Revising the Principles of Technorealism

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While preparing a talk for the Victorian Section of IEEE, I stumbled on the home page of the technorealists (www.technorealism.org). The overview proclaims that technorealists "seek to expand the fertile middle ground between techno-utopianism and neo-Luddism." Their goal is "neither to champion nor dismiss technology, but rather to understand it and apply it in a manner more consistent with basic human values." Although these statements show the technorealists' hearts to be in the right place, the eight principles that follow suggest that their minds have drifted way off course. The principles smack more of popular journalism than realism.

My misgivings grew stronger when further Web wandering brought me to Harvey Blume's comment in *Atlantic Unbound* that the technorealist movement seemed by 2000 "to have faded away … because the initial statement of technorealistic principles was simply too noncontroversial" (www.theatlantic.com/unbound/digicult/dc2000-01-13.htm).

That the technorealists little understand technology is unfortunate; that their mistaken ideas should be deemed uncontroversial is a revelation of the prevalent misunderstanding of technology that makes us tragically prone to be its slaves instead of its masters.

Technorealism needs the profession's intervention to become realistic.

These thoughts prompted me to suggest in my talk that engineers have a professional responsibility to bring realism to technorealism.

TECHNOLOGIES

The first technorealist principle asserts that

Technologies are not neutral.

This principle derives from the statement that "Technologies come loaded with both intended and unintended social, political, and economic leanings." Yet technologies do not simply *come*—loaded or otherwise—technologists *develop* them. Further, technologists—not the technology itself—supply any intended or unintended leanings these technologies might have.

In digital technology's case, technologists do not yet know themselves. The workers in more traditional technological areas distinguish between technicians, who know a trade and build and repair things, and professional engineers, who exercise professional judgment to develop and design the things the technicians use, build, and repair. By nature, technicians must answer to their employers and customers. Professionals, theoretically at least, hold a privileged place in the community because their education and experience qualify them to exercise judgment in their use of technology—which the public assumes will be exercised for the community's benefit. People expect professionals to be beyond the command of employers and clients in matters that concern the public good.

Digital technologists, at least in the computing field, seem mostly to be technicians who do their own designing and who seek distinction in arcane specialties. As technicians, they have little incentive or inclination to look past their employer's interests and leanings. The first principle should be that

Technology is *neutral.*

THE INTERNET

The second technorealist principle maintains that

The Internet is revolutionary, but not Utopian.

All the technorealist principles suffer from a misplaced preoccupation with digital technology, but it's especially strong here. Digital technology provides only a secondary tool, one that supports primary technologies such as genetic manipulation, medical imaging, and integrated-circuit manufacture.

The Internet is thus neither "an extraordinary communications tool" nor "revolutionary." It simply represents the current stage in the develop-

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ment of human capabilities through written language, which itself derived from the spoken form. Europe had an Internet two centuries ago: a semaphore system connecting Spain, Italy, France, Germany, and the Low Countries. Internets have developed in fits and starts since then, and will go on doing so.

So far, the main impersonal uses of the Internet and other digital technologies have been conservative, reinforcing and extending the existing social structure. This process has been good for some, bad for many, not because of the technology but because of how people use it.

The personal use of the Internet represents nothing more than a continuing evolution that has taken us from post to telegraph to telephone and beyond. The second principle should be that

The Internet is the present stage in the evolution of the technology that underpins human civilization.

CYBERSPACE

The third technorealist principle observes that

Government has an important role to play on the electronic frontier.

In their explanation, the technorealists equate the electronic frontier to "cyberspace [which] is not formally a place or jurisdiction separate from Earth." For them, "the state has the right and the responsibility to help integrate cyberspace and conventional society."

Cyberspace, one of technobabble's more ludicrous coinings, seems to be anything but a place or jurisdiction. Margaret Wertheim sees it as "a repackaging of the old idea of Heaven but in a secular, technologically sanctioned format" (*The Pearly Gates of Cyberspace*, Doubleday, 1999, p. 24).

If cyberspace refers to anything, it refers to the ubiquitous storage and transmission of digital data. The third principle should be that

Government has an important role to play in bringing the benefits of digital technology to the community.

INFORMATION

The fourth technorealist principle states that

Information is not knowledge.

The technorealists explain their reasoning with a welter of pompous banality for which, unfortunately, the computing profession must bear responsibility.

Before technologists worry about schools, they should be concerned with the effect their technology has on communities.

Nearly 50 years ago, wise pioneers persuaded the profession to officially adopt clear and unambiguous definitions for the two most important words in our professional vocabulary: *data* and *information*. In brief, *data* refers to the conventional representation of facts or ideas, while *information* refers to the meaning people give to data. The profession has ignored this vitally important distinction, allowing the two terms to become almost synonymous, and has thus supported confusion and obfuscation in public discussion of digital technology.

If the profession would only readopt these two standard definitions and promote them to the public, the difference between machines and people would always be clearly visible. The fourth principle should be that

Only people process information, machines only process data.

SCHOOLS VERSUS EDUCATION

The fifth technorealist principle states that

Wiring the schools will not save them.

Two assertions underpin this principle:

- "The problems with … public schools … have almost nothing to do with [digital] technology," and
- "The art of teaching cannot be replicated by computers, the Net, or by 'distance learning.'"

Despite the truth of these assertions, the resulting principle is much too weak. Its weakness lies in aiming at *schooling* rather than *education*, for only through education can children become full participants in society. Anything less than education for all children perpetrates a gross injustice.

Why is schooling secondary to education? Because the other members of a child's family constitute the child's first society and thus provide his or her main educators. If the family fails, the community must step in. If a family or community cannot educate its children, school will be unlikely to succeed where they have not. A misfit in the family usually becomes a misfit everywhere else.

Therefore, before they worry about schools, professional technologists should be concerned with the effect their technology has on families and communities. So should the government. The fifth principle should be that

Education is a basic human right, but it must come from the family and the community, not from schools or machines.

INTELLECTUAL PROPERTY

The sixth technorealist principle claims that

Information wants to be protected.

The motivation behind this absurdly worded principle is "that cyberspace … [is] challenging our copyright laws and frameworks for intellectual property." The technorealists' solution to this perceived problem calls for updating the old laws in pursuit of an old goal: "to give authors … an incentive to create."

They have their background wrong. Intellectual property rights are monopoly rights and as such have been regarded with extreme disfavor by democratic legislators. Coming late on the intellectual property scene, the drafters of the US Constitution—wary of the bad effects such property law had caused in Europe—stood strongly against monopolies of any kind (digital.library.upenn.edu/books/bplist/archive/1999-02-11$2.html). Only

with great reluctance did they give to Congress, in Article I Section 8, "the Power … To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries."

Viewed in this light, much intellectual property law has run off the rails and could even be viewed as unconstitutional in the US. Lawmakers stretch copyright to allow commercial profit from any expression of any idea and for its each and every use. Patent holders use their rights to aggressively discourage innovation and competition.

Jefferson and Madison would regard what is happening as a contemptible perversion of their work. Both copyrights and patents should be dropped, and only intellectual property monopolies such as trademarks and industrial designs should be granted—and then only to promote fair trade. The sixth principle should be that

Facts and ideas must be used for the public good.

CONTROLLING THE AIRWAVES

The seventh technorealist principle argues that

The public owns the airwaves; the public should benefit from their use.

This strangely worded principle springs from the Gilbertian antics of governments and telecommunications companies during the feeding frenzy that third-generation mobile-telephone technology prompted. Although the frenzy seems to have subsided, some points remain to be made.

The radio spectrum cannot be owned. Clearly, a government can grant or deny the right to emit electromagnetic radiation, just as it can grant or deny the right to fly or otherwise drive vehicles. The point of a democratic government is that it should use its power over rights to serve the greatest public good. In matters of public good, the community's welfare, not the economy's, provides the main criterion. The seventh principle should be that

Electromagnetic radiation cannot be owned, but the community must control its use for the public good.

UNDERSTANDING

Curiously, the eighth technorealist principle proclaims that

Understanding technology should be an essential component of global citizenship.

The technorealists pin this requirement's necessity on "a world driven by the flow of information," as though the world of humans hasn't always been thus. They define *global citizenship* as involvement in understanding "interfaces" and creating better tools.

Citizenship is more a matter of understanding society than of understanding digital technology. Further, the only understanding we need of any particular technology is how to control and exploit it. I need to know how to drive my car, but I get a mechanic to maintain it. Trying to make a technologist out of everyone is silly.

The idea of global citizenship does raise the important issue of public good on a global scale. Simply getting everyone to use digital technology is tragically impractical in a world where two billion people exist on less than one or two dollars a day. Surely, we should marshal technologies of all kinds to reduce this shameful inequality. The eighth principle should be that

Using technology to reduce inequity should be an aim of global citizenship.

Techno-utopianism, the belief that advancing technology will automatically bring global prosperity, is as ridiculous as neo-Luddism, the belief that global prosperity can be achieved only by rejecting technology. Although technology is inherent in all human civilizations, *people* develop it.

Yet the nature of any civilization depends on how it uses technology. Low technology used well might better serve a community than high technology used poorly. To prosper, any community must include professionals who use their expert judgment to guide the development and use of technology to the community's greater benefit. In today's world, digital technology clearly holds great importance, not only for its role in supporting human interactions and everyday activities, but for supporting the development and use of other technologies as well.

Technorealism should be based on the idea that people are more important than technologies. Before we can properly develop and use technology, we must first understand how people interact and coexist. Computing professionals can play an important role in guiding the future development of our global civilization, but their view of digital technology and the people they help must be realistic. ■

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