



Is E-Learning Really Working? The Trillion-Dollar Question

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In the world of Web 2.0, Internet 2, and open systems, most learning is still done in traditional classrooms. As education costs continue to grow far faster than inflation, what's e-Learning's role?

The policy challenges are clear. Although the US spends more than \$1 trillion annually on education – \$631 billion for primary and secondary schools (K–12) and \$386 billion for postsecondary schools (www.nces.ed.gov/programs/digest/d08/tables/dt08_026.asp?referrer=list) – Secretary of Education Arne Duncan has warned that only 73 percent of high school students graduate; in some regions, this number is closer to 50 percent. Furthermore, three of every four young people aren't prepared to serve in the military due to academic ineligibility. The US also has one of the lowest percentages of college graduates among industrialized nations, and college tuition increases inflation rates by a wide margin every year (www.ed.gov/news/speeches/2009/11/11092009.html). Most of these difficulties have nothing directly to do with IT, but frequently technology can assist in solving social problems. Here, I examine some of e-learning's major opportunities and challenges in an era of soaring education costs.

Most classes are still taught in the traditional way – a teacher in a classroom with students – but, in the past decade, e-learning has emerged as a useful option. Roughly one college student in four is now taking at least one online course and one in 20 at the K–12 level. College e-learning enrollment in 2008 was 16.9 percent over 2007 at 4.6 million students, and more than half the US colleges and universities have some e-learning courses or programs.¹ UK's Open University is a significant force in the EU, and considerable growth in e-learning is apparent in Asia, especially in Japan, Korea, China, and India.

Postsecondary and K–12 Programs

Among the major players in the e-learning market in college education are large state college systems such as University of Maryland's University College (UMUC), Pennsylvania State University, the University of Massachusetts (UMassOnline), and hundreds of smaller schools with e-learning programs aimed at associate and undergraduate degrees. UMUC claims to be the “world's largest provider of online education [1/4] with more than 40 bachelor's and master's degree programs available completely online” (www.worldwidelearn.com/umuc/index.php). More than half of all online learners are in associate degree programs. In the for-profit university space, the major force is University of Phoenix (UP), which describes itself as the “largest private university in North America,” (www.citytowninfo.com/school-profiles/uph-online) with \$4 billion in annual revenue and programs in the US and Europe. Other schools show significant revenues, too – for example, Kaplan (\$2 billion in the US and Europe), Laureate (\$1.4 billion in 20 countries), and Strayer (\$396 million in 14 states). To get a sense of the scale of the largest for-profit institution, UP's academic revenues are almost twice the budget for the entire University of Virginia, including the UVA medical school. Incidentally, many of these institutions have brick-and-mortar campuses in addition to online programs, and even the least-known colleges have received the required regional accreditation for their online courses. Some also have the sought-after accreditation from discipline-related bodies, such as the Association to Advance Collegiate Schools of Business for business schools.

With games, simulations, online lectures, and many other approaches, K-12 e-learning is varied, but not as broadly distributed as postsecondary programs. Not surprisingly, there's a wide spectrum of opinion on its future. A recent Sloan Consortium report on K-12 e-learning – although acknowledging that more than a million of the US's 63 million primary school students are taking an online course – concluded that primary school e-learning “is still considered to be in its nascent stages.” But the report did note that e-learning was already an essential ingredient for poor, rural schools: “availability of online learning is a lifeline and enables them to provide students with course choices and, in some cases, the basic courses that should be part of every curriculum.”² Clayton Christenson of Harvard Business School believes that, by the end of the decade, learning software will be an integral part of most K-12 programs. As an example of how e-learning platforms might someday leverage scarce expertise, Georgia has 440 high schools but only 88 qualified physics teachers (www.theatlantic.com/doc/200908/race-to-the-top-education).

Part-Time and Contingent Faculty

Who teaches courses online? More than 70 percent of all postsecondary instructors are either part-timers or not tenured/tenure track, according to the American Association of University Professors (www.aaup.org/AAUP/issues/contingent). For online course delivery, the percentage is even higher, owing to the increase in for-profit university e-learning programs (UP, Kaplan, Strayer, and so on) that have mostly part-time instructional staff. Many full-time professors prefer not to teach online, as is evidenced by considerable literature. For example, one article describes in its title the dilemma

that might be crucial to continued e-learning deployment in higher education: “Universities Marginalize Online Courses: Why Should Faculty Members Develop Online Courses If the Effort May Be Detrimental to Their Promotion or Tenure?”³ E-learning's future will probably be closely tied to the ability of university “outsiders” – adjunct and contingent faculty – to deliver the content because full-time professors are often reluctant participants, even after they have tenure.⁴ Sloan Consortium annual reports repeatedly indicate that both university administrators and faculty regard infrastructure development and fac-

Cameron Evans, CTO of Microsoft Education, North America, recently described a scenario that might be a game changer in e-learning because it could reduce costs significantly. Although he insists that his company has no current intention of pursuing this option, he said, “An imaginative state university system could take their Moodle implementations to cloud scale without having to learn any new programming skills. This creates an opportunity for an always-on learning course-management system without the overhead of datacenter investments” (<http://higherinnovation.com/?p=438>). Dartmouth instructional technologist

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ulty training for e-learning as significantly unmet challenges.

Learning-Management System Platforms

E-learning technologies have been featured in *IEEE Internet Computing* for the past two years. They discussed topics such as e-learning standards, managing and storing metadata, and game-based learning.⁵ They also covered open source learning-management systems (LMSs), such as Moodle, Sakai, and ATutor, and proprietary models such as Web CT, Blackboard, Graderpoint, and Desire2Learn.⁶ Two of the most widely used e-learning LMSs are Moodle (open source) and Blackboard (proprietary). Most of the e-learning literature available stresses specific examples and learning outcomes, not LMS details. For example, a recent article about mobile learning in China concentrated on the deployment scope and especially on student response, but not on platform details.⁷

Joshua Kim suggested an ideal LMS in which Moodle might be hosted on a cloud system, drastically altering the e-learning paradigm. He said, “What could campuses do to innovate and advance learning with the dollars saved in licensing fees and hardware? Come to think of it, why limit our dreaming to Moodle?” (www.insidehighered.com/blogs/technology_and_learning/how_to_leverage_the_microsoft_cloud). System-wide standards, such as the Sharable Content Object Reference Model (SCORM) will also be an important part of leveraging LMSs across many applications.

Quality of E-Learning

A frequent criticism of e-learning has been that a student learns better in a classroom environment than at a workstation, but this debate often focuses on individual case examples. In the past decade, researchers have conducted thousands of studies on this topic, including the well-known

collection of hundreds of studies Thomas Russell assembled in 2001.⁸ The reports showed, in most cases, “no significant difference” between online and classroom results. Many subsequent studies have developed similar findings. Recently, the Stanford Research Institute (SRI) examined hundreds of e-learning case studies and selected a sample of the ones that had the soundest analytical techniques. One widely quoted, headline-grabbing finding was this: “On average, students in online learning conditions performed better than those receiving face-to-face instruction.”⁹ SRI’s study added several caveats and certainly doesn’t end the quality discussion. Because most of the e-learning instructors aren’t the higher-paid mainstream faculty (see the point I made earlier about tenured professors), and negative correlations have been found between adjunct faculty use and students’ long-term learning success,¹⁰ there are still many unsettled issues. Also, the process for recruiting some e-learning students has been questioned. The Apollo Group, UP’s owner, recently agreed to pay a \$78.5 million settlement stemming from a 2003 allegation of student recruiting irregularities (www.universityworldnews.com/article.php?story=20091218095431810).

Policy Actions and Legislation

In 2006, the US Congress helped e-learning programs considerably by revoking the so-called “50 percent rule,” which required that at least half of the course content be delivered in a classroom to qualify for federal Title IV aid (Pell Grants, Federal Supplemental Educational Opportunity Grants, and so on.). For-profit institutions received more than \$16 billion in federal Title IV loans, grants, and aid in the 2007–2008 school year but experienced higher default rates than other groups (www.gao.gov/new.items/d09600).

pdf). The American Graduation Initiative, an investment of \$12 billion through 2020, is aimed at achieving five million additional community college graduates – more than half of all e-learning students are in community colleges (www.whitehouse.gov/the_press_office/Excerpts-of-the-Presidents-remarks-in-Warren-Michigan-and-fact-sheet-on-the-American-Graduation-Initiative). Also, the current education legislation for Title IV funds will allocate \$500 million to assist community colleges in developing needed infrastructure, including added e-learning capacity. Many other federal programs are also in place – for example, the Post 9/11 GI Bill, which provides generous education benefits, including e-learning, for veterans and in some cases their spouses.

Cost Benefits

Is e-learning less expensive than traditional delivery systems? IT interventions frequently deliver significant reductions in unit costs of labor-intensive tasks. Little evidence exists that major savings are possible in postsecondary education without a drastic shakeup in the way the major cost elements – instructors and infrastructure – are allocated. Colleges have tried many pilot programs, such as the University of North Carolina’s move last year to change face-to-face Spanish 101 classes to online modules (www.insidehighered.com/news/2009/10/21/spanish), but results aren’t clear. In US postsecondary education, there are more than 4,000 individual replicas of each academic department – math, history, science, economics, and so on – and of administrative staffs – registrar, student services, and more. Could this change? An article in *Educause Quarterly* suggested four major strategies that might save tens of billions of dollars annually, long term:¹¹

- significant regional consolidation

of academic departments and staff;

- UP-like linkages among cooperating large e-learning clusters;
- overhaul in space allocation of university facilities (double and triple booking classrooms for blended learning, exchanging classroom and office space for TV studios, and so on); and
- overturn of the current low status and benefits for contingent/adjunct faculty – who constitute the majority of the instructors.

Although this would be painful and difficult to achieve, the continued growth of tuition costs might force changes eventually. The US Department of Education’s National Educational Technology Plan (NETP) is researching a possible middle ground that aims to “provide a vision for how information and communication technologies can help transform American education” (<https://edtechfuture.org>). NETP is examining several approaches that would give community colleges access to credit-granting courses that don’t require actual intervention by live instructors. If implemented widely across the education spectrum, this approach could drastically alter the cost equation but would be initially unpopular with many stakeholders.

Public and Private Sectors

As e-learning grows in the K–12 and postsecondary areas, it’s also gaining in the broader public and private sectors. In the US, employee learning and development expenditure for 2008 was \$134 billion, or more than \$1,000 per employee, and more than 10 percent of this investment was in self-paced e-learning products and services. According to the Ambient Group, healthcare, pre K–12, and higher education are anticipated to show the largest growth segments over the next five years (www.ambientinsight.com/Resources/Documents/AmbientInsight_2009).

Selected Resources for Further Review

_2014_eLearningMarket_Executive Overview.pdf). The US Department of Defense is also a major user of online and self-paced training, simulations, and games (see the “Selected Resources for Further Review” sidebar for more information).

Open Courseware

A few universities, notably Massachusetts Institute of Technology (MIT), Yale, and Carnegie Mellon, have made extensive course content available to the public, including syllabi, study modules, and online lectures. For the 1,900 courses currently offered, the MIT Open Courseware (OCW) Web page states, “Free lecture notes, exams, and videos from MIT. No registration required” (<http://ocw.mit.edu/OcwWeb/web/home/home/index.htm>). These resources are useful and highly educational, but they don’t offer university matriculation to those who download the content.¹² Incidentally, registered students are also contributing to open courseware resources. Harvard students provide free detailed weekly lecture notes for some courses at Finalsclub.com, which they call “the premier Web portal for interactive education [...] create an account and begin learning.” A related area is the increasing availability of “open textbooks” – that is, Web sites like the Connexions repository (<http://cnx.org>) at Rice University, which provides “an effective means for educators to create, modify, share, and disseminate open textbooks under the Creative Commons Attribution license download or repurpose course texts, homework, and exercises at low or zero cost.”

Failures

E-learning programs have sometimes had to fold their tents in the past decade, overestimating demand and underestimating costs. Prestigious schools aren’t immune – Columbia (Fathom) and NYU (NYUonline) are examples from the early 2000s.

- *International Review of Research in Open and Distance Learning* (www.irrodl.org) is possibly the premiere journal of e-learning research, with case studies from all over the world.
- *IEEE Transactions on Education* (www.ieee.org) features high-quality studies of educational interventions in engineering and computer disciplines.
- *Interservice/Industry Training, Simulation and Education Conference* (I/ITSEC; www.iitsec.org) features many of the newest uses for gaming, modeling, and simulation in training, especially in US Department of Defense applications.
- *Educause Quarterly* (www.educause.edu/eq) is a popular practitioner journal.
- *US News and World Report’s* “Online Education Ratings” (www.usnews.com/sections/education/online-education/index.html) has detailed data from hundreds of e-learning programs.

Recently, the University of Illinois decided to close a much-heralded but controversial Global Campus – a large-scale distance-learning unit that initially aimed to function mostly off campus without using university facilities (www.insidehighered.com/news/2009/09/03/global-campus). Late in 2009, the self-described “world’s premier online graduate school,” U21 Global, which had aimed at attracting 500,000 students, saw its enrollment fall to 5,000, lost several of its investors, and is facing an uncertain future (www.insidehighered.com/news/2009/12/09/u21). It seems clear that large, successful e-learning programs, such as UP’s and UMUC’s, are able to leverage the combined advantages of low unit costs for faculty, shared infrastructure, and good marketing, along with accredited course content.

What’s Next?

It’s already possible to deploy e-learning applications and even a university’s entire course packet – syllabus, lectures, registration apps, downloadable books, study aids, and so on – on iPhones and Blackberries, tablets, and so on, letting students be truly mobile and professors’ best lectures to be more widely viewed and studied. Recently, Brad Stone of *The New York Times* proposed an idea to take advantage of this capability. He

noted that Apple’s iTunes U Web site (www.apple.com/education/mobile-learning) has more than 250,000 different classes available free to the public, from more than 600 institutions. The UK’s Open University’s iTunes U lecture downloads now exceed 10 million; and Stanford, Florida, Pennsylvania, and many other universities also have high numbers. Google’s YouTube Edu (www.youtube.com/education?b=400) operates in a similar way. Why not grant credit for courses taken through iTunes U or YouTube Edu, he suggests (<http://bits.blogs.nytimes.com/2009/11/17/the-argument-for-free-classes-via-itunes>). Chris Anderson of *Wired* looks upon this sort of development as inevitable. In his new book *Free: The Future of a Radical Price*, he points to the “free lunch” business model that allows zero-cost things (such as online lectures) to be inducements for a customer to buy things that aren’t zero cost (for example, a university degree).¹³ Many universities are reluctant to risk opening up their content in this way.

Web 2.0, Second Life, and Other Social Media Sites

Web 2.0 is another potential stimulus for online learning but is likely a long way from reaching K–12 or post-secondary education in a major way. The American Society for Training and Development, an industry group,

recently commissioned a study by Booz Allen Hamilton to determine the learning impact of Web 2.0, with an emphasis on individual-centered learning through podcasts, blogs, wikis, and so on. Although fewer than 10 percent of the companies felt that training with Web 2.0 would play a major role soon, most agreed that it was a significant longer-term issue. Virtual worlds such as Second Life are already a major part of the training environment for many firms (IBM, for example) and might be the ultimate exemplar for LMS deployment. When asked for his opinion of the potential for virtual worlds, Anders Gronstedt, president of Grondstedt Group – a training and consulting company – said, “I think it’s going to cross over the chasm and go into the mainstream. Once you’ve experienced it a couple of times, there’s no going back to boring old webinars, conference calls, and virtual classrooms” (www.asted.org/LC/2008/1208_kaplan.htm).


Changing habits will be difficult. Obviously, in futuristic scenarios like this, the trillion-dollar, highly compartmentalized US education system might require some time to leverage the opportunities. For example, the idea of having an import-export model for university credit courses is very unconventional. How would overhead be computed? Will the history or economics department get its revenue share if the instruction is imported from outside the university? Perhaps the current steep annual rises in tuition costs will someday force very different questions, such as, “Are 4,000 sets of faculties really possible anymore?” New Jersey’s Science and Technology University futurists Starr Hiltz and Murray Turoff described the problem this way: “Once more, courses are available in digital formats as well as on campuses, geographic monopo-

lies and barriers that have sustained thousands of different colleges and universities in the US and around the world will weaken.”¹⁴ As Frank Mayadas, e-learning program director at the Alfred P. Sloan Foundation put it recently, “Now the challenge is to engage more of the faculty to meet the continuing growth in demand for online-learning opportunities” (www.aplu.org/NetCommunity/Page.aspx?pid=1348). □

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