

How To Tell If You Really Need the Latest Technology

By Hank Bromley

Technology has a peculiar status in our culture. Rather than approach technological activity as an ordinary pursuit, entailing the usual human concerns and frailties, we often view it as a "fact of nature" that we must simply accommodate ourselves to.

Educational decision-makers often treat technology as something apart from the human world, instead of as a *social* phenomenon. The sort of judgment that would be exercised as a matter of course when any other new element entered a social situation is usually suspended when the addition is a piece of technology.

This difference in approach can be recognized by considering the following item that appeared in a newsletter for educators sponsored by Apple Computer.¹ A box labeled "Hiring an Outside Consultant" offered suggestions for ensuring that engaging a consultant produced the hoped-for results.

The suggestions are common-

sensical. Interestingly, though, if we replace the word "consultant" with "technology," we generate suggestions that run counter to usual practices.

So, for instance, the first suggestion becomes "Define your needs, then look for a [technology]." While this bit of advice ought to be obvious and unnecessary, the practice described is not at all common.

Rather than starting with what we want to accomplish, and then examining how technology might be used to achieve those goals, we more often approach our computer decisions with the attitude: "This technology exists; we've got to have it." The result: Educational computing is largely technology-driven rather than curriculum-driven.

As a result, in public schools, for instance, computers have all too often produced more of the same—only automated: electronic workbooks, computerized tracking of student "progress," and so on.

Institutions of higher education

Hank Bromley is assistant professor in the Department of Educational Leadership and Policy and associate director of the Center for Educational Resources and Technologies at the State University of New York at Buffalo. He is the coeditor of *Education/Technology/Power: Educational Computing as a Social Practice*, which is scheduled for release in June. He is also coediting a special issue of *Educational Policy on science and technology* scheduled to be out this September.

There is an a priori presumption that the addition of new technologies brings automatic benefits.

have been equally driven by a perceived need to “keep up,” in place of any deliberately generated vision of what education should achieve.

There is an *a priori* presumption that the addition of new technologies brings automatic benefits. Other innovations—the use of paid consultants, for instance—are routinely planned with attention to the subtle hazards of vested interests, mixed motives, unforeseen effects, and the like, but the special status of technology renders it largely immune from such considerations.

The prospect of “more technology” is self-evidently desirable. Efforts to raise questions—even merely saying: “Use the same judgment here you would in any other situation”—are seen as anti-technology statements. Because of the presumption of technology’s largess, skepticism is dismissed without consideration.

The “ordinary language” for technological evaluation remains impoverished precisely because the questioning of technology is one of the few topics still considered taboo in polite American society. Outside of small coteries of radical environmentalists or postmodernists, most attempts to criticize the roles of technology are answered with *ad hominem* charges of “Luddite.”²

In such a context, a serious examination of what social visions are built into—and in turn enacted by—a given technology is hardly likely. But if one were committed to conduct such an examination, what questions might be asked?

One set of important considerations are highlighted by the recent popularity of “Integrated Learning Systems” (ILS). ILS combines presentation of material, testing, and tracking of student progress into one automated package. But it is a package with a severely restricted understanding of education. The Integrated Learning System “labs,” equipped to process students by the roomful,

are prime examples of the non-neutrality of technology. They do not foster all or even several types of learning but rather one particular, and particularly narrow, conception whose origin is not with teachers who work with children but with the technologists, industrialists, and military designers who develop “man-machine systems.” They do not encourage or even permit many types of classroom organization but only one. They instantiate and enforce only one model of organization, of pedagogy, of relationship between people and machines.³

What assumptions are built into a technology on the nature of learning and the goals of education?

The distance-learning classrooms being built at many colleges and universities also reinforce a single pedagogy. The distance-learning design meets the need to capture the sights and sounds of the classroom with camera and microphone by constraining the location and movement of classroom participants and furniture.

The result: Technology limits the form of pedagogy to a very traditional delivery of information, conveyed from an authority-invested instructor positioned at the front of the room to rows of passively absorbent students.⁴

What sort of "baggage" comes with a given technology? What assumptions are built into a technology and imposed on its users as to the nature of learning and the goals of education? As David Noble puts it, technology is "hardened history, frozen fragments of human and social endeavor."⁵

The work technology's developers do, based on whatever they conceive to be "natural" and "appropriate," is given durable form in the technology itself. What social relations they take for granted will tend to persist wherever the technology propagates. Maybe such tendencies can be overridden by those who use the technology, but it will not be easy.

Consider the "Instructional

Management System" marketed by Abacus Educational Systems and used in many school districts. This is a performance-monitoring and report-generating software package, used for curriculum design, lesson planning, test generation and scoring, record-keeping, and performance evaluation. It integrates all these tasks by basing instruction on lengthy lists of simple, specific objectives.

Student progress is continually monitored on a check-off basis, "yes" or "no" on each objective, and the results are readily aggregated to any level of interest, at any time.

But the Abacus package does far more than "assist" with these pedagogical and administrative tasks; it will in fact determine important aspects of the educational process by constraining the form of instructional objectives. Student mastery of each objective can only be expressed as a simple "yes" or "no," as determined by computer-scored, multiple-choice tests.

The adoption of such a system clearly creates enormous pressure for adhering to certain educational philosophies rather than others. What if, for instance, a teacher felt the most important thing for students to learn was how to ask good questions? Where would that fit into this scheme?

The accountability systems now being implemented at many uni-

Insisting on readily countable outcomes compels us to prioritize the superficial over the substantial.

versities share these features. At my own institution, we are in the midst of an exercise requiring each unit and sub-unit to provide administrators with a list of numerical “outcomes” by which their effectiveness may be measured.

The next step will presumably be tying budgetary allotments to each unit’s progress according to these measures. This procedure is touted as establishing a “rational” basis for budgeting, which in one sense it surely does. But it also introduces a thoroughly perverse incentive structure.

By insisting on readily countable outcomes, it excludes what I would consider all the most meaningful results of our work, and compels us to prioritize the superficial over the substantial.

It would be easy enough, for instance, to count the number of students who take my classes. But can I reliably count those whose view of the world has been transformed? I can count how many students pass through my office, but can I request to have my effectiveness as an advisor measured by “number of alienating experiences compensated for”?

These examples reflect an obsession with narrowly construed information, in which fundamental questions of what education is for are displaced by preoccupation with an enormous stream of num-

bers. In each case, a technology embodies those priorities and imposes them on its users.

The computer has intensified this problem, through facilitating the management of large amounts of data, but it certainly did not create it. The computer is simply a mechanical manifestation and carrier of the underlying social vision.

Alongside the questions of what assumptions are built into a given technology and what social relations it embodies, it is equally important to consider the context in which the technology is used.

Much of the literature on educational technology has a narrow focus on the characteristics of the technology itself. To gain a full understanding of why a particular piece of technology is or is not used, or used in particular ways or has a particular impact, we need to pay careful attention to the social context of its use: Who is using it? Why? Under what conditions and pressures? All of this has as much to do with the eventual outcome as the nature of the technology itself does.

I am involved in a research project at a local elementary school, where it has become apparent that such contextual factors as an unfavorable student-to-teacher ratio help determine how computers are used in the classroom.

Where students are customers and knowledge is a product, how is technology likely to be used?

The staff at this school are committed to integrating the computer into the curriculum, rather than treating it as some sort of extraneous add-on. But given that there are too few adults in the classroom to meet the diverse needs of the students, teachers sometimes find they must resort to using the computer as a reward and withdrawing access as a punishment.

In the immediate situation, the teacher gets compliance and the student gets some experience with the technology. But, ultimately, this practice interferes with integrating the computer into the curriculum, and students become habituated to a "carrot-and-stick" model of social interaction—even though no one involved seeks these outcomes.

Higher education should also examine the context of technology use. One central feature is intense economic pressure. With the administrative response to this pressure now transforming nearly every aspect of university operations, we should expect it to influence the use of technology, as well.

Administrators everywhere—with varying degrees of faculty resistance—rely increasingly on part-time faculty, outsourcing schemes, ancillary revenue sources, and a general embrace of business-oriented thinking. Here is a *Wall*

Street Journal report on cost-cutting measures at Salem College in North Carolina:

Salem's president, Julianne Still Thrift,⁶ explains such measures with the business-world language that has become common among college administrators. "It's the same here as at IBM or AT&T," she says. "I've got to have a slimmer staff, I've got to produce more with what I have, and I've got to market aggressively."⁷

In an environment where students are "customers," knowledge is a "product," faculty are "human resources" or "content providers," and administrators are preoccupied with expanding "market share," how is technology likely to be used?

Surely, technology will be used to enhance the revenue stream by increasing enrollment, package knowledge as a salable commodity, and reduce the cost of personnel.⁸

Broadcasting instruction via video and capturing it for later re-use, with or without the participation of the original faculty, fits this agenda. So does transferring the packaged instructional product to the World Wide Web. The Web facilitates re-use and adds the enticement of paid advertising.

Of course, the existence of such an agenda by no means guarantees its fulfillment. Competing agen-

Rather than ask whether a particular use of technology is a good idea, we need to ask: Good for whom?

das—often promoted by faculty and students—can prevail, as demonstrated by last year’s faculty strike at York University in Toronto.⁹

The point here is simply that if one wishes to understand technology in use, studying the context of that use—the complex net of relationships already inhabiting the site—is crucial.

Something else often overlooked is how people in different social positions can have very different experiences with the same technology. Rather than ask whether a particular use of technology is a good idea, we need to ask: Good for whom? Who benefits—in what ways—and who doesn’t?

There had been systematic inequities throughout the 1980s and early ’90s in K-12 instructional use of computers.¹⁰ Measurements of computer use both in and out of school, at all ages, in several countries, found less access for girls, as well as for students of color, children from low-income families, and students labeled “low-ability.”

The type of use varied along the same lines. Even when students from these groups had access to computers, they were disproportionately engaged with drill-and-practice software, “mastery” learning of basic skills, and vocational training in using specific software.

Boys, white students, middle-class children, and students labeled

“high-ability” were disproportionately involved with open-ended simulations, integrated applications, and programming. In effect, some students were learning how to direct the new technology while others were learning how to be directed by it.

As a result, the already advantaged became more so, adding yet another domain to their list of advantages. The computer, introduced partly in hopes of creating new opportunities for all children, by and large made things worse, even when everyone got to use it.

The changes transforming higher education certainly portend similarly uneven consequences.

Regardless of how the lines are drawn, there are always varying needs and interests that require “disaggregating” the question of a given technology’s impact.

Let me propose a set of questions that ought to be asked if one is serious about understanding the meaning of any technological intervention in educational institutions.

- First, why is this initiative even occurring? In particular, is it technology-driven—based on a perceived need to have the latest technology—or curriculum-driven—based on a careful discussion of educational goals, and of what means are lacking in order to reach those goals?

- What social visions are built into—and in turn enacted by—a given technology? Does it enforce particular forms of pedagogy? Does it impose a certain conception of knowledge or of the learning process? Is it compatible only with particular views of what education is for?
- How is the context of use likely to shape the way this technology is employed? Who is using it, why, toward what ends, under what conditions and pressures, with what support-

ing resources?

- How are groups of people in different structural locations likely to be affected differently by this initiative? Who will be helped, and how? Who will be harmed, and how?

The answers to these questions should underscore—despite our culture's disinclination—the fundamentally social nature of the technology in question, a prerequisite to any meaningful effort to determine its role in our lives. ■

Endnotes

- ¹ Bailey and Lumley, 1994, 6. Although several of my examples are drawn from the world of K-12 public schools, that being my own field of study, the same tendencies are readily visible in higher education as well.
- ² Crawford, 1994 (no page numbers).
- ³ Hodas, 1993 (no page numbers).
- ⁴ See Waltz, 1997.
- ⁵ Noble, 1984, xi. See also Latour, 1991.
- ⁶ Dickens could have done no better.
- ⁷ Horwitz, 1994, A1.
- ⁸ For a fuller examination of these trends and their meaning, see Winner, 1997 and Noble, 1998.
- ⁹ See Noble, 1998.
- ¹⁰ See Sutton, 1991 for one extensive research review.

Works Cited

- Bailey, Gerald and Dan Lumley. "Create a Culture of Technology." *Technology & Education*, supplement to *Electronic Learning Magazine* (winter 1994): 6.
- Crawford, Rick. "Computer-Assisted Crises," 1994. Essay available at the International Philosophy Preprint

Exchange at ftp://Phil-Preprints.L.Chiba-U.ac.jp/pub/preprints/Political_Phil/Crawford.Computer-assisted_Crises/tek_crit.txt. [A condensed version of this essay appears in *Invisible Crises*, ed. G. Gerbner, H. Mowlana, and H. I. Schiller. Boulder: Westview Press, 1996.]

Hodas, Steven. "Technology Refusal and the Organizational Culture of Schools." *Education Policy Analysis Archives* 1, no. 10 (1993). [EPAA is a peer-reviewed journal distributed electronically. The Hodas article is available at <http://seamonkey.ed.asu.edu/epaa/v1n10.html>.]

Horwitz, Tony. "Young Professors Find Life in Academia Isn't What It Used to Be." *The Wall Street Journal* (15 February 1994): A1, A8.

Latour, Bruno. "Technology Is Society Made Durable." In *A Sociology of Monsters: Essays on Power, Technology and Domination*, ed. John Law. New York: Routledge, 1991.

Noble, David F. *Forces of Production: A Social History of Industrial Automation*. New York: Knopf, 1984.

Noble, David F. "Digital Diploma Mills: The Automation of Higher Education." *First Monday* 3, no. 1 (January 1998). Available at http://www.firstmonday.dk/issues/issue3_1/noble/index.html.

Sutton, Rosemary E. "Equity and Computers in the Schools: A Decade of Research." *Review of Educational Research* 61, no. 4 (winter 1991): 475-503.

Waltz, Scott B. "Virtual Classrooms as Merely That: Implications and Limitations of Distance Learning Classrooms." Unpublished manuscript. State University of New York at Buffalo, 1997.

Winner, Langdon. "The Handwriting on the Wall: Resisting Technoglobalism's Assault on Education." In *Tech High: Globalization and the Future of Canadian Education*, ed. Marita Moll. Ottawa: Fernwood, 1997. Available at <http://www.rpi.edu/~winner/queens2.html>.