

Teaching as a Social Process

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It was in 1964, I think, when I first saw the now-famous *New Yorker* cartoon of a classroom of the future. The picture shows a tape recorder on each student's desk and a tape player on the teacher's table. The machines whir quietly -- and no one is in the room. Thus did the cartoonist skewer the stereotype of the classroom as a venue for transmitting information from teacher's brain to student's notebook. Today, with TV classrooms a stereotype for distance education, the cartoonist might render the scene as a virtual classroom populated with a camcorder and VCRs. In five years, the same cartoonist might add a new machine, a tester that certifies when a student machine has learned its lessons from the teacher machine. As in the original, the machines whir, and no one is present.

These images depict the modern teacher's anxiety: Will computers and networks eventually automate the tasks that now dominate teacher time and student time in school -- lecturing, distributing assignments and homework, note-taking, testing, and record-keeping? Why would anyone even think that computers might be as effective as real teachers? David Noble has used the term "digital diploma mill" to describe a possible future in which most teaching is done by machine and few teachers are actually employed. He is not alone in this concern. Many faculty find the scenarios plausible and worry that their personal futures will be as barren as this picture. Although Noble focuses almost exclusively on how such a future might leave faculty without jobs and without intellectual property rights to their courses, you don't have to be a professor to appreciate that something is profoundly unsatisfactory with this scene. It seems to be the logical conclusion of current trends, and yet it makes no sense. What is wrong with this picture?

In this essay I will propose that two popular stereotypes of teachers, the sage and the guide, are incapable of realizing the expectations of students, parents, employers, politicians -- and teachers. These metaphors obscure the fundamental social responsibility of a teacher as an expert professional in a domain. Students look to their teachers to show them the ways of a community and offer them entries into practicing memberships in that community.

According to the sage metaphor, the teacher is an information provider who lectures to a room full of students and occasionally tests them to see how much information each has received. This metaphor is often stereotyped as "the sage on the stage" or "the talking head." This view has rightfully come under criticism. It seems to imply that most everything a teacher does can be automated, given sufficient computing power and networking bandwidth. The early critics of this view proposed an alternative: the guide. According to the guide metaphor, the teacher is both a facilitator offering suggestions to students and also a coach offering practices. This teacher seeks to create an environment in which students discover the key knowledge for themselves without having to submit to a teacher's authority. This metaphor is often stereotyped as "the guide at your side," "the navigator," or "the coach."

These stereotypes raise more questions than they answer. Why do students care so much about great teachers? Why does a student aspiring to be a musician, or a software designer, or a physician seek apprenticeship with a great violinist, software builder, or doctor? Why do students compete fiercely for places in MIT, Stanford, or Harvard, where a Bachelor's degree will cost them \$150,000, when they can get the same courses taught by equally capable teachers in their state university for \$20,000? Why do so many students prefer courses that include strong elements of in-person participation to those that are completely on-line? And why aren't more students flocking to the growing cadre of on-line universities or vendors offering the recorded lectures of the world's greatest teachers? Neither stereotype explains these phenomena. The teacher as professional expert in a domain does.

Teacher as Information Conveyor: A Dying View

David Noble has written eloquently about the disastrous social consequences that would arise in a world of "digital diploma mills." Students would find such a world barren, a place that does not appreciate creativity or the special talents of each individual. Faculty would find themselves without jobs and their intellectual property rights expropriated by university administrators.

Although Noble appears on first reading to be exposing administrative abuse, a deeper reading reveals much more: he vividly depicts the contradictions that await us as long as we cling to our current discourse of learning and

teaching. Automation threatens the information-provider teacher because machines will ultimately be better information-channels than humans and because the products of a teacher's work (course materials) must be claimed by the university if it is to continue functioning after the teachers are gone.

Noble cites a drift in university practices since the 1970s to support his claims. That was when many universities undertook to commercialize research products, mostly through patents and licenses. More recently, he says, universities have undertaken to commercialize educational content, mostly through copyrights, intellectual property claims, videos, CDROMS, and Web sites. These processes have happened slowly without catching the attention of the faculty. Noble maintains that this drift poses a severe threat to the values of higher education, among them faculty control of the curriculum and processes of learning, academic freedom, faculty autonomy, and quality of research, faculty, and students.

It is easy to get drawn in by the apocalyptic claims and believe that the world depicted by Noble is inevitable. Is it? Will confronting, attacking, and blaming administrators avert it? Administrators have acted rationally in a discourse that we ourselves have created, the discourse of information. We have met the enemy: and he is us. Let us question the discourse and choose paths different from the ones it offers. No one wants a world with most teaching done by machines and the few remaining teachers the hapless victims of robber-baron administrators: accordingly, that world will not happen.

It's too bad that the sage and information-manager aspects of teacher are getting bad names from these scenes. They shouldn't. Students look to their teachers for wisdom and authoritative opinions (sage) and for access to information that can help them (information manager). Even if information manager is not the prime paradigm of the teacher, it is an important part.

The Teacher as Facilitator: Next Target of Automation

Some educators have proposed that the facilitator model is more suited to future teaching than the lecturer model. Let us examine this claim. The good news is that this view opens up the human side of learning because the teacher must deal with the diversity of concerns, learning styles, backgrounds, and talents among students. The bad news has two chapters: it does not address the automation issue and it is blocked by enormous institutional inertia.

First, automation is likely to make significant inroads into the guide and coach aspects of teaching. Researchers in artificial intelligence, education technology, and management are making considerable progress with

technology and processes capable of automating significant parts of the coaching function. AI researchers are studying natural language and immersion tutorial systems, virtual reality simulators, multistrategy learning systems, personal coaching agents, and neural nets for assessing competence by observing problem-solving strategies. Ed tech researchers are studying collaboration systems, individual history-of-action recorders, simulations, workbenches, tools for supporting student participation and collaboration, and new forms of computer-aided assessment. Managers are studying how to teach people to be good coaches, capturing on CDROM and videotape training processes that actually work.

Thus it is likely that there will come a time when students can receive meaningful inspiration or advice from recorded clips of great coaches at the exact moments when they encounter breakdowns in their learning. The successful tutorial systems constructed by Roger Schank are like this. Virtual-reality environments can host a coach's routines for training team members. A large semantic-network database can host a large number of possible paths that students might follow through a domain, including the many paths that lead to dead ends. Assessment systems already exist to administer non-repeating multiple-choice exams, grade programs, grade essays, and assess a student's level of competence at problem-solving in a domain; these systems are getting progressively more powerful and capable of making increasingly sophisticated and accurate assessments of human competence. (Education expert Howard Gardner argues that new kinds of tests for skillful behavior in domains may be accorded status as indicators of intelligence.) It is only a matter of time until these technologies mature and be capable of automating important parts of what we now call coaching, facilitating, and guiding.

The second reason that the facilitator role of a teacher may be an unrealizable dream is institutional inertia. Many of the skills associated with good coaching don't show up on the radar screens of our information discourse. They are not taught to PhD students aspiring to university positions because few of the faculty know how to teach them and because the students are not required to study with faculty who understand coaching (e.g., management or athletics). Moreover, many faculty see the type of environment in which coaching works best as a "training" environment and maintain that training is not the main function of the university. Assessment of teachers in their capacities as coaches must necessarily focus on the performance of students -- much as athletic coaches or managers are assessed by the performance of their teams -- a form of assessment that does not resonate with the standard practice of peer review. Teachers who embrace the role of coach often feel lonely and isolated in their institutions for these reasons. Such teachers are attracted to the growing number of private educational vendors and corporate universities that value the skill of coaching.

Shifting Markets

Reviewing our roles as teachers is not simply an interesting philosophical question; it is an imperative thrust upon us by new realities in the world. In his best-selling book, *School's Out*, Lewis Perelman depicted vividly how people will learn in a world dominated by information technologies, where work and learning are intimately connected. Many aspects of that vision -- certification, learning on demand, learning while working, self-pacing, access to recorded lectures, simulations, virtual realities, chat rooms, project groups, location-independent access, richly hyperlinked resources -- are already realities. A growing number of commercial "virtual universities" offer alternatives to classrooms. Numerous companies offer intensive training and certification programs. The recorded lectures of the best teachers are available on audio and videotapes. Perelman believes that many universities lack the inclination or institutional ability to compete in the new markets for education. He says that the "virtual university" is like the "iron horse" -- not a new kind of university, but a replacement.

Jeanne Meister, President of the Corporate Universities Exchange, describes an enormous network of corporate universities in the United States -- some 1500 of them with combined annual budgets of \$30 billion. Their number has quadrupled in the past decade. Most include specialties in information technology. By comparison, the number of departments granting IT degrees in universities is approximately 1000. You don't have to hypothesize about a network of corporate universities offering alternative education to universities. That network already exists. A few universities are positioning themselves as partners and suppliers of the corporate university network. Most are ignoring it.

Management guru Peter Drucker recently predicted that today's universities will be relics within 30 years. He based his claim on what he saw as a severe mismatch between universities as suppliers of education and the marketplace as buyers. He believes that universities have too much institutional inertia to respond in a timely way to the markets and consequently that private educational organizations will gain a foothold and take the business away from universities. Graduate and adult students may find technology-rich, low-commute, flexibly-scheduled alternatives more attractive than current universities.

The New University

These trends and new realities paint a picture of expectations on public universities that differ markedly from those of a generation ago. The public broadly expects universities to prepare their students for employment and help them maintain professional currency after graduation. The public also

believes that a well-educated workforce is economically competitive in world markets and that the education necessary to support this must continue through a person's career into retirement.

These trends have created a rich set of new opportunities for universities in research, professional education, and teaching. I will only summarize here what I have said at length elsewhere (*Educom Review*, November 1996). Universities are beginning to adapt to the demands of the marketplace. The successful ones will escape the dark future forecast by Drucker and feared by Perelman.

In research, we can learn much from the model designed by Dennis Tsichritzis, Chairman of GMD, the German National Laboratory for Information Technology. Tsichritzis focuses on innovation, which he says is the ultimate purpose of research. He recognizes three processes for producing innovation: generation of new ideas, generation of new competencies, and generation of new products. Each process leads to the adoption of new practices (the hallmark of innovation) by a different path. This model has been well received and GMD enjoys broad political support from universities, businesses, and government. One lesson that a university can learn from this is that its portfolio of research can include research that assists companies develop products. Broadened research portfolios will expand the ways in which faculty's creative energies can be harnessed, enrich the range of experiences available to students, and give access to new federal research programs and corporate research moneys.

In professional education, a rich new world of graduate programs is opening up, including professional certifications, professional updating, and teaching of higher levels of competence such as expert, virtuoso, and even master in selected domains. Even in the unlikely event that significant automation is achieved in many undergraduate courses, there will be plenty of work for faculty in professional and continuing education.

The Professional Teacher

In our current environments, teaching is perhaps the area of greatest stress for faculty. As discussed above, digital recordings, on-line assessment, and databases are taking over many familiar faculty roles. It is possible, but by no means assured, that machines can make inroads into the teacher's roles of inspiring, motivating, guiding, coaching, and managing students. By intelligently automating the routine parts of teaching, the technology can enable the faculty to spend more time on the human side of their roles, and to reach more students without losing the quality of interaction.

No amount of automation can displace the primary social function of a teacher: the expert, respected member of a professional community. Teachers are a community's representatives for the young and for others who seek recognition as a practicing member of that community. Students see a degree not as a receipt for attending classes, but as a certification for admission into a social network -- the network of people already in the community. The teacher is already a member of the social network to which the student seeks entry. The teacher can show the student the ways of the community and the practices and skills needed to function in the community. The teacher can be an ally to vouch for and endorse the student's entry when the time comes. The social networks of the elite colleges and universities wield much influence and control much wealth. This is why so many are willing to spend \$150,000 to wear the Harvard Crimson at graduation.

An analogy with physicians is helpful. You don't become a physician by obtaining an MD degree. You become a physician when the community of physicians declares you to be a physician. To achieve that status, you must achieve certain milestones including the MD degree, residency, licensure, and membership in a medical "college". Your teachers are central to your realizing your dream to be a physician. You do not look to your medical teachers simply to dispense wisdom about medicine or guidance about treatments; you want them to help you *become* a doctor. You look to your teachers to transform you from rank-amateur beginner to practicing professional. This is an awesome responsibility for a teacher.

Nonetheless, many faculty feel disoriented as teachers in the world of multimedia, web-based modules, TV links, liveboards, chat rooms, and other affects of information technology. They have not been trained as coaches and managers and their institutions offer no significant development programs to help them learn; and yet at some point they will be evaluated more on the results produced by their students than on the opinions of their faculty peers. They are professionals but do not see that this is the primary reason that students come to them. Herein lies the major opportunity for professional success of teachers.

In spite of the stress, the good news for students and teachers is that learning is more than information transfer, that automation can affect at most the information-transfer part of learning, and that the teacher is indispensable.

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