

The Silent Revolution in Higher Education

Herbert London and Mark Draper

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There is a silent revolution going on in higher education that in time will change the face of the academy. This is not a revolution in curriculum, albeit that is probably necessary. Nor is it a revolution in requirements, albeit that, too, would be desirable. The revolution we refer to is in the delivery system, i.e., the way information is conveyed and the manner in which students learn.

Amazing new technologies already under development in American labs are about to transform learning in profound ways. Rapid advancements will produce powerful new learning environments and experiences using such new tools as simulation, visualization tools, virtual environments, personal intelligent tutors, vast digital libraries, and interactive museums—learning and collaboration unbounded by geography.

Emergent technologies could help students of all ages reach their goals by teaching individuals precisely what they need to know in the way they learn best and at their own pace. Students will be able to learn faster and better than is now the case. They'll reach much higher levels of achievement, and at a drastically lower cost than even the relatively low tuition of public institutions of learning.

The first milestone will soon be reached: twice the learning in half the time at one-tenth the cost. Futurists like Thomas Frey predict that the speed of learning will increase tenfold, with the possibility that the equivalent of our current K–12 education system will be compressed into as little as one year.

Herbert London is president of the Hudson Institute, 90 Broad Street, 20th Floor, New York, NY 10004, and professor emeritus of humanities at New York University; Herb@hudson.org.

Mark Draper is vice-provost of Grantham University, 7200 NW 86th Street, Kansas City, MO 64153; mdraper@grantham.edu.

This appears a less exaggerated claim when one considers the inefficiency of the present system. At the moment, higher education generally fails to exploit the amazing power of the new educational technology. Computers have now been in classrooms for decades, yet almost none of the opportunities they provide for new approaches to learning and teaching has been realized.

If higher education had exploited the new technology to the fullest, everyone on the planet would already have access to a top-quality college education for pennies a day acquired in less than half the traditional four years. Instead, academics in most instances talk about the value of the machine, but fail to harness the educational value of the computer over the tried and tired method of the lecture.

As Graham Gibbs points out in “Twenty Terrible Reasons for Lecturing,” the shortcomings of lecturing are well known.¹ These shortcomings are addressed as well in such works as Donald Bligh’s *What’s the Use of Lectures?*² These authors demonstrate that reliance on lecturing to teach is a poor use of time and energy for both student and teacher. The dominance of the lecture deprives students of rich and rewarding educational experiences available through technology-enhanced instruction. Overwhelming evidence demonstrates that while the lecture is not woefully inadequate—even the worst lecturer probably teaches something—whatever course objectives it does achieve can be surpassed and in a more involving, interesting, and entertaining way.

Survey after survey shows that students find hour-long lectures boring. Lancelot Macmanaway found that eight in ten students reported that the longest they could stay focused on a lecture was twenty to thirty minutes.³ This observation fits with the evidence from J.O. Johnston and Paul Calhoun’s 1969 study that found that students remember less from the middle of a lecture than from its beginning and end.⁴ James Trenaman found

¹Graham Gibbs, *Twenty Terrible Reasons for Lecturing*, SCEDSIP Occasional Paper No. 8 (Birmingham: SCED Publications, December 1981).

²Donald A. Bligh, *What’s the Use of Lectures?* (San Francisco: Jossey-Bass, 2000).

³Lancelot A. Macmanaway, “Teaching Methods in Higher Education—Innovation and Research,” *Universities Quarterly* 24, no. 3 (June 1970): 321–29.

⁴J.O. Johnston and Paul Calhoun, “The Serial Position Effect in Lecture Material,” *T A P Journal of Educational Research* 62, no. 6 (1969): 255–58.

students absorb significantly less after fifteen minutes and after a half-hour either cease to learn more or start to forget material learned earlier.⁵

Most students are not skilled note takers and few make good use of notes they do take. A study by James Hartley and Alan Cameron observes that while all students studied said that they intended to go over their lecture notes, nine out of ten never even look at them again.⁶ In short, the evidence is clear and compelling that the traditional lecture format has major limitations as a teaching method.

Unfortunately, habits obstruct change. Professors distrust innovation and cling to their existing processes and techniques. This is a natural and necessary phenomenon. We need fairly robust notions about teaching when we stand up in front of students or we would not be able to cope with what, after all, is a fairly difficult task.

We also distrust students. We do not trust them to work independently or find out for themselves, and we feel more secure when they are sitting in front of us doing exactly what we prescribe. Lecturing meets our needs better than those of our students.

By contrast, educational technology presents a new and enhanced form of “learning by doing.” Learning does not take place in a classroom isolated from real world job requirements, but in a simulated work environment that provides a low stress, smooth transition into real world work. Learning and doing are essentially indistinguishable.

It seems to us inevitable that more of this approach is going to happen. Fledgling surgeons will interact with robotic technology honing their skills to perfection in hundreds of simulated operations identical to the real thing but with no patient risk. New drivers will learn the consequences of poor driving by experiencing dozens of injury-free automobile accidents. But as impressive as are the richer and realer learning experience that technology provides, probably its greatest importance is the near elimination of the cost of education.

We believe that it is essentially inevitable that the very best of knowledge management, learning theory, technology, and curriculum will be synthesized into a highly automated teaching program linked to a robust online

⁵James Trenaman, cited in John McLeish, *The Lecture Method*, Cambridge Monographs on Teaching Methods, no. 1 (Cambridge Institute of Education, 1968).

⁶James Hartley and Alan Cameron, “Some Observations on the Efficiency of Lecturing,” *Educational Review* 20, no. 1 (1967): 30–37.

community of learners and teachers to provide a world-class dirt-cheap college education. The key significance of such a “B.A. in a Box” is that it reduces the marginal cost of each additional student to near zero. This means that high-quality instruction can be provided at a cost that anyone on the planet can afford. We are not arguing that you can push the perfect college experience through a wire. But we can assert confidently that the actual knowledge imparted will be at least equivalent to what a good student learns in four years at an excellent liberal arts school. We are also sure that the graduate will have writing and thinking skills superior to that of the average college graduate today, along with a well thought out master philosophy of life.

In our judgment, deployment of educational technologies for learning will change everything in the academy. It will also have profound effects on America’s competitiveness, job opportunities, and standard of living, as well as the fitness of our citizens to restrain the power of government. With rapid technological change and growing competition around the world, a highly-skilled, constantly learning workforce is more vital to our nation than ever before. The growing centralization of government power makes it ever more critical that we have an educated citizenry who can understand complex issues, detect manipulation by demagogues, and grab hold of the levers of power.

It is instructive that despite the protests of professors desperate to hang onto anachronistic methods, technology works. In Indiana, the Buddy System gave students at eighty schools networked computers. During its first ten years, researchers found that this project had the impact of adding a free month of instruction to the school year without keeping the school doors open a single extra hour. And it cost only as much as keeping the schools open one extra day. Incidentally, these results were true for both urban and rural students—for those from high- and low-income families alike.

It is a cliché to argue that we are experiencing a fierce pace of change in an increasingly global economy. But it is also true. The challenge for schools was stated quite clearly by Jack Welch, former CEO of General Electric, when he said. “If the rate of change inside an institution is less than the rate of change outside, the end is in sight.”⁷

⁷Jack Welch, quoted in David D. Thornburg, “Reading the Future: Here’s What’s On Hand for Technology and Education,” *Electronic School Online*, June 1998, <http://www.electronic-school.com/0698f1.html>.

Schools that ignore the trends shaping tomorrow will cease to be relevant in the lives of their students, and will disappear, though perhaps not as quickly as one would hope. We must transform all formal institutions of learning, from pre-K through college, to insure that we are preparing students for their future, not for our past.

We believe a synthesis of the best thoughts of the best minds of the past and the best of emerging technology will actually make it possible for people to literally create and successfully sustain their own realities, to choose the cards they want rather than waiting to see what the dealer hands out.

The age of electronically customized education is just over the horizon. We see it now; the revolution is here.