than a state of control. It has to be carefully and continuously nurtured. Mara Sapon-Shevon (1995) observes that “Community building is not what you do if you have time, or only for the first 2 days of class. Building a solid, safe community must be a priority and an ongoing commitment” (p. 102).

The idea of commitment is central to developing a strong community in a classroom. Richard Prawat (1996) observes that, “If our intent is to build social and intellectual connections between people, commitment may be a more relevant construct than control” (p. 100). I have been arguing throughout these essays that deep social and intellectual connections are precisely what are sacrificed through the use of educational computing. Rather than build our classroom structures around computers we would be far more likely to see a strong community develop if we built it around commitment. Commitment not only helps establish strong connections between people and ideas, Prawat contends that, “Commitment strengthens action by transforming effort into value and meaning, a process that generally takes place outside of awareness” (p. 100). “Value” and “meaning,” two concepts that lie outside Technology’s frame of reference, find a home in commitment and become once again an integral, ideological assumption within the learning community.

If all of this seems fanciful or utopian, it may be because we have suffered under the yoke of Cubberley’s vision of students as products of a manufacturing system for nearly a century. Technology-centered reformers seem to believe that getting rid of the factory model of schooling is revolutionary, but it is really a very conservative shift that leaves the fundamental production-consumer model untouched. Replacing the entire manufacturing model with a community that grows organically within each classroom will not provide us with a new utopian system. I have no illusions about that, nor do I see it as a goal. These classrooms will have all of the problems that go with human society - and there are plenty of those. A community approach will likely cause the teacher to spend less time on content, at least early on, with no assurance that the group will come together for their mutual benefit. A
Technology-centered approach, on the other hand, effectively puts blinders on students by shielding them from many of these distracting concerns. Frank Withrow (1997), head of NASA's education section, has promoted the use of Internet-based learning by noting, "Netcourses wipe out divergent conditions. I don't know age, gender, race, disabling conditions of my fellow students." He is, of course, absolutely right. Technology does tend to "wipe out" many human characteristics, which allows students to focus on content. But in doing so it inhibits rather than encourages the growth of a classroom community "in which students are comfortable showing themselves, being themselves, and being honest about who and what they are" (Sapon-Shevon, 1995, p. 104).

Here I think we see revealed the critical difference between a technologically oriented and a community oriented approach to education. Technology focuses on content - on giving the individual the power to accumulate the information needed to succeed within an atomistic environment already determined for him. A healthy community assumes that its members can determine the conditions under which they learn, and focuses its attention not on empowering its members but supporting them in the process of finding the meaning of the content of their studies in the context of their shared experiences.

There are times, especially in adult learning, when the technological approach is justified, and, in fact, offers great benefits. When very specific, work-related training is desired, the technological approach provides an efficient means of attaining that training. But in the more general education of the K-12 school, where learning how to live is precursor to learning how to make a living, a community is critical to personal and social growth. Today especially as we all struggle against the swift current of high mobility, fractured families and constant cultural change, the need for a community of place and kindred souls is critical to, first of all, finding that rock to stand on and, secondly, giving us the strength to reach back out into that current without being swept away.
Inquiry

Given the wide open terrain of educational computing, we might expect to see the word “inquiry” applied quite frequently. Yet I have rarely encountered it in the literature. Perhaps I just haven’t paid close enough attention (I’ve certainly read enough of the literature). Perhaps it is just a word that is not fashionable in educational computing circles. If the latter is true, I think there is good reason for it. “Inquiry” is one of those words that may belong on the list of terms that Birkerts (1994) claims we don’t traffic in anymore because we are losing the “paradigm of depth.” Inquiry is a process that leads us deeply into a topic, that implies a focus to our questioning. Somehow it just doesn’t seem to provide the right connotation to the search-engine based research done with computer systems, especially those that use the Internet. “Exploration” is the term more often applied by educators to this kind of activity, though certainly the term “surfing” has survived because it catches the spirit even more closely. Whereas inquiry demands depth, a sort of settling into a topic, exploration invites breadth, a wandering across the face of it. Inquiry implies asking questions that attempt to get at the roots of a situation. Exploration is not so much concerned with questioning as with accumulating experiences, covering the terrain. In Fromm’s (1976) interpretation of the language, exploration seeks knowledge while inquiry seeks to know.

Inquiry issues from within, its success dependent on our ability to tap our own curiosity to generate questions that progressively reveal the truth of what we study. Perhaps no one embodies the inquiry method of learning so clearly (if not expertly) as the small child who incessantly asks “why?” The child’s insistent curiosity compels her to pursue understanding to the bottom of things if only those around her will have the patience and imagination to respond with answers she can comprehend.16

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16 I have never heard a child pursue this same course of questioning using the word “how,” yet once in school this is precisely the course of learning toward which we direct her attention.
If the inquiry method did nothing other than preserve the questioning nature of the child its use in schools would be justified. But perhaps more importantly, inquiry requires a willingness to engage others, whether those others are people, literature, the environment, institutions, etc. By its demand that we “look into,” inquiry leads us deeper into knowing, not only the subject of inquiry, but the others we engage along the way. This occurs by way of what Matthew Lipman (1988) calls the self-correcting process inherent in inquiry, that not only corrects for errors but also corrects for partiality.

To correct for partiality of what is gained by observing from a single perspective, we must take into account what is to be observed from other perspectives, and still others...Thus, inquiry is necessarily perspectival, social, and communal. When a class moves to become a community of inquiry, it accepts the discipline of logic and scientific method; it practices listening to one another’s ideas, respecting one another’s points of view, and yet demanding that claims be warranted by evidence and reason. (p. 148)

Lipman seems to conflate logic with reason, but his main point, that inquiry is a social endeavor that deepens the relatedness of the child and learning, is valid. Inquiry well employed refuses the kind of commoditization of knowledge that comes with viewing learning as the consumption of packets of information. It refuses to be satisfied by the surface appearance of things, demanding that connections be found and pursued and alternative routes and viewpoints be considered as well. It accepts as a starting point the rich ambiguity that exists in human society and seeks to clarify through an open-minded questioning rather than satisfy through the gathering, manipulation and production of information.

For the teacher, inquiry as an approach to teaching implies an openness and reverence for what the students’ own histories and dispositions bring to the learning process. It is inherently student-centered, though requires for its effectiveness a fully engaged and inquiring leader. This is not the “guide on the side” so hyped by educational technologist, but the head of the family - or, to borrow from an old pop record hit, “the leader of the pack.”
Connecting Community and Inquiry

What most attracts me to communities of inquiry as an antidote to the atomistic, fragmented, intensely dehumanized environment of Technology-based learning is its facility to help students develop a sense of connectedness - between themselves and the subject matter, between themselves and the teacher and even between the teacher and subject matter as the teacher too looks into the subject anew each time around. In developing those connections which allow them to plumb ever deeper levels of knowing, students, I think, also discover the magical quality of a learning community - the sense that their deepest insights are communal insights, that exist only within the community as a whole and not within the individuals themselves. Thus, they come to recognize the ideal of a society, and perhaps even begin to recognize and accept the tension that in a healthy society leads to an accommodation between individual desires and social demands.

For me as a teacher, a community of inquiry lowers many of the barriers between myself and my students, so that we can get beyond power issues and get on with the task of learning. This is a critical matter, for Technology is all about power relationships. In the Technology-based classroom power is supposedly shifted from the teacher to the students and learning becomes "student-centered." This, of course, is an illusion, as the real power shifts out of the classroom altogether, into the hands of programmers and technical staff, those invisible pedagogues who establish the parameters of computerized learning totally outside the context of the students' lives. But that isn't really the issue here. Power itself is the issue. Power corrupts the classroom no matter who is invested with it. That Technology brings this particular baggage with it into the classroom should make us look on it with great suspicion. That we don't is testimony to how far we have given ourselves over to it as an ideology. Furthermore, we have become confused by our own sloppy use of the term, a problem that takes us deeper into the role of the teacher in the classroom.
Authority vs Power

As I have argued in each of the previous essays, one of the most destructive consequences of applying the ideology of Technology to education has been the diminished role of the teacher. Certainly no one suffers from the loss of purpose more than the teacher, who more and more is charged with simply delivering someone else's educational goods - nearly as technical a role as that of an auto mechanic. Of course, this is camouflaged by all of the social problems that 25-35 kids bring to a classroom. But when it comes to instruction it is no wonder the teacher is being pushed aside - with most of her role technical in nature, she has no chance against the far more powerful technical tool, the computer. What few who advocate reform of education through the use of computers seem to understand is that we computerized the school environment in concept a long time ago. We just didn't have the tool to do the job really well until now. In the meantime teachers have filled in. We have accomplished this to greater and lesser degrees by seeking to make education teacher proof through canned resources and standard methods. Until recently, however, these resources and methodologies constituted a rather rigid and unpredictable machinery that required considerable fine tuning by the teacher-technician. With the coming of the computer the next step in marginalizing the teacher is accomplished by putting resources and methodology inside a real machine and the students in front it. Throughout the entire process, the role of the teacher is progressively narrowed to mostly a technical capacity (Apple, 1990). This is not to say that teachers are no longer highly skilled. As Ellul (1964) pointed out, it takes a rather remarkable pedagogue to profitably apply the proper psychological techniques needed to mold the irregular, organically

17 Even here the teacher finds himself more and more dependent on techniques, as the problems the students bring into the classroom become less and less related to his own personal experience and the solutions less and less within his power to provide. "Classroom management" becomes yet another bundle of techniques he learns to apply without much regard for their congruence with his own character.

18 In this respect, the computer is a profoundly conservative innovation. It merely replaces a rather inadequate tool with a more efficient one. The teacher doesn't get entirely cast aside, of course. She still has to set the machinery in motion and provide the adult authority and disciplinary guidance to keep the students (who are not yet fully disciplined to the machine) from wandering away from the tasks the computers give them or destroying the expensive machinery.
shaped psyches of our children to fit into the precision made slots of a technological society. Common sense, intuition, personal relations are no longer adequate resources to draw on when preparing young people to function in a nearly totally artificial world. And so our schools of education concentrate on methodology and psychology, and aspiring teachers have to spend a longer time learning what does not come natural to either them or their future students.

All of this provides the teacher with the means by which she can continue to assert her power over the classroom environment even as she loses her authority to teach. By applying certain techniques she is able to manipulate the environment (much as her students learn to manipulate the computers) in such a way that the students “choose” to learn what they are required to learn. The teacher is aided in this by numerous tools that retrieve control that otherwise would flow to the student through the powerful devices they have been given. Acceptable Use Agreements that threaten legal action if Internet access is misused, network monitoring systems that give technical staff access to student computers, lock-out programs that keep students from altering system software are all ways in which the teacher-technician is enlisted in the power struggle with her students. Of course, the teacher may opt out of this struggle, laying the responsibility for these restrictions on administrators or technical staff. But that simply highlights the real powerlessness of the teacher in relation to her work. And it furthers the misunderstanding of the proper relationship between the teacher and her students.

No one I have encountered has stated this misunderstanding and its consequences as well as Parker Palmer. The distinction he makes between power and authority warrants a rather lengthy excerpt from *The Courage to Teach* (1998):

> In a culture of technique, we often confuse authority with power, but the two are not the same. Power works from the outside in, but authority works from the inside out. We are mistaken when we seek authority outside ourselves, in sources ranging from subtle skills of group process to that less than subtle method of social control called grading. This
view of teaching turns the teacher into the cop on the corner, trying to keep things moving amicably and by consent but always having recourse to the coercive power of the law.

External tools of power have occasional utility in teaching, but they are no substitute for authority, the authority that comes from the teacher’s inner life. The clue is in the word itself, which has author as its core. Authority is granted to people who are perceived as authoring their own words, their own actions, their own lives, rather than playing a scripted role at great remove from their own hearts. When teachers depend on the coercive powers of law or technique, they have no authority at all.

Authority comes as I reclaim my identity and integrity, remembering my selfhood and my sense of vocation. Then teaching can come from the depths of my own truth - and the truth that is within my students has a chance to respond in kind. (pp. 32-33)

Though Palmer doesn’t use the word here, what he is implying, I think, is a close relationship between authority and freedom, a freedom that comes from being liberated from the struggle for power. This kind of personal freedom issues from and strengthens one’s authority, a reciprocal relationship that operates outside power relationships altogether. In recalling that “Freedom is what took hold of Aleksandr Solzenitsyn when he first stepped into the Gulag” (p. 207), Talbott (1995) argues that, “Neither you nor I nor anyone in the world can exercise power over someone who is fully in possession of himself” (p. 210). He too is saying that those who author their own words possess a freedom that is beyond the reach of power.

This is the kind of freedom Freire believed must be taught in order to abolish rather than just rearrange oppression. It is the only sense of freedom that resides wholly within the person, independent of physical circumstances which exist in the world. This discrimination between authority and power is as important to the child as to the teacher. It is, I believe, a very serious mistake to equate the granting of power to the child through the use of a powerful machine with giving him freedom. The child’s power is dependent on a machinery he does not, in the larger
picture, control (or even understand). Freedom as conceived by Freire and Talbott and Palmer, however, is contingent solely on what takes place in the heart and mind of the individual. The development of this kind of freedom, learning to be the author of one’s own life, is something that veteran Waldorf teacher Willi Aeppli (1986) observed must, paradoxically, begin with an apprenticeship to an authoritative teacher.

An individual will be able to make the right use of freedom later, if as a child, and in the most natural way, he is allowed to place himself under the absolute authority of a well-liked adult, if he is able to feel respect for that adult. The respect of a child for a particular person - which is actually respect for the truth the way it is silently expressed by that particular adult - is later transformed into respect for the objective truth, independent of any human being... Without authority there is not freedom. (p. 21)

What is central to all of these conceptions of authority as the foundation of the teacher-student relationship is the personal character of the teacher. And it is just here that we see the greatest contrast with the Technologically oriented classroom. To the extent that a teacher delivers another’s curriculum, applies another’s set of techniques, or relies on the use of powerful machines, he is not teaching out of his own identity and to that extent he sacrifices his authority. In so doing, he loses his students as apprentices in seeking freedom. In my hierarchy of educational goals, this is the greatest loss imaginable, for without it I see no hope for developing a healthy community either inside or outside of school.

**Teaching Teachers**

There is, as there always seems to be, a catch to all of this. It relies on teachers actually having strong identities and unassailable integrity. I have argued throughout this series of essays that it is just these kinds of internal qualities that we have been neglecting, even intentionally emptying out, to the point that we don’t even recognize the value of developing them, either in ourselves or in our students. Recall Palmer’s observation (quoted at greater
length in the first essay) “that we train teachers to master techniques but not to engage their students’ souls” (p. 19). As I look around and think of teachers I have known over the many years I have been teaching, there are a few who regularly develop the kind of authoritative relationship that engage students’ souls. The majority of them do not. More importantly, I suspect that most do not want that kind of relationship. It is not what they signed up for when they started their teacher’s training, and it certainly is not what they learned during that training.

How many colleges of education emphasize developing the “identity and integrity of the teacher” that Palmer believes is the foundation of good teaching? How many stress that the authority of the teacher develops outward from her own character rather than from external techniques and coercive bureaucratic tools? Though we pay lip service to the common knowledge that what really makes a difference in a child’s learning is the relationship, the connection that the child somehow is able to make between his or her own life and that of a teacher, how many classes offered in any college of education focus on helping teachers develop the qualities that facilitate that connection? Pascal said “The heart has reasons that reason cannot know.” With our emphasis on methods and psychological insights gained from statistical models, we are succeeding in rationalizing education more and more, and in the process losing contact with much that is critical to living in the world. The wisdom of Pascal’s observation is that contact with the living world relies as much on listening to the heart as to the intellect. The further we retreat from applying that wisdom the further we slide away from the development of a similar wisdom in ourselves and our students.

So it is no wonder that the majority of teachers I have known feel uncomfortable with the idea of entering into a community of inquiry that relies on the teacher’s inner qualities as its guiding principle. No one has ever taught them the role that their own courage, nobility, self-discipline and love plays in the learning process. These qualities perhaps always have been assumed by their mentors to be necessary for good teaching, but in a society that no longer nurtures those qualities in its other institutions, that has gravitated more and more toward the
technical view of humans that relegates the inner life to insignificance if not outright banishment, this assumption no longer can be made. I am not saying that people no longer have an inner life (though I suspect it burns more dimly in many); rather that it has become an increasing private affair, so much so that it no longer has the positive social strength to serve as a guide to their relationship with others. For many what now serves socially are the ideological values of Technology itself: a drive for control, power, efficiency and measurability - all qualities that separate and alienate individuals rather than engage them. Unfortunately they are also qualities that form an integral part of teacher education in this society.

This is the real crisis of education as I see it. We no longer have large numbers of teachers in place or emerging from our schools of education who understand that it is they alone who hold the key to their students' education; not their progressive methods, not their constructivist psychology, not their facility with computer technology, not their skills at organizing students into cooperative learning groups. It is their naked souls that matter most, the only antidote to the mass soul suicide being committed by our young people every day.

I am not here suggesting that we must make saints of our prospective teachers (though concentrating on improving the person of the teacher rather than her tools is certainly one of the things I am saying). What I am suggesting is that we need whole people as teachers, not perfect people. To learn to teach from the heart is to acknowledge our human frailties and bring them along with us in our efforts to connect with our students. It is often our own weaknesses that resonate with our students rather than our strengths. To question is often to question ourselves: our motives, our perceptions, our understanding of others, our compassion, our biases; none of which tends to come up in a Technological environment.

Those children liberated by the curtain of the Internet, entertained by the mass broadcasts of TV, sedated by the eye-hand reactiveness of video games, spend very little time in the company of adults who give fully of themselves. By the time students get to my high school class none of them expect it, few are willing to engage it. They have learned quite well how one deals with
a world of power, control and manipulation. They have been prepared better than the business community realizes to participate in a corporate world in which people are merely human resources.

If we are to change this I see no alternative but to develop schools where there are people acting in the fullness of their own humanness, not people applying techniques and facilitating immersion into even more technology.

This is true in our schools of education as well as in the K-12 environment. How can future teachers learn to truly be themselves in their teaching if our schools of education continue the shift toward a greater concentration on methods, psychological techniques and instructional technology? I am not so foolish to believe that we can suddenly determine a potential teacher’s fitness by her capacity to love children rather her ability to apply appropriate educational methods. These ideological shifts take time and the structure of typical teacher education schools works as much against this shift as the focus of the courses within them.

What we can do is work within these schools, within our own classes, to be ourselves as fully human as possible, to draw our students into a community of inquiry and make learning how to do that an agenda item in every class. Theodore Roszak’s (1986) vision of education seems appropriate here:

That of teachers and students in one another’s face-to-face company, perhaps pondering a book, a work of art, even a crude scrawl on the blackboard. At the very least, that image reminds us how marvelously simple, even primitive, education is. It is the unmediated encounter of two minds, one needing to learn, the other wanting to teach...Too much apparatus, like too much bureaucracy, only inhibits the natural flow. Free human dialogue, wandering where the agility of the mind allows, lies at the heart of education. (p. 63)
Stripped to its essence, education is the engagement of two willing souls. As others join in, the dynamics become more complex but the essence remains. This is what aspiring teachers need to know far more than how to put a computer to use in the classroom.

Can computers and other technologies and formal techniques fit into this picture? Of course. But they are not essential and the relative emphasis they currently receive is destructive to the kind of teaching I am advocating. Palmer (1998) writes, “As we learn more about who we are, we can learn techniques that reveal rather than conceal the personhood from which good teaching comes” (p. 24). Here we find the means issuing from and serving a transcendent end. Technologies should be brought into the teacher education program only as we come to know ourselves, for we can never come to know ourselves through the technology. As the future teacher’s self-knowledge increases, she can begin to draw on techniques and other tools as they compliment her identity and improve a particular situation she encounters with her students. She can support the use of technology by her students in the completion of certain tasks that are meaningful to their learning. But she must always be aware of the seduction, the temptation to look to Technology for power at the cost of her and her students’ souls. This is the Faustian bargain of educational technology and it advertises itself from the moment the prospective teacher starts her journey toward the classroom.

Developing a Relationship with Technology in the Classroom

Though I have evoked the specter of Mephistopheles, it is not my intent at all to demonize Technology. It presents us with a tremendous challenge - one of the most important challenges in society today - but it is a challenge, not an evil. My intent is to help us respond to this challenge in ways that will improve education and life. And if we respond in healthy ways many of our technologies will find a role in that improved condition. So I am not advocating that we throw all of our computers into the dumpsters. Rather, I want us to approach them in the manner to which I think many within the computer profession themselves subscribe. Jaron
Lanier (1995), one of the pioneers of virtual reality machines summed up this attitude by observing, "In my experience and observations, computers, unlike other tools, seem to produce the best results when users have an antagonistic attitude towards them" (p. 68).

The rest of this essay is devoted to providing some suggestions for creating this kind of critical, adversarial attitude toward computers in the generations to come through their experiences in school. It skirts as close as I dare come to concrete curriculum. Even at that, I hasten to add that I offer these ideas as guidance, not prescriptions. Teachers must always find their own way, even when determining the role of technology in the classroom. Nothing could defeat the purpose of what I have been advocating so thoroughly as to take the suggestions I make below and apply them systematically throughout a school district or even a school.

Preparing for the Technological Society

It should be clear by now that I consider computers to be dangerous machines. This should be neither surprising nor taken as anti-computer. Many of our most prized tools - automobiles, airplanes, fireplaces, "the pen" - share this distinction. Many other valuable tools are considered dangerous to children at various stages of their development. Generally the more powerful the tool the more dangerous it is and the more carefully we must prepare our youth to use it. In most cases the danger recognized is a physical danger. What sets the computer apart from most dangerous tools is that the greatest hazards it poses are to mental health, not physical health. And because the damage done there is much more difficult to assess, the danger is not so well accepted. Here I will assume (based on all that has come before) that the danger exists and, in much the same way that we prepare a young child to drive a car, use a knife and light a stove, we must in some way prepare him to use computers. This is not just a matter of teaching

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19 Many of the ideas contained here were developed in conversations and writings with Valdemar Setzer, Professor Emeritus of Computer Science at the University of Sao Paulo, Brazil and were first expressed in an as yet unpublished paper titled "Challenging the Applications: An Alternative View on Why, When and How Computers Should Be Used in Education."
him skills, but also responsibilities. It means preparing his mind and soul for the challenges in which the computer and other high tech tools will subtly engage them. And because it is such a powerful machine, we should expect that it will take a good deal of time and effort to accomplish that preparation.

Let me lay out the assertions in list form:

1. If computers promote commodification of learning, then young people should first approach learning wholistically, making connections and developing a sense of relatedness.

2. If computers promote an oppressive dehumanization, then young people should first learn to cherish being human.

3. If computers draw young people into a world of decontextualized abstractions, then first they should be immersed in a rich physical environment.

4. If computers promote a mechanical worldview, then young people should first be encouraged to understand the world organically.

5. If computers tend to draw students' attention outward and externalize skills, then young people should first concentrate on developing their inner resources.

6. If computers promote instrumentalism, then young people should first engage in activities that have intrinsic value rather than utilitarian worth.

7. If computers promote a radically rational thinking, then young people should first train their intuitive and aesthetic faculties.

8. If computers are a black box, then young people should first be helped to open that box up and reveal, at least in its principles, how this box works.

These are, to be sure, general assertions and I suspect they could be carried out in a variety of ways. I will briefly share some suggestions as illustrations of what I think makes sense:

Items 1 and 2 emphasize learning what it means to be human through making connections with others. Ideally, this would mean securing an environment for children in which they have the opportunity to interact with a wide variety of people, of various age groups, in meaningful
ways. It would mean developing a slowly expanding community of relationships while concentrating on deepening those that already exist. What it probably means more than anything is getting more caring adults and older children into younger children’s lives.

Ah, but we can do this through the Internet. Of course, this is the grand seduction, for Technology is always there to provide the easy remedy, so long as we are willing to redefine our terms.\textsuperscript{20} This I refuse to do. To become more human children need to be \textit{with} humans - touch humans, be touched by them; sense their presence, feel their warmth, their breath, perhaps their chill, their senility. Moreover, in a society in which we already have erected innumerable technical barriers between adults and children, using the Internet to “connect” the two is the disease masquerading as the cure. Getting more caring people \textit{into} young children’s lives through their physical presence requires that we exert the effort and make the commitment to tear some of these barriers down, and our unwillingness to do that only testifies to our true loyalties.

I recently visited a community that included a unique care-center, where the elderly and preschoolers mingled in the same facility. This reuniting of two generations that once were integral to each others’ well-being is a rare occurrence in our society, and an absurdity. Tied to our belief that human needs can be provided by professional technicians, we lock these generations away from each other, each administered to by supposed experts of their age.

Schools perpetuate this segregation, as people like Ivan Illich (1972), John Holt (1968) and John Taylor Gatto (1992) have long pointed out, and settle for technical substitutes rather than

\textsuperscript{20} It has been my experience that some of the most cogent critiques of contemporary education have come from the educational technology community. In part, I think this is because, as mentioned in the previous essay, this community developed with a high population of disgruntled and radical classroom teachers. I often find myself in agreement with them on what is wrong with education; I just disagree with how to make it better. It is also because it is the character of technology and those who employ it, to find ways to apply it to whatever problems are raised. Thus, anytime a criticism is suggested with regard to education, technologists rush out to find solutions. So no matter what one decides is wrong with education, there is a technical fix that will make it right - however, you want to define “right.”
pushing hard for fundamental changes in the social structure that would reintegrate children into the adult world.

I do not claim to know how to achieve that reintegration, only that it would make a valuable contribution toward preparing children for the Technological society that awaits them - and a long awaited relief of the oppression we visit on our youngest community members and probably our oldest as well. But then, if that reintegration took place, it is likely that there would not be the same Technological society to prepare them for.

Much the same conundrum faces us with respect to items 3 and 4. The same Technological ideology which encourages us to view everything in the world as resources for our use has brought us an environment in which there are few natural, complex surroundings within the reach of most children. Rather, they are immersed in the mechanical, the artificial, without relief. The enormous complexity of the organic world is reduced to images in nature shows on TV, or virtual field trips to the Rift Valley via the Internet. In his book, *The Children's Machine* (1993), Seymour Papert describes at great length the way in which the computer was able to help him learn to know the names of flowers. He seems to see this as a means by which young people will actually connect with nature. But naming, describing, analyzing and classifying flowers is a technical activity. One wonders how a child could ever come to want to do any of that if he has not first smelled, touched, planted, picked, arranged, and watched the pollination of flowers by all the varied bugs and bees that interact with them? It is that which young children need most if they are to eventually develop such a love and interest in flowers that the abstract information they can get through the computer will have any meaning to them beyond the compulsive accumulation of yet another commodity.

What would be the consequence if those elementary schools that spent hundreds of thousands of dollars on computers so that students could view "interactive" video to learn about plant cells had instead spent a fraction of that on building a modest greenhouse where each child could tend a few flowers, plants or vegetables during the long school year? Would
their understanding of what science is all about be different? Would they develop the inner connections with life that would allow them to transcend the reductionist, atomistic, mechanical processes they will have to study when they reach high school? Perhaps not. But at least they would have experienced some long term connection with the organic world. And perhaps their teachers would begin to recognize that some technologies are life sustaining as well as educational and seek to bring more of life into their students’ learning. They might even find a way to deliver all those flowers and vegetables grown by their students to the elders they took their students to visit once a month.

Items 5, 6 and 7 are concerned with the development of the children’s worldviews. This is, admittedly, a treacherous issue. It cuts to the heart of belief systems and therefore represents a direct threat to the religious, ideological and philosophical values that parents, educators and community members bring to the learning process. Technology is such an attractive means of educating in a culturally diverse society because it seems to take a position of neutrality toward these belief systems. But as I hopefully have shown, this is an illusion. Technology simply disregards other belief systems, subsuming them all under its imperative. I have throughout this dissertation claimed that we have no choice but to take an ideological position, and I will not retreat from that position now.

If we are to educate children to become fully human we must concentrate on developing their inner capacities and their spiritual sensibilities to the fullest extent possible before the instrumentalism of Technology seizes them. My use of the phrase “spiritual sensibilities” here does not imply teaching religion in school. It means helping children recognize that there is something more to their lives than just electro-chemical reactions to physical stimuli. It means helping them sense that there is something that joins them to the rest of the world that is inspiring of goodness, compassion, empathy, nobility and courage. In short, it means helping them view the world and all that is in it as something other than machines.
Certainly good teachers try to do this every day through their personal interactions with their students. But the ideological underpinnings of the curriculum undermines their efforts and the structure of schooling itself overwhelms them. Schools are machines. For most youngsters and many teachers they are themselves black boxes, whose fundamental operations are beyond comprehension or control or, in many cases, even influence. As long as schools operate as machines there is little hope that the efforts of all these good teachers will succeed in preparing children to maintain their humanity in the face of the mental machinery of the computer.

So the first step might be to disassemble schools as many of them exist today and reorganize them not for economic efficiency but for human efficacy. As people like Illich (1973), Kirkpatrick Sale (1980) and especially E.F. Schumacher (1973) have argued, when machinery grows beyond human scale it begins to chew up humans. That we have allowed this to happen is a tragedy of modern times. But that it has happened in schools of all places is simply obscene. The argument that massing students into huge school districts is an economic necessity if we are to have public education at all is beginning to lose its persuasive power, as the social and fiscal costs of this system mount in huge proportion to the benefits attained. Restructuring schools to a scale in which individuals who actually do the learning and teaching can also control their environment may incur greater direct financial costs, but the ultimate costs to society may be no more than we experience today. Almost certainly, the cost in human lives would be greatly diminished.

I will not attempt to draw a blueprint for bringing schools into human scale. That it can be done I accept as one of those "untested hypotheses" Freire encourages us to pursue in spite of all the perfectly rational arguments against it. As Theodore Roszak (1973) wrote in response to criticism of such radical rehumanizing of society,

I can think of forty reasons why none of [these] projects can possibly succeed and forty different tones of wry cynicism in which to express my well-documented doubts. But I
also know that it is more humanly beautiful to risk failure seeking for the hidden springs
than to resign to the futurelessness of the wasteland. (p. 394)

The “more humanly beautiful” view Roszak is opting for is just what I would hope that the
adoption of items 5, 6 and 7 would promote in young children. To understand the world in
terms of the life that exists in it, to strengthen the qualities within themselves that flow from
that life and to find intrinsic value in what life brings to them are, paradoxically, perhaps the
most important means by which young people can become inoculated against the Technological
worldview that assails them in every other venue of society today.

How to do this is, once more, a matter that I cannot prescribe. There is one model,
however, that I believe is worth mentioning because it is so insistent on developing those
attributes in children. Waldorf schools operate very much in the spirit I have just described,
and their approach to early education strikes me as a perfectly reasonable way to proceed. In
Waldorf schools the early emphasis is on the arts - music and painting especially. The arts
provide pathways to the soul and involvement in artistic activities strengthens the soul’s
qualities. These activities are not separated from other subjects in Waldorf schools, but rather
provide the means of pursuing them. Math is learned through chants and dances; writing is
learned as drawing. Textbooks are not purchased but made by each student throughout the
year, richly illustrated (I have seen several sets myself) with artistic representations of the
topics studied in each subject area. At the same time, these activities and works are appreciated
in their own right - ends in themselves that require no justification other than the students’
natural desire to bring beauty and creativity into his daily life. The fundamental idea is to
maintain the wholeness of the person in education rather than turn it into an intellectual pursuit
at an early age. Throughout much of the elementary years art and music remain at the heart of
Waldorf methodology to prevent the too early intellectualization of learning, for it is understood
that the abstract qualities of intellectual thought tend to deaden knowledge unless there is a
wealth of experience through which the child can connect her inner essence to it. According to
one Waldorf advocate, "Artistic activity is in this period as necessary to the inner being as food and drink, air and light to the physical frame. Thought should be warmed by feeling that stimulates the imagination" (Stebbing, 1962, p. 31). It probably goes without saying (though I feel compelled to say it) that computers are not necessary in this environment, nor are they generally welcome, for they do just what Waldorf’s schools were developed to prevent: The promotion of the separation of the intellectual from the soulful; the abandonment of the enlivening, organic aspect of life through the too early concentration on that which is most mechanical.

The final item on my list is probably the final step in the preparation process. Revealing the inner workings of the computer to young people may be impossible in any literal fashion, but there are ways that it can be revealed both conceptually and physically that can at least bring young people to grips with both its promise and its perils. Studying electricity and doing hands-on experiments with both mechanical and electrical logic gates which allow for simple decision-making give students a sense of what goes on inside the opaque processors of the computer. Studying magnetism and observing the properties of the fields they create can help students understand the way in which data is stored on harddrives and floppies (and video and audio cassettes as well). Other lab activities can reveal some of the other aspects of computer operations that would help demystify computers and lessen their oppressive power.

Helping students conceptually understand how computers actually process data is a more difficult task, for it is such a profoundly abstract matter. Computer Science professor Valdemar Setzer has taught high school students the basic operations of the computer central processing unit through a play in which the students take on the roles of various parts of the CPU and the data that passes through it. I cannot attest to the effectiveness of this activity, only its imaginative attempt to bring into concrete human form the most abstract of mechanical activities. Undoubtedly, teachers could discover many ways to part at least some of the layers of veils that shroud computer operations if they set their minds, and hearts, to it.
All of this preparation obviously would take time. I have used the term “preparation” intentionally to convey the contention that these things should be done before students begin using computers for learning. So how long will that take? Naturally, it could vary from child to child. But since there is no compelling reason to use computers in a noncommodified environment that focuses on contextualized, experiential learning, there is really no reason to make fine individual distinctions. Certainly, unless there are other intervening issues such as learning or physical disabilities, there is no educational need to employ computers in the classroom during the elementary years.

Rudolf Steiner, the Austrian philosopher who founded the first Waldorf School in 1919, presaged Piaget in his development of stages of growth, but he put them in what he called spiritual terms that calls us all the way back the wisdom of Classical Greece. Steiner observed that for about the first seven years of life children pay most attention to learning what is good. For the second seven year interval they are most naturally drawn to what is beauty. In the third interval they become most interested in what is true. I don’t think we have to scientifically try to determine whether Steiner’s stages were precisely accurate or even natural to recognize that this is a “humanly beautiful” way to treat children in learning. To discover the beauty in mathematics, to recognize the elegance of language, to appreciate “at the level of one’s essence,” the magnificence of nature is to send out deep roots from the seed of learning. These roots are far more essential for the healthy flowering of a knowing intellect than all the external scaffolding that an information manipulating computer can provide.

Preparing Students for the Technological Society

No matter when we determine is a proper time to introduce the computer to the learning environment, our work is not done. Regardless of how well the computer’s physical operations are revealed, ultimately what is most crucial is that we reveal its connections with students’ lives. Like all other things, computers should be drawn into a student’s world of relationships, not define them. All the items I have discussed will help prepare the student for
that, but none of those items actually direct the student's attention toward the impact that computer technology and the ideology embedded in it have on society. This issue must be taken up at some point if our young people are to be able to consciously respond to its challenge.

Of course, one way to do this would be to undertake a direct study. There is such a class in the College of Education at Iowa State. It is designed for graduate students. Another is currently being designed for undergraduates. For the past five years I have included a study of many of the issues raised in this dissertation in my Advanced Computer Technology class at Des Moines Public Schools. It has inspired some, appalled some, befuddled many and bored a surprising few. Perhaps the most important thing I have learned from teaching it is that the ideas are so new that it takes time for them to germinate and grow within the minds and hearts of my students. Those students who have returned to my class for a second year for independent study have almost unanimously observed that the issues become much clearer the second time around. They may not come to the same conclusions I have, but that is neither my goal nor the point. They are aware - aware that technologies influence them and the world around them; that there is a technological worldview that is not the only worldview; that the future is not determined and their will can influence that future; that there are people who believe that life consists of more than just being alive and that there may be higher goals to life than accumulating things.

I am convinced that once people become aware of an ideology it begins to lose its power over them. So perhaps a modest but valuable goal of our response to Technology is to bring our students to awareness. Here I will make my most universal, concrete proposal. I suggest that the study of technology be brought directly into the curriculum at all levels. No, I am not proposing that 3rd graders sit around discussing Ellul and Heidegger. What I am suggesting is that at all levels students' attention be consciously brought to focus on how technologies
influence their lives; that the role of technology be part of the study of history; that technologies' influence on communication be at least mentioned in the study of language arts.

Let me give just one example how this can be done. I have next to me a book I recently read to my two sons, ages nine and eleven. The name of the book is *Hatchet* (1987), by Gary Paulsen. It is an adventure story about a boy who is the lone survivor of a plane crash in the northern wilderness of Canada. Originally, the only tool the boy has is a hatchet. He uses it to fashion other tools, such as a bow and arrow, with he uses for hunting. Eventually he is able to retrieve some other supplies from the plane, including a rifle. This rifle makes hunting much easier but Paulsen is too experienced an outdoorsman and too sensitive a human being to leave it at that. The boy finds that using the gun to take game somehow doesn’t feel right. It doesn’t seem to fit into the natural order of things he has come to know in the wilderness. He chooses to go on using it, but never quite gets over his uneasiness with it.

I think this is a wonderful example of how to bring the issue of technology into the lives of young children. It doesn’t even require comment at this age, I suspect, though certainly the opportunity for asking why the boy would feel that way is there. There must be thousands of similar books and activities that would be similarly beneficial if we just start paying attention.

I don’t consider this proposal a radical one. After all, if we do indeed live in a Technological Society, then it seems only natural that our children learn what that means. Surely it is as valuable to know how computers alter our relationship with our surroundings as it is to know how to solve a quadratic equation, or dissect a frog, or create a hyper-book report. As I have illustrated, this need not, should not, be the domain of intellectuals. Starting with stories and experiences we can give children a sense and awareness of the ambiguous influence of the tools they use. As they grow older the subject can be approached more systematically and directly, perhaps through technology labs where students investigate all the black boxes in their lives and at the same time consider what it means to use them.
Changing our Lives

All of this hinges on two decisive factors: First, our own awareness. That there is so little critical discussion in our schools now concerning what it means to live in a Technological Society is evidence that teachers and administrators are not, for the most part, aware of its real influence on their lives or their work. Talbott (1995) expresses my own greatest fear as an educator when he writes: "What is directly at risk now - what the computer asks us to abdicate - are our independent powers of awareness. Yet those powers are the only means by which we can raise ourselves above the machine" (p. 131). If the computer becomes fully integrated into the learning environment before the educational community itself comes to recognize this imperative, there will certainly be little hope that it will spring forth from our children. Talbott goes on to warn us, "The more intelligence, the more independent life, the machine possesses, the more urgently I must strive with it in order to bend it to my own purposes" (p. 131). What is at risk here is not just our ability to reason independently, but our ability to imagine the world differently than it is. If we in the educational sector invite computer technology into the very framework of the learning endeavor, it will indeed frame our learning. It is hard to imagine how we or our students could come to think outside that box, beyond the rational options it will insist upon, if our system of learning comes to rest on its mechanistic architecture.

The second decisive factor is our willingness to undertake the responsible structuring of our lives and the learning environment to produce a more humane world. What I am calling for here is nothing more than what Steiner, Montessori and Dewey, each in different and imperfect ways, insisted we do nearly a century ago when the first really powerful wave of Technology swept through education. But today the stakes are even higher, for whereas 100 years ago Technology could only reshape the physical structure of learning in its image, today it threatens to reshape the entire intellectual structure of learning as well. If that happens, responsible structuring of our own lives will be redefined as making the "right" choices from a constantly
changing menu of emerging technical activities (which we will call freedom), all designed to keep us in motion (which we will call progress), and all fueled by the never-ending consumption of information (which we will call education).

There are those who prefer such an environment, in part, I suspect, because in it there are no moral or ethical paths, only more or less useful ones. In such a world personal responsibility is no longer a useful concept, for responsibility grows out of moral and ethical sensibilities. Recall once more Weizenbaum's (1976) observation that "Ethics, at bottom, deals with nothing so much as renunciation" (p. 264). As we have seen, the one thing Technology renounces is renunciation. The ideology of Technology is all about getting anything (that has monetary value), for anyone (who has the technology), anywhere (that's safe for machines), anytime (that the machinery is working).

Unlike organic systems, Technology can't impose limits on itself. Yet, as Weizenbaum also reminds us, people sit around tables and decide these things. So it seems to me that more than ever before, those of us who resist the Technological drive but don't want to completely reject the technology have to work at developing our inner capacities to make those kinds of God-like judgments and the inner strength to impose the limits we deem necessary. The only way I can see maintaining our full humanity in a Technological world is through the development of a heightened sense of responsibility - to ourselves, to our communities, to the rest of the world, and most especially to our children. This, as I see it, is the primary task of education in a Technological world.

We dance with our tools. And today that dance demands that we learn many different intricate steps. But dancing is not really about knowing the steps. Dancing is about style and grace and rhythm and poise. We dance because it brings us joy, because it gives bodily expression to our deepest feelings and imaginings, and because at its best we find ourselves moving with one or many others in transcendent unity. Tools may be able to teach us the steps; they can never teach us to dance.
REFERENCES


