Foreword

E-Learning – like e-anything – has made a dramatic entrance onto the world stage. While distance learning can be traced to the English instruction in shorthand by correspondence in the 1840s, e-learning – using the electronic computer and data communication networks – is a recent development. The electronic computer itself is only slightly more than 60 years old and as recently as 1977, some, like Digital Equipment Corporation founder and CEO Ken Olsen, told the World Future Society that "there is no reason for any individual to have a computer in his home."[1] Of course Apple Computer did introduce home computers at this time and personal computing became mainstream in 1982 with the introduction of the IBM PC. By 1983, there were about 2 million computers in the USA. By 1990, this number had grown to 54 million, and by 2000, 60 percent of all US households owned at least one of the 182 million personal computers in use at that time.[2] In 2008, the number of computers in the world passed 1 billion![3]

The history of networking is similarly spectacular. In 1969, the first four nodes of the ARPANET exchanged packets in the U.S. By 1973, University College London connected to the ARPANET via Norway's NORSAR, while Louis Pouzin led French networking efforts. By 1982, TCP/IP was adopted as the protocol for the ARPANET and the growth of networking exploded. By 1984, backbone networks had been initiated in England, continental Europe, Japan, and Canada, as well as in the USA. By 1987, the number of (computer) hosts connected to the US network backbone exceeded 10,000. The rest, as they say, is history. In 1991, Tim Berners-Lee and his colleagues at CERN had developed the World Wide Web and by 1998, the Canadians had created the first national optical network. Today, nearly one-quarter of all men, women and children – 1.4 billion people – are connected to the global Internet, using more than 1.5 billion networked devices.[4] Today, specialized computers in automobiles, appliances, and telephones comprise an increasingly diverse soup of smart devices regularly and persistently connected to the Internet. Not only has access to computing and the Internet become nearly ubiquitous, the capacity of the global Internet is continually growing. Breakthroughs in fiber optics and in optronics and wireless networking are facilitating a series of long-anticipated convergences that are literally putting multiple media in the hands – or pockets – of students, teachers, and others.

This history is central to the history of e-learning. Critical design for e-learning cannot likely predate the emergence of e-learning. E-learning, in turn, cannot predate the emergence of a standardized palette of hardware, software, and communications protocols that together constitute an *e-learning environment*. As important, critical design for e-learning cannot predate widespread ownership of the technologies that comprise the e-learning environment, or a widespread knowledge of how to place these technologies in the service of teaching and learning. Importantly, this dependency places burdens on both the learner and the teacher.

Amazingly, in many parts of the globe, preconditions have been met in less than three decades. The breathtaking and inexorable march of Moore's Law and related laws are ensuring that more and more

computing, networking, storage capacity and human connections are available to teachers and learners at a constantly declining price. Having more and more people connected to the global Internet means that more software, more services, more information resources, and more expertise are available to all. The status of e-learning has moved – as a result – from the realm of the diabolical (see David Noble's early villification of Educom and other early supporters of e-learning), to the quixotic (see Bob Zemsky's characterization of e-learning as a case of "thwarted innovation"), to the satisfactory (No Significant Difference), to the mainstream, to the exciting in less than 20 years.[5]

Two additional important developments facilitated the progress of computing in the service of education. Not only did computers become economically accessible features of the educational landscape, they became technically accessible. Early personal computers and their operating systems were anything but friendly, but by the early 1990s, even instruction manuals had gone the way of dip switches from the computer user's perspective. Hardware and software standards meant an increasingly standardized user interface, eliminating the need to spend hours figuring out how to navigate the software one would need to encounter in educational settings. Additionally, efforts in England, Canada, the USA, Norway and elsewhere – sporting mysterious and tantalizing names like Athena, Cyclops, Delta, and others – were developing an understanding of smart classroom environments and were creating environments designed to facilitate teachers in the management of educational courses for their students using computer hardware and software, which they called learning management systems or virtual learning environments. As with other technologies, these systems too became highly standardized across many parts of the world and across educational systems creating a common means and metaphor for delivering a great deal of educational content.

And so we conclude that, by this writing, most of the critical preconditions for the technology-mediated *improvement* of teaching and learning in the higher education sector have been met. A robust e-learning environment can now be put in place and made economically and technically accessible to a very wide variety of teachers and learners.

Pedagogy (that is, the principles and practices of instruction), like so many other social practices, has lagged the emergence of the e-learning environment. The popular and professional literature crackles with excitement (or anxiety) about the emergence of those NetGen learners who are storming our classrooms and the Internet with their skills as digital natives and their passion for all things digital. In too many cases, we digital immigrants are left in a state of hapless confusion. The literature that is informed by large-scale data tells other stories as well.[6] This literature describes the simultaneous emergence of (1) a digital *cognoscenti* among our students, (2) an equipped and connected student mainstream that can hardly be described as fluent with the academic uses of technology, and (3) a sizeable digital underclass that is equipped with hand-me-down tools, narrow band connections, untrained parents, and a generally unfriendly relationship with the new tools of the emergent e-learning environment. Not surprisingly, our instructional cadre arrays in much the same way. While a number of instructors have embraced the possibilities presented by e-learning, a great majority is using technology dominantly as a means to *administer* their courses (e.g. distribute syllabi and assignments, post grades, take attendance, etc.), and another large swathe is holed up in pre-technology bunkers, clinging to the course notes of another era. Importantly, some are eschewing the e-learning environment because they have well and truly mastered the conventional pedagogy. For one, I'd hate to insist that our finest stage sages abandon the lectern.

So here we have it. Another case of technology outrunning social and professional practice. The gap between emerging technological possibilities and pedagogical response in fact lies at the heart of the issues examined in this volume. If such gaps between technological innovation and the socialization or

diffusion of new practices are commonplace, can't we conclude that time is on our side? In fact, I believe that we do not have time on our side, and the absence of time makes the reading of this book and the taking of recommended actions matters of grave urgency. I urge the instructor who reads this book to become an activist. Become a discriminating advocate for the integration of emerging technologies into the dominant pedagogies around you. Either commit to integrating new technologies into your class-room practice immediately, or if you already do this, commit to becoming an active agent in spreading the case for urgent action to your colleagues. Open your hearts and minds at the same time to securing the place of the magnificent lecture or teaching techniques where they make positive contributions to student learning and experience.

Why so urgent? Unlike many innovations that diffuse at rates that do not challenge core elements of the existing order, information technologies in general and e-learning technologies in particular are disruptive technologies. Disruptive technologies are new technologies that may be simpler and cheaper than the prevailing technologies but initially offer reduced performance. As these technologies improve, their simplicity and cost might allow them to supplant the prevailing technology. In the case of e-learning, the focus of modern pedagogy and of IT and e-learning technologies is student learning. In effect, e-learning, and in particular the remarkable tapestry of people, tools, and resources on the Internet are making it easier and easier for students to learn in ways that are remote from the classroom and ultimately, remote from the instructor. The results can in many cases be breathtaking for the learner and simultaneously devastating for the traditional instructor or the institution.

Earlier this decade, Oxford University considered requiring students to sign contracts that would oblige them to attend lectures and tutorials, complete written work and attend practical lessons. It seems that lecture halls and even tutors' apartments have been emptying of students, a problem by no means unique to Oxford University. So what has happened? Where are the students? Why are our lecture halls, seminar rooms, tutors' apartments empty? I suspect that we all know the answer to these and other ques-tions. The answer is *not* that contemporary students have become lazy and irresponsible and simply prefer sleep or videogames to classroom instruction. What is far more likely is that our breathtaking global information system is being crafted – on an increasingly personal basis – by our students into the educational environment they need. While at this writing our institutions of higher learning, our facul-ties, our academic staff, remain secure as *certifiers of academic accomplishment and qualifications*, we are at risk of being replaced as the dominant suppliers of that which we certify. Students are coming to our institutions with substantial hardware and software, with lifetimes of network connections, with intact social networks, and in many cases with behaviors and norms for participating in network-situated learning. It is also clear that others – like publishers or Google – who control vast tracts of cyberspace and the rights to considerable intellectual property will also compete with traditional institutions for the learner's time, attention, and ultimately money.

The modern college or university and every modern academic then needs to understand that they are no longer the exclusive channel that our students must daily tune in to. And we must recognize that unless we develop active strategies to extend the relevancy and appeal of our pedagogical practice, that our lecture theaters may come to resemble our newspapers, television broadcasters, or others in the age of the Internet.

We are lucky to live and work in what Jim Duderstadt labeled the "knowledge-driven era." The challenge for those of us who toil in higher education's traditional fields is to secure the place of the modern college or university as a central force in a knowledge-driven world.[7] We will accomplish this only by thoughtfully situating our tradition-honoring and place-centric institutions clearly in the emerg-

ing e-learning environment, and by pressing hard to evaluate and adopt learning designs and tools that leverage this environment. While technology's uses will be conditioned and constrained by institutions out of respect for their spectacular historical successes, we must now work actively to balance our historical roles, standards, practices, and techniques, with emerging tools, practices, and pedagogies if our institutions and we are to remain relevant in the knowledge-driven era. The authors of this volume demonstrate how the respect for historical scholastic standards and methods can be carried forward and woven into the evolving e-learning environment. Their messages are at once relevant and exciting. They deserve our urgent attention.

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ENDNOTES

[1]   See http://www.snopes.com/quotes/kenolsen.asp

[2]   See The Physics Factbook, http://hypertextbook.com/facts/2004/DianeEnnefils.shtml

[3]   See Science Portal, http://www.science-portal.org/in/71

[4]   IDC, IDC Finds More of the World's Population Connecting to the Internet in New Ways and Embracing Web 2.0 Activities, at http://www.idc.com/getdoc.jsp?containerId=prUS21303808

[5]   See David Noble, *Digital Diploma Mills*, October 1997, at http://www.handshake.ca/noble.html. See also Robert Zemsky, *Thwarted Innovation: What Happened to E-Learning and Why?,* West Chester, PA: The Learning Alliance for Higher Education at Http://www.irhe.upenn.edu/WeatherStation.html. See also See also Thomas L. Russell, *The No Significant Difference Phenomenon*, International Distance Education Certification Center, 2001, at http://www.nosignificantdifference.org/

[6]   See studies by the Pew Internet and American Life or the EDUCAUSE Center for Applied Research (ECAR).

[7]   James J. Duderstadt, "New Roles for the 21st Century University, in *Issues in Science and Technology Online*, Winter 1999, at http://www.issues.org/16.2/duderstadt.htm