

The Paradox of Technology: What's Gained and Lost?

By C. A. Bowers

The paradox surrounding the current rush to make all aspects of education dependent on computers has disturbing implications that are being ignored at all levels of decision-making.

While the computerization of public schools and universities is highly profitable to the computer industry, it is also an experiment with the basic symbolic and moral foundations of mainstream Western culture—and how these foundations are intergenerationally renewed.

Decisions to incorporate computers into public schools and universities, whether for administrative use or classroom instruction, follow from the unquestioned assumption that computers are the latest expression of social “progress.”

The paradox in this rush to embrace computers is that neither the computer industry nor educational policy makers understand the cultural mediating characteris-

tics of computers.

To state the paradox more directly: We are becoming dependent on a technology that we understand in terms of technical applications. But we are unable to recognize the connections between the cultural forms of knowledge that we are losing through the educational use of computers.

What is to be done? Colleges and universities need to reform the curriculum to provide citizens with the educational basis for democratizing the initial stages of technological innovation.

Currently, the lack of understanding of the profound changes technology introduces into everyday life, as well its impact on natural systems, limits the public to making decisions about funding after the technology already has been introduced into the web of interdependent systems.

The history of the nuclear power technology, the technology of genetic engineering, and the cre-

C. A. Bowers has taught at the University of Oregon and Portland State University. He lives in Eugene, Oregon, where he writes on technology and the cultural and educational implications of the ecological crisis. He is the author of *Educating for an Ecologically Sustainable Culture (1995)* and *The Culture of Denial (1997)*.

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ation of virtual universities are three examples where experts rather than citizens have framed how the issues are to be understood and made critical decisions about implementation.

Educating for more democratic control of technological innovation would also lead to a better understanding of the unintended consequences of introducing Western technologies into other cultures that have evolved along relatively self-sufficient pathways.

At the same time, it will provide future technology experts a more complex understanding of the cultural and ecological implications they must consider.

Right now, learning about the cultural non-neutrality of technology is a peripheral area of study, if it is studied at all. This, despite the fact that technology is the dominant force in shaping our approach to work and influencing our aesthetic and moral judgments, patterns of thinking, and relationships with others and with nature.

The typical graduates of our universities have been educated to advance the development of technology, consume the products of a technologically centered culture, and fit into the behavioral and thought patterns dictated by the interlocking systems of technology.

But, with few exceptions, these graduates will base their decisions

in this critical area of cultural development on the assumption that a technology, such as a computer, is a culturally neutral tool that empowers them to communicate, solve problems, and access information more efficiently.

It is the exceptional graduate who can raise questions and frame an argument that makes a genuine contribution to democratizing the process of technological decision making.

To come to grips with the cultural impact of this technology, we must first recognize that the spread of computers through our institutions of formal learning represents a continuation of a cultural trend that had its origins in the early stages of the Industrial Revolution.

One of the basic changes set in motion by that revolutionary combination of science, new technologies, and economic and social theory was the transformation of labor and nature into commodities, subject only to the newly formulated laws of supply and demand.

This trend of turning skills, relationships, knowledge, and leisure into commodities continues.

Indeed, the use of computers has accelerated this trend, enabling experts to commodify even more aspects of individual and community life. Even the genetic basis of dif-

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ferent forms of life are being re-designed for economic gain.

In education, computers commodify thought and communication. This requires that institutions make huge economic outlays to put libraries online and for professors to carry on research and to teach online. Students, in turn, must be consumers of technology that will require an endless series of upgrades to feed the industry's need to increase its share of the market.

Who knows what educational priorities will be compromised to pay the escalating cost of acquiring new computer technology and for maintaining the system that is in place?

I mention the continuity between computers and the earlier forms of commodification associated with the Industrial Revolution to challenge the current formulaic thinking that represents computers as ushering in a new era of consciousness and well-being.

I mention this connection also because of the adverse impact the Western approach to technological development has on the earth's ecosystems. This approach to technological development also has a negative impact on the viability of cultures that have created more ecologically informed technologies and patterns of moral reciprocity.

Advocates of computer-mediat-

ed learning do not understand the the Janus nature of computers. That is, while computers help understand the complex dynamics of natural systems and introduce efficiencies in other areas, they also reinforce cultural patterns of thinking that have their roots in the the Industrial Revolution.

I describe in detail the cultural amplification and reduction characteristics of computers in *Educating for an Ecologically Sustainable Culture* (1995) and *The Culture of Denial* (1997).

Here, I offer an abridged version of those characteristics to provide a basis for recognizing the negative pattern of thinking that computers are now globalizing.

This analysis will explain why teachers should not be displaced by cyberspace classes and educational software. I will also touch briefly on the basic misunderstanding of constructivist learning—that is, the argument that students can learn well by constructing their own understanding from data and information accessed through a computer.

To begin with, all technologies—the telephone, pencil, or computer—select certain aspects of individual experience and certain cultural patterns for amplification, while other aspects are reduced or are lost entirely from awareness.

The inherent characteristics of the computer determine what will be amplified and what will be lost.

Contrary to proponents' representation of the computer as a neutral tool—with the good or bad effects dependent upon the intent and competency of the user—the inherent characteristics of the computer determine what will be amplified and what will be marginalized or lost.

This is similar to how the inherent characteristics of the telephone select voice for amplification, while reducing the contextual metacommunication that gives face-to-face communication its greater complexity and richness.

Likewise, the inherent characteristics of a pencil amplify the ability to put thought into permanent form, while not accommodating directly the sensory basis of knowing and communicating, as in speech or gestures.

Just so, the characteristics of a computer also select for amplification certain aspects of cultural and personal experience, while reducing the presence and legitimacy of others. By considering these patterns of amplification and reduction, we can recognize more fully why computers should not be viewed as a neutral technology.

First, computers amplify explicit, context-free forms of knowledge, while their programmers usually overlook implicit, fully contextualized and culturally specific analog

experiences and ways of knowing.

Second, computers amplify a conduit view of language, while hiding the metaphorically layered nature of language, as well as masking how language on the screen reproduces a specific form of cultural intelligence.

Third, computers amplify the Western view of the individual as autonomous in matters of rational judgment and moral decision making. At the same time, computers help obfuscate how the supposedly autonomous individual continually thinks and makes judgments about relationships in culturally patterned ways that have been learned at the pre-reflective level of awareness that characterizes most of our shared knowledge.

Fourth, computers reinforce the Western way of experiencing time, which involves a linear sense of movement into the future and away from the past. What separates this way of experiencing time from other cultural patterns of temporality is that the autonomous individual decides whether anything from the past has relevance.

This amplification of the subjective sense of time reduces—indeed, eliminates—learning from elder knowledge and other forms of intergenerational communication based on face-to-face communication.

Fifth, computers amplify the Western tradition of anthropocen-

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trism, or what can be called a human-centered perspective that represents nature as a natural resource. At the same time, computers undermine ways of knowing—usually communicated through narrative and ceremony—that represent nature as part of the same moral/spiritual universe that humans participate in.

Sixth, computers amplify the cultural orientation that represents moral values as subjectively determined. At the same time, they marginalize the way other cultures pass on their moral norms through narrative and ceremony.

Each one of these amplification and reduction characteristics is related to complex cultural patterns that scholars have written about. Unfortunately, these writings are not likely to be studied by students who eventually go into the computer industry, write books on the futuristic nature of a cyberspace world culture, or become teachers, professors, and administrators who make decisions about the educational uses of computers.

Yet only if we understand these amplification and reduction characteristics will we see the connections between computers and the forms of knowledge that lead to a consumer, technologically oriented culture. Understanding these charac-

teristics is also essential to recognizing how computers, in spite of their positive uses, contribute to the ecological crisis.

This happens in more than one way. Socializing students from non-Western cultures into the patterns of thinking amplified through the use of computers is a form of cultural domination that exacerbates the ecological crisis.

Computers also contribute to the ecological crisis because they undermine the face-to-face patterns of non-commodified activities that were, until recently, a dominant aspect of community life in many cultures.

These non-commodified relationships involved complex webs of reciprocal and intergenerational relations that, in most instances, had only a slight impact on natural systems. But, as more aspects of community and individual life become commodified and based on a subjective sense of individualism, more waste is produced and more of nature must be processed as a "resource."

The people promoting virtual universities, connecting students to the Internet, and promoting the use of computers in every facet of human activity, never mention that the commodification process was one of the chief characteristics of the Industrial Revolution. Nor do they mention the impact that this

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cultural experiment has had on the Earth's ecosystems.

This failure can be traced to the failure of university faculty and administrators to recognize that the study of the cultural dimensions of technology should be given a central place in the curriculum. Indeed, it should be a required area of study for a university degree.

The failure of universities to provide the historical, cultural, and ecological background for understanding that computers are not a culturally neutral tool also has consequences for younger students. These students are being indoctrinated into believing that computer mediated thought and communication represent a superior and more empowering form of learning.

If public school teachers do not have the opportunity to learn about the cultural mediating characteristics of computers in their university classes, they will in turn be unable to help students recognize that thinking within the decision matrix of the software program really involves using the pattern of thinking of the people who designed the software.

Nor will teachers be able to help their students recognize that "objective" data and information represent another person's interpretation and culturally specific way of knowing.

Even more important, unless

there are changes in the curriculum, students will not learn about the forms of knowledge and community that are undermined as cyberspace becomes the dominant venue for human interaction.

Because students are not being encouraged to consider the cultural transforming characteristics of computers, they are more likely to accept explanations that serve the interests of the computer industry—even when this industry creates the technology that makes possible the "downsizing" of their own workplace.

Indeed, the rush of educators, the public, and politicians to become dependent on a technology that, while contributing to greater efficiencies, makes them more economically vulnerable as individuals and institutions is a paradox that is still largely unrecognized.

They don't recognize this paradox because they don't have the theoretical frameworks that illuminate such fundamental aspects of culture as the role that language plays in reproducing earlier forms of cultural intelligence—including the moral norms of the group.

Educators haven't considered the cultural/epistemic differences between face-to-face communication and print-based communication. Nor have they considered the complex nature of tradition and

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anti-tradition central to modern consciousness and the characteristics of ecologically sustainable cultures.

Without this knowledge, most university graduates continue to take for granted the same myths that encourage the use of computers. The result is that the cultural amplification and reduction characteristics of computers go unnoticed.

The myth used to justify the recommendation that computers should become the primary medium of learning in public schools is an example of how earlier forms of cultural intelligence—in this case, cultural misunderstandings—are encoded in the metaphorical language used to think about the connections between learning and computer mediated data and information.

The argument that students “construct” their own understanding of relationships on the basis of data and other sources accessed through computers, as well as their own direct experience, is partly correct.

There is an important element of individual reinterpretation and insight in learning, but these are individualized expressions of deeper patterns of thinking shared by other members of the language community.

The language used by students is a series of analogies that are

framed by the root metaphors taken-for-granted by their cultural group. This language also uses iconic metaphors such as “data” “change,” “development,” etc., that encode earlier processes of analogic thinking.

In *Life on the Screen: Identity in the Age of the Internet*, a technology proponent, Sherry Turkle, explains how computers facilitate the individual's construction of identity, knowledge, and relationships. It is an explanation that constructivist educators would embrace as justification for expanding the classroom use of computers.

I have argued that Internet experiences help us to develop models of psychological well-being that are in a meaningful sense postmodern: They admit of multiplicity and flexibility; they acknowledge the constructed nature of reality, self, and other. The Internet is not alone in encouraging such models. There are many places within our culture that do so. What they have in common is that they all suggest the value of approaching one's “story” in several ways and with fluid access to one's different aspects. We are encouraged to think of ourselves as fluid, emergent, decentralized, multiplicitous, flexible, and every in process.²

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Turkle's explanation is relevant for several reasons. First, it demonstrates how the cultural root metaphor that can be traced back several centuries in Western thought equates change with progress. Turkle expands this to an extreme form of moral relativism and experimentation with self-identity leading to a better society.

That her thinking reproduces other culturally specific root metaphors, such as the autonomous nature of the individual and a human centered world (anthropocentrism), can easily be seen in her explanation.

The deep cultural patterns of thinking that frame her explanation of how computers contribute to the development of psychological well-being can be seen by comparing how a person from a non-Western culture would view her culturally specific way of thinking.

This constructivist statement is based on the same cultural assumptions that underlie the arguments for expanding the educational uses of computers. The fact that these assumptions are not being questioned points again to the paradox of technical experts making decisions that are transforming the world's cultures in ways that are not being recognized.

A few environmentally oriented scholars are addressing the connec-

tions between Western technologies, consumerism, and the adverse changes occurring in the earth's ecosystems.

But, no university president and few professors have attempted to change the current discourse of technological optimism. Few scholars attempt to clarify the connection of computers to the commodification process that is transforming the environment into resources of production and sites for dumping toxic wastes.³

The recommendation that universities initiate curriculum reforms to provide citizens the educational basis for democratizing the processes of technological innovation raises a fundamental question: How can faculty who have based their scholarly careers on ways of knowing that rely on the use of technological innovation be expected to support the needed curriculum reforms?

How can we encourage our colleagues to gain the background necessary to introduce issues related to the cultural transforming characteristics of technology into their courses?

A decade or so ago, a similar question could have been asked about the failure of male faculty to recognize how the acceptance of the cultural root metaphor of patriarchy influenced the content of their courses, and whether blindness to this complex set of cultural

traditions would prevent them from re-educating themselves.

Some of the technology issues that need to be included in curriculum reform discussion:

- The cultural mediating characteristics of computers that threaten cultural diversity and ecological sustain ability.
- Technologies developed in traditional, more ecologically centered cultures versus the modern, Western approach to technology.
- The characteristics of technologies based on the principles of ecological design.
- The relationship between different forms of technology and the commodification of knowledge—and how the expansion of market forces undermine the viability of communities and natural systems.

- The impact of different forms of technology on traditions that contribute to the self-sufficiency of community life.
- The influence of technologies on patterns of thinking, values, and the metaphorical language that influences how relationships are understood.
- The social justice issues that are connected to different forms of technology.

In effect, this list covers the basic knowledge needed for democratizing decisions about technological innovation and globalization.

If education were to include a systematic study of these issues, we would see a far more intelligent discussion of technology and, hopefully, fewer decisions based on the myth that equates technological innovation with progress. ■

Endnotes

¹ President's Committee of Advisors on Science and Technology. *Report to the President on the Use of Technology to Strengthen K-12 Education in the United States*. Washington, D.C. 1997.

² Turkle, Sherry. *Life on the Screen: Identity in the Age of the Internet*. New York: Simon & Schuster, 1995.

³ Roszak, Theodore. *The Cult of Information: A Neo-Luddite Treatise on High-Tech, Artificial Intelligence, and the True Art of Thinking*. Berkeley: University of California Press, 1994.

