Guest Editorial

Will Computers Dehumanize Medical Care and Education?

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Is there anyone left who is not aware of the growing presence of computers in our lives? Major consumer magazines, professional journals, television broadcasts, and daily newspapers are filled with information and promotions about the latest developments in the exploding world of microchip technology.

The medical profession is hardly untouched by this spreading phenomenon. The best available current forecasts indicate that there will be an increase in computer use by physicians of 40 percent per year for the next three years![1]

Enthusiasts proclaim that our personal and professional lives will benefit enormously from the work-saving, time-saving, entertainment-giving capacity of these technological marvels. Detractors say that the microcomputer's arrival signals the end of our last hopes for retaining a humane, personal brand of medicine and medical education. There is little doubt that those in the medical profession will all feel the impact of computers, but will the growing presence of computers bring marvelous new opportunities and achievements or will it accelerate a decline?

At the University of Michigan's recent winter graduation ceremonies, President Cecil Mackey of Michigan State University reflected the concerns of many in saying, "The question for your era, stated broadly, is whether technology will be master or servant—a tool of oppression or an instrument for the general welfare."[2] Are such warnings just rhetorical hyperbole, made mainly for dramatic effect? Let us examine some of the issues and possibilities.

Technology Can Change Us

The capacity of technology to influence people is nicely illustrated by the way many people have changed their view of time as a consequence of converting to digital watches. In the days of the spring-driven watch, many of us were rather loose about time-keeping. Watches seldom gave highly accurate time and were not easy to read precisely. We generally thought about time in such terms as "about noon," or "nearly 10:30" and were satisfied with rough approximations. With the conversion to the microchip digital watch, some of us now sound like certifiable compulsives, reporting

time as "8:27," or "10:52." It is not that our personalities have changed; the technology has changed, and thus the quality of information available is more accurate and more readable. Unwittingly, we have come to value a different level of precision. Although this move toward enhanced precision in time-keeping has had little consequence for most, it serves to suggest what can happen, on a much larger scale, with potent technology.

Further, that potent technology is very much at hand. Each day makes more power available for doing more things with smaller computers. The potential of this power can be illustrated with a brief look at the changing process of writing, secondary to the arrival of a superb tool for writing: the microcomputer.

As experienced writers know, high-quality writing seldom happens without extensive rewriting. Beyond having something worth saying, a writer must be a good editor (rewriter). One has to be willing (and able) to change words and sentences, to move paragraphs to new locations, to reshape descriptions, to add examples and explanations. Most professional writers go through multiple drafts before beginning to be satisfied with their product. The tools with which we write can affect our writing.

The more difficult extensive rewriting is, the less likely some writers are to do it. The mechanical difficulty of doing extensive rewriting has served to keep many people from doing much writing, and, unless they do much writing, they are not likely to write very well. Like all skills, writing must be practiced . . . often.

No technology can give people talent they do not have. It cannot provide interesting ideas or the skill to convey them in writing. How do writers develop these abilities? Mainly through practice—the more they write, just as the more they play the piano or tennis, the better they tend to get. Anything that discourages a person from practicing reduces the chance of improving.

In other words, the arrival of the widely available word processor, via the inexpensive microcomputer, marks the arrival of the possibility for far larger numbers of people to practice more, and thereby become much better writers.

Please note the key word in the last paragraph: "possibility." The word-processing power of computers is now widely available, but this will not create by itself a general improvement in writing ability. The possibility is there, however. For the first time in human history, large numbers of people can approach writing as a pleasant and possible task. They can "play" with their writing, move it around, restructure it at will. They can experiment, switching back and forth between approaches. The computer (with appropriate software) can check their spelling and grammar, determine whether they have overused any words, and estimate the reading level of their writing, relieving them of those tedious, difficult tasks that are often left undone by writers using precomputer tools.

The Up Side of Computers

The capabilities computers confer upon writers are splendid examples of the up side of this technology. Computers *can* do wonderful things. They can give us powers to perform tasks that otherwise would be too difficult, time-consuming, tedious, or dangerous. They will enable us to do office-management, instruction, communication, and other tasks that can make work easier, more effective, quicker, more accurate, and even more fun. They will enable us to keep and use medical records more intelligently,[3] and the enormous intellectual burden of medicine will become manageable. Studies at the University of Pittsburgh have shown that responding appropriately to an "undifferentiated patient" can require at least 300,000 discrete pieces of information[4]—an impossible task for the unaided human brain. There is simply no doubt about the computer's capacity to be of help; it is already doing all of these things and more.

What About the Down Side?

What are the risks of the growing presence of computers in our lives? Perhaps the answer can come from experiences with other forms of technology. It seems fair to say that we (Americans in

general and physicians in particular) have not done a good job of keeping technology in perspective. We have tended to be so enamored of technology that we have allowed it to dominate us, to dictate our values, rather than the other way around.

Consider some examples. In medicine, there is a direct relationship between the use of technology and physician income. There is virtual straight-line linkage between the proportion of time spent with technology and annual earnings. In other words, the more time a physician spends directly with people, involved with their personal concerns (being less technological), the less he or she is likely to earn. There is little doubt that much medical technology is used more than is really necessary. Such technology is used, in part, because it is there. It is difficult not to use powerful capabilities when they are available. When you buy a car that is capable of going 120 mph, it tends to be difficult to observe a 55-mph speed limit.

Medical education has become dominated by the technology of evaluation. Despite widespread recognition of the severe limitations, even dangers, of using multiple-choice questions as a primary measure of physician competence, they remain dominant measures. The technological elegance of the machine-scorable test is seductive. As Rene Dubos has aptly observed, "The measurable tends to drive out the important" (personal communication, March 1978). Put another way, we would rather assess what is easily measurable through technology than go to the trouble of inventing ways to assess something that is more important but for which technology offers no measuring tools.

How Will Computers Be Used?

Computers now hold the promise of doing much of our complex work and relieving drudgery. In the most optimistic characterization, physicians will delegate to computers those mindless, repetitive tasks on which so much time is now squandered, leaving them free to devote much more of themselves to the human side of their work. This hope, which so many now share, was expressed well in Truman Schnabel's recollections of medicine as practiced in his father's day: "In the future, the place of medicine's art in the care of the sick may to a large degree depend on the manner in which computers are used. With their help, primary care physicians may find time to give the pe nalized kind of care each individual so rightly deserves."[5] The fond expectation is that all physicians will have more time to talk with patients, to consult with students, to keep up to date. But, will they *really* do that?

The question is *not* whether computers *can* make these desirable changes possible. There is no doubt they can. But, will these changes actually happen? Might we use our newly freed time for scrambling after more "productivity," doing more technological things, still at a distance from those people we mean to serve as clinicians and as teachers?

If we look back a decade from now and observe that computers did not liberate us, that we did not become more humane as a profession, and that we did not find new ways to do the personal work of medicine or education, we will have no one to blame but ourselves.

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