

[Talk given at the Conference on Technology for Learning, Teaching and the Institution, JISC-CETIS, Birmingham, UK, 2008.]

The Online Education Controversy

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The phrase “educational technology” is ambiguous. It usually refers to technologies employed by educators. But it can also mean the opposite: educators employed by technologies. In this latter sense “educational technology” is an oxymoron that appeals to some of those who administer educational institutions and their allies in education departments, technology companies and government.

Here is William Brody, the retiring President of my old university:

“If you went to a Johns Hopkins class circa 1900, and you went today, probably the only difference would be today we have PowerPoint. It would look exactly the same. If you went into an automobile plant in 1900 and today, you wouldn’t recognize that you were in the same place. Almost every other aspect of society has employed technology to reduce the labor content needed to produce a unit of service. The labor content of a car is dramatically lower today than it was 50 years ago or 100 years ago....At some point higher education is going to price itself out of the market....[unless] you figure out how to deliver the educational content in a different way.... One thing about education and information is it costs a lot to develop and deliver the first copy of it, but subsequent copies are less expensive. So you can distribute the same material to different audiences. You can develop a course in Shakespeare for undergraduates, which is delivered in a low student-to-faculty ratio with all the interaction you want. But you could then develop the same course to give to larger audiences for an evening course.”

The refrain is familiar. The “Ivy League” and presumably “Oxbridge” too will continue to offer students the personal contact with professors that we all enjoyed when we were in college. But future students will not be so lucky. They may have to settle for an automated tutorial delivered over the Internet, with videos of “star professors” taking the place of lectures and “interactive” tests taking the place of classroom discussion. Perhaps underpaid “tutors” will continue to lead online discussions in some programs, but the old model of the university as a place of collegial intellectual life is doomed to go the way of the steam car and telegraph.

Brody explains the economics of all this in the passage I have cited. Education today is a performance and like other performing arts, its labor costs are high since each show costs as much as the last. In fact faculty salaries represent about half the cost of higher education. The promise of technology is the transformation of education into a decreasing cost item, like CDs or pencils. Initial investment in courses may be high, but the nth copy will be nearly free. Economies of scale will save mass education from bankruptcy.

But will it still be education? This is the question asked by many professors and students. Brody himself reveals the problem later in his discussion. He points out that we have no clear measure of productivity in education, so we have no easy way to know what to preserve and what to give up in technologizing it. This is a different from the manufacture of automobiles. Henry Ford had no problem identifying and counting the product at the end of his assembly line. But how can we compare a personalized education based on human interaction with an automated product?

One can of course test for the delivery of contents, but that is a contentious definition of educational output, not least because of arguments over what those contents might be. No similar quarrels troubled Henry Ford. While some of his customers had quality concerns—Ford once said you can buy my cars in any color as long as it's black—the basic reason they wanted a car was clear and simple: to get from here to there, and this Ford supplied as well or better than his competitors.

I was shocked to read Brody's remarks in the Johns Hopkins Magazine, especially since I was involved in the invention of the very technology to which he implicitly appeals. I was working at the Western Behavioral Sciences Institute in La Jolla, California when the Director decided to create a distance learning system for executives based on a computer network. This was in 1981 and nothing like this had ever been done before. The Internet was closed to the public and e-mail was still new, used primarily in computer companies and a few university research departments.

In those days, when you signed up for a distance learning program you received a package of printed materials in the mail. You had no contact with other students or your teachers. We invented online education in order to add human interaction to distance learning. We found a proprietary network and a host computer running a computer conferencing program. We hired faculty from major universities, fascinated by the prospect of using a computer for the first time. Our program opened in January of 1982, but with only seven students. It had proven extremely difficult to recruit for a program so innovative almost no one could understand it. The faculty still had to send out readings by mail, but our students could discuss the readings online and discuss they did, generating hundreds of pages of transcripts each month. This communicative application of computer networks came as a surprise to both educators and computer specialists, although today it is fairly routine.

This experience put me in touch with leading people in industry and government. I recall being invited to lunch in the early 1980s by a vice president of one of the largest computer companies in the world. He asked my opinion on the future of computing. I thought to myself, if this guy doesn't know and is asking me, a student of Herbert Marcuse, to tell him, then no one knows! It became clear to me that technology was highly flexible and unpredictable and not at all like the image of the rigidly rational system projected by admirers and critics of technology alike. In fact we were proving this point in practice. By creating the first online education program at a time when computers were understood as calculating and filing devices, we contributed to reinventing computer technology as a medium of communication.

But there were many problems. The normal way in which one learns to teach is by being taught. Most people who have studied in a classroom have no difficulty performing the basic rituals of teaching such as facing the class to speak, recognizing those who raise their hands, using a blackboard, and so on. But none of our teachers had ever been in an online classroom and so they had no idea what they were supposed to do. Neither did we. It took a while to figure out how to initiate discussion and build interaction online but eventually we devised a dialogic pedagogy which became part of the culture of our school. Once students experienced successful online classes, they were impressed and spread the word about our program. We were moderately successful for ten years but never attracted the kind of support we needed to make a major impact and meet our costs.

From these experiences we learned lessons that are still valid today. Text-based online discussion is an inexpensive and effective pedagogical format that requires no special equipment

and little training. The important point is that effective learning can take place through interactive on-line education. Not always, of course—what pedagogy succeeds every time—but often enough for us to form an ideal of good practice. Using computer conferencing software, faculty in many universities have for years now brought the excitement of classroom discussion to an electronic setting. New programs such as Blogs enrich the experience.

Such on-line discussions are not the same as face-to-face interactions, of course, but they have their own advantages. For the instantaneous back and forth of real-time discussion, they substitute a slower but still engaging day to day rhythm. With time to think and compose questions and answers, students who might never have participated in a face-to-face setting bring forward their ideas. The use of writing imposes a discipline and helps focus thinking. Faculty learn to grasp students' ideas at a much deeper level as they engage with them on line. Innovative pedagogical techniques have been adapted to the Internet and new forms of interaction invented. In successful applications, small classes are the rule: twenty is a good maximum. From an educational standpoint, there is little doubt that competent teachers under these conditions can be effective at sustaining a true equivalent of classroom interaction.

Large-scale interest in online education only appeared at the end of the 1990s, during a crisis in university funding. But paradoxically what computer companies and college administrators understood by “online education” was quite different from our pioneering program. The meaning of the term had slipped. Where we had added communication to a traditional distance learning system that lacked it, the new advocates of online education hoped to automate education on the Internet, eliminating the existing interaction in the classroom.

Of course the ambition to automate education provoked faculty rage. I recall feeling targeted by colleagues who blamed me for this monstrous assault on their profession. I could only say, “It's not my fault, I lost control of my idea long ago.” David Noble, the Marxist historian of deskilling, became the principal critic of online education and he and I participated in several public debates on the virtues and vices of the new system.

In my contribution to these debates I attempted to place the issues in the widest possible context. This was necessary because I was fighting on two fronts, against humanists who dismissed all electronic mediation and technocrats who saw in it the promise of eliminating the teaching profession. Their values differed but their arguments converged in a deterministic conception of technology as a dehumanizing and commercially profitable alternative to traditional arrangements.

The philosophical argument begins with Plato, 2500 years ago. One of the first educational technologies was writing, and like every subsequent educational technology, it had its critics. Plato denounced the medium for its inability to recreate the give and take of spoken discourse. Writing is analogous to painting, he has Socrates argue in *The Phaedrus* (a text that, fittingly, depicts an intimate conversation between teacher and student).

“The painters’ products stand before us as though they were alive, but if you question them, they maintain the most majestic silence. It is the same with written words; they seem to talk to you as though they were intelligent, but if you ask them anything about what they say, from a desire to be instructed, they go on telling you just the same thing forever.”

In short, Plato holds that the technology of writing has the power to destroy the dialogic relationship that ought to join teacher and student. Technology in the form of writing is the enemy of the human touch, a position familiar from critics of modern life today. How often have we heard that technology alienates, “enframes” and dehumanizes, that technical systems intrude

on human relations, depersonalizing social life and neutralizing its normative implications? Could it be that the humanistic bias against the computer goes back to Plato?

As Plato sees it, the medium in which we communicate determines the quality of our interactions. But this is a deeply flawed view. Rather, the social impact of technology depends on how it is designed and used. Writing can lend itself to ongoing dialogues between teachers and students, and speech can easily become one-sided.

However, while Plato's condemnation of writing was unfair, he alerts us to a real issue: whenever a new educational technology is introduced, arguments emerge for substituting interaction with the technology for the process of intellectual exchange. But there is something about dialogue, and the active involvement of the teacher, that is fundamental to the educational process and that should be woven into the design of every new instructional tool. Any break with this assumption would amount to an epochal change in the communication between the generations. Ultimately, then, the question comes down to whether we can still defend an understanding of education like Plato's or whether the Internet, a more powerful technology than writing, has finally rendered his conception obsolete. Neither television nor stand-alone computers ever managed to accomplish this feat, but many believe that such possibilities await us just a few miles down the information superhighway.

Plato's critique echoes still in such philosophers as Martin Heidegger and Jean-François Lyotard who identify the digital encoding of information in computers as the source of their dehumanizing effects. This argument culminates finally in the attack on online education for substituting computers for humanistic understanding. But the notion that the use of computers will somehow bias language and learning toward the strictly functional or technical is wildly off the mark. The deterministic hypothesis on which this notion rests has been refuted by the predominantly informal communicative usages of computer networks. To judge by the results users have had as much impact on computers as computers have had on users.

This argument opens the technical question of the design of computer systems in education. So long as the computer as such is the problem, design is unimportant. But if the computer is innocent, at least of the charge of dehumanization, then everything depends on how the systems are put together. Automation is one possible design agenda.

The issue of educational technology must therefore be framed in a broader context because it is not primarily a technical issue. It reflects the politics of education. It has to do with the relation of management and professionalism, which in turn concerns issues of career patterns, standardization, control, quality and the very definition of education. The resolution of these issues and the evolution of educational technology will go hand in hand.

Although many faculty see no way to reconcile traditional academic values with the changes made possible by the new technology, we cannot simply dismiss technology as some are inclined to do. Since the early 1980s, more and more of our social life has gone on in cyberspace. This is true even of the humanistic critics of technology. David Noble's famous essay entitled *Digital Diploma Mills* circulated on the Internet.

Despite the endlessly renewed and disappointed promise of virtual reality, many social interactions that used to be face-to-face are now mediated. For the most part the mediation is written text, which has become a far more flexible instrument than in the past. So, we are now typing our identities and our relationships. This remarkable change has freed us from time and space constraints while making us dependent on computers, software and the corporations that own online services. Has our social world been colonized by technology and these corporations, or have we imposed our communicative imperatives on the technocratic order of computing?

Will the very meaning of education be transformed to suit the limits of automated systems, or will educational technology be developed to serve something like education as we know it? As we will see, these questions hide a deeper one concerning the relation of technology to society.

The transfer of skills from craftsmen to machines is an old pattern that underlies the industrial revolution and continues through the Taylorist and Fordist developments of the 20th century. The industrial technical code aims to centralize control of the workforce and to lessen labor costs by substituting machines tended by unskilled labor for skilled labor. The automation agenda responds to this technical code.

The idea of lowering labor costs through a new division of labor is a child of capitalist manufacturing and especially of the industrial revolution. Its prophet was a Scot named Andrew Ure. His book, "The Philosophy of Manufactures," explained the whole program in 1835. Back in those early days, it was easier to say what you meant without fear of exposing the embarrassing truth to alert critics. Listen closely and you will hear the unspoken and no doubt unintended sub-text of Brody's message.

"By the infirmity of human nature it happens, that the more skillful the workman, the more self-willed and intractable he is apt to become, and, of course, the less fit a component of a mechanical system, in which, by occasional irregularities, he may do great damage to the whole. The grand object therefore of the modern manufacturer is, through the union of capital and science, to reduce the task of his work-people to the exercise of vigilance and dexterity".

Is such a gloomy version of the future of education really plausible? Is it likely that "self-willed and intractable" professors will disappear as have weavers, shoemakers, and typesetters, to be replaced by cheap unskilled tutors and online videos?

The project of automating education on the Internet follows a long line of initiatives beginning in the 1950s with Computer Aided Instruction, or CAI. CAI was delivered by the (ironically called) Plato system, and later by application programs running on personal computers. But it could never offer a really convincing substitute for live face-to-face instruction. At the end of the 1990s, we were led to believe that the new multimedia features of the Internet could provide a more realistic experience. The Internet promised simulated interaction and video delivery of canned lectures by "star" professors, adding a little life to the sterile programs of earlier CAI.

The ideal of automated education is no doubt still a minority view, but it has gained sufficient plausibility from advances in computing and the Internet to occupy a considerable space in public discourse. Other current buzz words such as "self-paced individualized instruction" feed into this trend. The essential idea is that in a future virtual university, accomplishment will no longer depend on contact hours, indeed, on contact with professors.

Much of today's reform rhetoric, with its appeals to the revolutionary potential of virtual universities and competency-based degrees, hints at the obsolescence of the traditional campus and its teaching methods, arousing suspicion among faculty that technology will be used against them. In the longer run, should teachers be expelled from the classroom, we would truly enter a new era. One fundamental project of modern societies, the substitution of technical control for traditional methods, and devices for social arrangements, here overflows the sphere of production to which it has been largely confined up to now and enters the realm of social reproduction. In this model the "disembedding" of the educational process, its disconnection from the local setting of the campus, is also its depersonalization. If human contacts are no longer central in so fundamental a growth process as education, then surely we are headed for a

very different ideal of adulthood and a very different kind of modern society from the one we live in at present. But is this a necessary consequence of modernization?

Ironically, contemporary theory (if not always practice) in the business world has left behind the industrial era's fascination with deskilling. Starting with Peters and Waterman's 1982 best seller *In Search of Excellence*, Frederick Taylor's old model of deskilled labor and hierarchical management was blamed for everything that ailed American business. Since then the lesson has been hammered home in dozens of similar books devoted to exploring a third way, an alternative to the old opposition of "man" versus "machine."

What we learned from this literature is the *complementarity* of human and computer capabilities. While humans are best at dealing with unexpected situations and responding to novelty, computers can organize the vast amount of data required by modern production. Those companies prosper that choose technologies designed to get the best from both workers and machines. But it is also possible to use machines to replace workers in roles for which human beings are most suitable. There is a false promise of technology behind such strategies, the promise of total control. A similar false promise is at work in the vision of automated education. But complementarity is also possible: teachers can manage the complex and unpredictable communication process of the classroom, whether face-to-face or online, while data is delivered not only by textbooks as in the old days, but also by the network.

The specifics of the business literature do not always apply to colleges and universities, but the emphasis on technological *choice* is relevant. Unfortunately, though, higher education hasn't quite gotten the message. There is still a tendency to believe that computerization in itself sets the reform agenda in some clear-cut and unambiguous way. And there still exists plenty of faculty opposition to the supposed *consequences* of the new media, as though their impact were predetermined.

I recall a meeting at San Diego State University, where I used to teach. This was during a debate over the "wiring" of classrooms by a public-private consortium to which the university belonged. The Chancellor held an open forum with faculty to discuss many current issues of which this was one. I was unable to get my question in during the discussion but I stopped him on the way out and asked him to explain the pedagogy the investment in information technology was supposed to support. He looked at me coolly, said, "We've got the engineering plan. It's up to you faculty to figure out what to do with it." And off he went: subject closed!

Would you build a house or design a new kind of motor vehicle this way? Surely it is important to find out how the thing is going to be used before committing a lot of resources to a specific plan or design. Yet this was not at all the order in which our Chancellor understood the process. Why not? I would guess it is because he did not conceive of educational technology as an evolving system, creating novel pedagogical challenges, but as an infrastructure, an "information superhighway," down which we faculty were invited to drive. And just as drivers are not consulted about how to build the roads, so faculty were not much involved in designing the educational superhighway.

But this overworked metaphor is altogether inappropriate. In the case of educational technology, the choice of infrastructure will largely determine the applications. If corporations rather than faculty are consulted about this choice, the outcome will be different from the ideal of educational community to which faculty are attached by their culture and traditions.

The view that educational technology is political challenges the commonplace notion that technology is above politics because it is based on value-free scientific knowledge. This is no

longer believed by those who study science and technology seriously today. Constructivist approaches in technology studies are particularly important for understanding the issues in debates over education.

The chief idea shared by these approaches is negative: the success of a technology is not fully explained by its technical achievements. There are always alternative paths of development at the outset and social forces determine which are pursued and which fall by the wayside. Behind each of the technical devices that surround us there lies a halo of alternatives that were eliminated at some stage and which we have forgotten or notice only in the quaint illustrations of old books. What is called the principle of “underdetermination” teaches that technical considerations alone cannot explain why we are living with this particular survivor of the process of elimination rather than that one, why for example we drive gas powered rather than electric cars.

To make matters still more complicated, the struggle between alternatives is not a straightforward competition to achieve the same goal. Approximately the same technology, with a slightly different design, can serve the interests and needs of very different social groups. Constructivists call this variability of goals the “interpretive flexibility” of technologies. What a technology *is* depends on what it is *for* and that is often in dispute at first. “The different interpretations by social groups of the content of artifacts lead by means of different chains of problems and solutions to different further developments...”.

The interpretive flexibility of technologies is greatest at the outset and diminishes as the competition between alternatives is sorted out. Finally, closure is achieved in the consolidation of a standard design capable of prevailing for an extended period. This is what happened to the bicycle, the automobile, and all the familiar technologies that surround us. This has not yet happened to the technology of online education.

Once closure is achieved in a certain domain, it influences the way we think and act in that domain. The impact of many such influences in a highly technologized society such as ours affects the kind of people who inhabit the society, their knowledge and skills, the communities to which they belong, the aspirations they feel, and therefore also the kinds of technologies they will create in the future. Truly, technology and society are co-constructions.

The constructivist approach represents technologies not as things but as processes in more or less rapid movement. The process pulls at first in several different directions but is finally stabilized in a single more or less durable form. Because our lives move quickly with respect to these stabilized forms, it appears that they are finished and fixed rather than temporary arrangements that may enter into flux again at a future date. We assume the functions they serve are the obvious ones similar technologies ought to serve rather than noticing the contingency of their purpose on a particular configuration of social forces that interpreted the problems in a certain way at the outset. Constructivism aims to overcome this illusion in order to restore a more accurate picture of the process of development.

To apply the constructivist approach to educational technology, we need to identify the various versions of it that currently coexist and from among which a selection will finally be made. There is a larger issue here which has to do with the overall social impact of the Internet. Much recent discussion of the Internet emphasizes its promise of epoch making changes in our lives. This theme is familiar by now. The transformation and democratization of politics, teleworking and telemedicine, the convergence of entertainment technologies around new models of distribution, are some of the miracles promised by enthusiasts, while skeptics worry about surveillance and commercialism. Thus the debate is not limited to education, which is

simply one among several fronts in the struggle to define the society of the future. The meaning of modernity is at stake in this struggle. One possible outcome is a society reflecting in all its institutions the logic of the modern factory, obsessed by efficiency achieved through mechanization and management.

But one can also envisage a very different outcome modelled not on the factory but on another modern institution, the city. The city is the place of cosmopolitan interactions and enhanced communication. Its god is not efficiency but freedom. It is not dedicated to the rigid reproduction of the same, the "one best way," but to the flexible testing of possibilities and the development of the new. Not hierarchical control but unplanned horizontal contacts. Not simplification and standardization but variety and the growth of the capacities required to live in a more complex world. The Internet extends this urban logic in a radically new way.

The factory model of education is based on the functions individuals serve in systems such as markets, workplaces, and administrations, while the city model conceives of the individuals as bearers of a range of potentialities that surpass any particular functional realization. The definition of those potentialities occurs in aesthetic experimentation, ethical and political debate, and technical controversies. The first view characterizes modernity as we know it. The tendency of this modernity is to replace human communication wherever possible by technical or bureaucratic systems that enhance the power of the few in the name of efficiency. Education, from this point of view, should be narrowly specialized and tightly controlled, both in terms of costs and content. Automated systems in which communication is restricted to the delivery of data and programs could serve this technocratic project.

The second view holds out the possibility of an alternative modernity realizing human potentials ignored or suppressed in the present society. Many of those potentials are specifically communicative and depend on the very practices regarded as candidates for cost cutting in an automated educational system. Furthermore, these potentials can only express themselves in a communicatively open environment. This vision implies a broad education for citizenship and personal development, as well as the acquisition of technical skills.

The question implied in the debate over educational technology is therefore: Which model, the factory or the city, will shape the future of education? Online education can serve either strategy in different technical configurations. Automated education is certainly possible although at the price of a redefinition of education itself. The generalization on the Internet of a more traditional concept of education centered on human interaction would facilitate participation by under-served groups and might raise the cultural level of the population at large. But it would not cut costs and eliminate the faculty.

In shaping the future of our technologies, economic and political realities now look to play the leading roles. Higher education seems increasingly enamored with corporate rather than professional models of organization. The erosion of traditional faculty status continues apace in innovative institutions serving adult learners, now half the students in American higher education. Even the older universities that now teach a declining fraction of students employ more and more part timers in the search for "flexibility." And it is becoming more difficult to resist arguments against tenure, arguments that carry conviction with the public if not with most members of the university community. In short, there exists a great temptation to think of technology as a managerial tool for centralizing the university. And if we are not careful, something like this may actually happen in the confusing environment created by technological change. Bad decisions will be locked in technically and difficult to reverse.

The quality of college education is at stake not in whether we use computers but in how we use them. This is the real problem distorted in the current debates for and against technology. It is time to get beyond that frozen opposition to focus on the deeper social issues underlying our technological choices. The debate over educational technology must be framed in a broader context because the issues are not primarily technical.

Fortunately, how we design the new technologies is still an open question; the answer will decide which benefits and which limitations we end up with. Indeed, that choice will decide who the "we" are that peoples the educational institutions of the future, since our choices will define the future identities and roles of students and teachers. If we can resist simplistic appeals to managerial efficiency and focus our efforts on sustaining the dialogue that has always been at the heart of the educational experience, then technology holds great promise.