

PART V

The Internet in the public interest

12. The promise and the myths of e-learning in post-secondary education

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E-LEARNING AND CHANGE IN EDUCATION

The Internet and, in particular, the World Wide Web have had a remarkable impact on education at all levels. In the past, new technologies such as the telephone, radio, television, cassettes, satellites, and computers were all predicted to bring about a revolution in education. However, after the initial hype, these new technologies left a marginal impact on the general practice of education, each finding a niche, but not changing the essential process of a teacher personally interacting with learners.

However, the Internet and, especially, the World Wide Web are different, both in the scale and the nature of their impact on education. Certainly, the web has penetrated teaching and learning much more than any other previous technology, with the important exception of the printed book. Indeed, it is possible to see parallels between the social and educational influence of both mechanically printed books and the Internet on post-secondary education, and these parallels will be explored a little further in this chapter.

The application of the Internet to teaching and learning has had both strong advocates and equally strong critics. Electronic learning has been seized upon as the next commercial development of the Internet, a natural extension of e-commerce. John Chambers, the CEO of the giant American Internet equipment company, Cisco, described education as the next Internet “killer application” at the Comdex exhibition in Las Vegas in 2001 (Moore and Jones, 2001). Chambers linked several concepts together: e-learning is necessary to improve the quality of education; e-learning is necessary to improve the quality of the workforce; and a highly qualified technology workforce is essential for national economic development and competitiveness.

It is perhaps not surprising that the CEO of a company that makes its living through the Internet would be supporting the use of the Internet for education and training. However, there are also strong advocates of e-learning within the

education profession. Their arguments tend to be based primarily on pedagogical issues. For instance, Harasim and co-workers (1995) have argued that e-learning represents a paradigm shift in education. Both Harasim et al. and Jonassen and colleagues (1995) claim that e-learning facilitates a more constructivist approach to learning, thus encouraging knowledge construction and critical thinking skills. Collis (1996: xxi) predicted that “two of the most important changes to education involving tele-learning will be the importance of virtual communities to complement face-to-face relationships in learning, and the increasing use of ‘knowledge utilities,’ particularly through hyper-linked distributed environments such as the WWW.”

Peters (2002) is one of many commentators who believe that e-learning will force a radical restructuring of our educational institutions. For universities, Peters argues that “the only treatment available is a bold wave of modernization such as never before in the history of academic . . . institutions” (2002: 158). Both the pedagogical and organizational issues will be explored later in the chapter.

The heady mixture in electronic learning of commercialization, technology, and challenge to institutions and traditions has not surprisingly resulted in an active body of critics. Noble, over a series of articles (1997, 1998a, b, 1999, 2001), ironically available initially only on the Internet, has associated e-learning with the commercialization and automation of education: “Here faculty . . . are transformed into mere producers of marketable instructional commodities which they may or may not themselves ‘deliver’” (1997). Noble argues that such automation and commercialization is coercive in nature, being forced upon professors as well as students, with commercial interests in mind. He argues that online learning is not a progressive but a regressive trend, toward the old era of mass-production, standardization, and purely commercial interests. According to Noble (1998a):

the primary commercial impulse has come from non-academic forces, industrial corporations seeking indirect public subsidy of their research needs and private vendors of instructional hardware, software, and content looking for subsidized product development and a potentially lucrative market for their wares. In both cases also, there has been a fundamental transformation of the nature of academic work and the relationship between higher educational institutions and their faculty employees.

Others have suggested that the use of the Internet for education increases the divide between the wealthy and the poor, and that the Internet acts as a form of Western cultural dominance, with its predominant use of English and primarily American programs and materials (see, for example, Wilson et al., 1998).

On a more pragmatic level, many instructors are worried about the extra workload and skills needed to teach effectively through e-learning, and administrators are concerned with what appear to be the high investment and

maintenance costs of e-learning. Others (for example, Bates, 2000) have criticized institutional managements and governments which, while exhorting institutions and teachers to do more e-learning, have failed to provide the necessary resources. In particular, there is criticism that institutions and governments are not doing enough to prepare managers, teachers, instructors, and students for the organizational, institutional, and cultural changes needed to make e-learning successful (for example, see COIMBRA Group of Universities, 2002). Lastly, a number of critics have questioned the costs and benefits of e-learning. In particular, there is a dearth of evidence of improved performance, and some evidence to suggest increased costs, at least in the initial stages of an e-learning program (for instance, Bartolic-Zlomislic and Bates, 1999).

The rhetoric on some of these issues has changed over the years, as more experience of e-learning has been acquired. In particular, the belief that e-learning is somehow a totally new educational phenomenon is becoming increasingly untenable. At the same time, e-learning is becoming a major component of post-secondary education and training, and therefore deserves careful attention. Consequently, the rest of the chapter explores the issues raised in more depth.

WHAT IS E-LEARNING?

We need to start with some definitions because, as always with a new phenomenon that is emerging and developing over time, terminology is not always well defined or used consistently. From about 1996 onwards, when the World Wide Web was first applied to teaching on a consistent basis, regular classroom teachers started to incorporate the Internet into their teaching. This occurs in a variety of forms. Web pages may be used as illustrations in face-to-face classes or lectures. Online discussion forums can be used to continue discussion after class or the lecture. Students may be asked to do web searches or use recommended websites as part of their studies, either in or outside class. Textbooks have started to appear with dedicated websites, which provide student activities and tests based on the textbook. The development of software platforms such as WebCT and Blackboard has encouraged instructors and teachers to create their own web-based learning materials. “Hybrid,” “blended,” or “mixed mode” are all terms used for integrating the web into classroom teaching, though I prefer to call this type of application “web-enhanced” or “Internet-enhanced” classroom teaching.

In general, these Internet-based activities have been incorporated into regular face-to-face classes. However, in still a few rare cases, instructors have reduced (but not eliminated) the number of face-to-face classes to allow for

more online learning: hybrid, blended, mixed mode, and distributed learning are all terms used for this form of teaching. “Distributed learning” is a term that usually encompasses both on-campus and distance courses delivered online (from the computer term “distributed intelligence;” Twigg, 2001). However, I prefer to use the term “mixed mode” in the specific context of a reduction in class time to accommodate more time spent studying online, whereas hybrid or blended could mean just adding online teaching to regular class time. However, there is no consistency yet in terminology in this field.

It would not appear to be a big step, then, for a classroom instructor to move to a class that is entirely delivered online, that is, to create a distance education course as an extension of their classroom teaching. Some teachers also call a fully online course “distributed learning” because they do not want to confuse it with print-based distance education via correspondence course. However, from my experience, there are significant differences in a class delivered entirely at a distance, whether online or print-based, compared with a face-to-face or mixed-mode class with online elements.

At the same time as classroom teachers were moving to online components of their teaching, so too were many print-based “correspondence” distance education operations. Many institutions started adding e-mail, online web articles, and online discussion forums to their already existing print-based correspondence courses. Often, these additional online activities were optional, so as not to reduce access to students without Internet or computer facilities. However, institutions with such online enhancements also claimed to be offering e-learning courses. Bates and Poole (2003) have described these developments graphically (see figure 12.1).

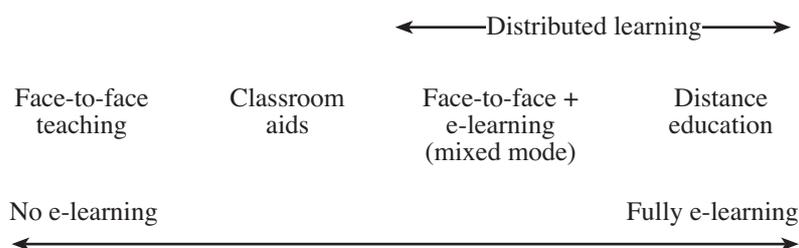


Figure 12.1 The continuum of e-learning in formal education

The OECD has extended these definitions. In a new study (OECD, 2004), it offers the following categories of e-learning:

Online learning: For the purpose of this survey, the following categories are used to define different types of online learning:

- (i) *Web supplemented* (e.g. course outline and lecture notes online, use of email, links to external online resources)
- (ii) *Web dependent*: students are required to use the Internet for key “active” elements of the programme, e.g. online discussions, assessment, online project/collaborative work, but without significant reduction in classroom time.
- (iii) *Mixed mode*: classroom time has been reduced but not eliminated. The reduced classroom time is replaced by online activities, e.g. online discussions, assessment, online project/collaborative work.
- (iv) *Fully online*

The terms “online learning” and “e-learning” are used synonymously throughout the survey.

Thus the OECD study subdivides Bates and Poole’s (2003) classification of “classroom aids” into “web supplemented” and “web dependent,” further reinforcing the notion of a continuum of e-learning.

So far I have described forms of Internet-based learning in the formal post-secondary education sector. However, e-learning is also growing rapidly in the corporate sector, and, indeed, in some aspects, e-learning has a unique function in this sector. The more conventional application of e-learning is to move more traditional training from a face-to-face mode to one delivered into the workplace, and often to the desk or workstation of the employee. In this sense, it is similar to the use of e-learning in the formal education sector, except that the learning tends to be more modular, more skill-specific, and delivered “just-in-time,” that is, on demand at the moment when the employee needs the training or information.

However, there is a more fundamentally different view of e-learning in the corporate sector, and that is in the sense of the learning organization (see, for example, Senge, 1990). In this sense, e-learning is far more encompassing than the conventional application of the Internet to study or training. In a learning organization, the aim is to use the Internet and access to integrated company databases to empower employees across the organization to learn more about the operations of the organization, and to use that knowledge and information to improve the products and services of the organization. In other words, it is about knowledge management (see Rosenberg, 2001).

Thus, defining e-learning is not straightforward. Institutions often claim that they are offering e-learning when all they have done is merely added an online component to what is basically a face-to-face, print-based, or video-based course. However, even courses designed from scratch as “online” courses will often contain printed readings, either in the form of required textbooks or collections of printed articles distributed to students by mail. Some mainly online courses require attending an institute in the summer or weekend classes. These are not just issues of terminology. There is a tendency by many

institutions to over-inflate their claims to be an e-learning institution, so terms need to be defined and used consistently.

HOW BIG IS E-LEARNING?

Since the first appearance of the World Wide Web in education around 1995, we have seen the emergence of fully online universities in both the public and private sectors, university for-profit, spin-off companies, public and private partnerships, national and international consortia, extensive penetration of e-learning into the corporate training market, and the development of virtual schools. In addition, there has been a large penetration of e-learning into traditional campus-based teaching.

Given the issues around definitions of e-learning, it is not surprising that there are few reliable sources of data about the extent of e-learning in post-secondary education (a comprehensive survey by the OECD, UNESCO, or a similar body would be extremely timely). I will try to give a rough indication. I have drawn data from multiple sources, but in particular from Cunningham et al. (2000), Dirr (2001), Allen and Seaman (2002), and many articles from the *Chronicle of Higher Education*. And, above all, I have used the search engine Google and the web to go to institutional and corporate websites to ensure that data for 2002–2003 were accurate. This rough-and-ready survey produced the following results. Figures refer to course enrolments, not individual students.

e-Learning on Conventional Campuses

In terms of e-learning on university and college campuses, figures from the major learning resource management system (LRMS) companies give some guidance. The two major LRMS companies for higher education are WebCT and Blackboard Inc. WebCT and Blackboard cover about 80 per cent of the market, with the rest made up of a number of different proprietary LRMSs and open-source systems. In 2002–2003, WebCT had approximately 2.5 million student licenses and Blackboard about 1.5 million. WebCT estimates that approximately 80 percent of the applications of WebCT are to support on-campus courses. If we make the same assumption for other LRMS providers, we get an estimate of approximately four million on-campus e-learners in higher education in 2002–2003. The vast majority of these, though, will be supplementing their face-to-face classes with e-learning. These students are spread throughout the world (WebCT has licenses in over 80 different countries), but the majority will be in North America.

Public Dual-mode Institutions

Public universities and colleges that are primarily campus-based but also offer distance courses as well (dual-mode institutions) are particularly difficult to analyze in terms of student numbers and mode of delivery. In terms of institutions that offer distance education programs they are by far the most numerous (I counted just over a thousand institutions with at least some distance programs as well as campus-based operations), although the numbers of students in dual-mode distance education programs are in total less than those in autonomous distance teaching universities (one million compared to four million).

The great majority of dual-mode institutions are in transition from print-based to online teaching for their distance courses. Because of the backlog of print-based inventory, it appears that at least two-thirds of distance courses being offered are still primarily print-based. However, this figure is changing rapidly, at roughly 15 per cent a year being moved to fully online delivery. In addition, there are some institutions that have no print-based inventory that are going straight to online distance delivery. I estimate that there are probably about 250,000 students taking fully online courses in these institutions, mainly in North America, Britain, and Australia. (Not included in this category are blended or mixed-mode courses; that is, courses requiring regular campus attendance. The 250,000 students taking fully online courses in conventional universities would be in addition to the estimate of four million e-learners supplementing their campus-based courses in higher education institutions.)

Commercial Post-secondary Institutions

Particularly in the United States, but also in Malaysia, China, and India, there have been a number of attempts to develop private or commercial forms of e-learning in higher education. Although some of these new initiatives have been clearly successful in terms of sustainability and market penetration (for example, University of Phoenix Online, with 22,000 students in 2002–2003), others have been nothing short of a disaster. In particular, some very prestigious universities got it badly wrong in their attempts to cash in on the e-learning bonanza. Columbia University, New York University, Temple University, the University of Chicago, the University of Melbourne, and the UK Open University were all involved in operations that lost a minimum of US\$10 million each in trying to set up for-profit e-learning operations. Thus the number of students in private e-learning universities is probably no more than 50,000 in 2002–2003 (mainly at the University of Phoenix Online and Jones International University).

Consortia

Also, e-learning consortia of public (and sometimes private) universities such as Western Governors University, Cardean, and Fathom seem too cumbersome to work. The numbers enrolled in 2002–2003 in such consortia (under 5,000 in total) are pitiful, given the publicity and level of investment. If we include some of the public university consortia, such as the Canadian Virtual University and NextEd in Asia, the total number is unlikely to exceed 50,000 enrolments, many of which will already be included in the figures for e-learners in dual-mode institutions.

Distance Universities

Autonomous distance education institutions are those that teach solely at a distance. These tend to be very large institutions operating on a national basis, often on an open-access basis. There are currently about fifty such universities globally with a total of over four million students worldwide (Daniel, 1998). Most are primarily print and broadcast based, but many have what the British Open University calls “Internet-enhanced courses.” Thus there are many students (probably half a million) in these institutions using online teaching to supplement other forms of distance education, but the Open University of Catalonia in Spain is one of the few public universities dedicated to teaching entirely online. Thus the number of students studying entirely online in autonomous distance teaching universities in 2002–2003 is probably no more than 150,000. These students are quite widespread (for example, Spain, Britain, Mexico, India, China, and Canada) but few in the United States, which has very few autonomous distance teaching universities.

Corporate Training

The number of students in workplace and distant corporate training is another difficult figure to estimate. Meister (1998) stated that there were approximately two hundred genuine corporate universities, in the sense of offering in-house training. Some of these have several hundred thousand employees taking programs. However, many corporate university programs are primarily classroom-based. In addition, there are thousands of small training companies who offer online programs. For corporate training, a module may be as short as two minutes, so that counting “learner sessions” can be very misleading. The figure of four million is an estimate of the number of individuals who would have used e-learning as part of their employment in one year. Much more focused and detailed research is needed in this sector.

Thus, there appear to be about nine million e-learning course enrolments

worldwide in post-secondary education and training (see table 12.1). This is a snapshot taken in 2003. I have tried to be conservative in estimating numbers, and will have missed many small e-learning education operations, so the actual numbers are probably higher. What I am concerned with, though, are the trends, and the relative size of the different categories of e-learning providers.

What has grown relatively rapidly over the past eight years is the use of e-learning both in company training and on university and college campuses, and I see this continuing. Fully online courses form a minority of all e-learning enrolments (probably less than 10 percent). Europe seems to be lagging behind the USA, Canada, Mexico, Australia, Singapore, and Korea in the application of e-learning in post-secondary education, although in the past few years some European countries (especially Britain, Scandinavia, and The Netherlands) have started to pick up speed.

Despite the pressure toward privatization in the United States, I do not see a rapid expansion in North America of private e-learning post-secondary institutions, as long as the public universities remain adequately funded. However, private e-learning universities and colleges such as the University of Phoenix Online will expand slowly. On the other hand, I anticipate that private sector university and college e-learning will grow rapidly in countries such as Mexico, Brazil, Chile, China, Malaysia, Korea, India, and other newly emerging economic powerhouses, where powerful and impatient middle classes are increasing faster than the provision of good-quality public sector post-secondary education. In poorer countries, and for the poor in rapidly developing countries, post-secondary e-learning will remain the priv-

Table 12.1 Rough estimate of e-learners globally, 2002–2003

<i>Higher education</i>	
Web-supplemented classroom teaching (public)	4,000,000
Fully online (dual-mode)	250,000
For-profit online universities	50,000
Public and private consortia	50,000
Distance teaching universities	
Web-supplemented	500,000
Fully online	150,000
<i>Corporate sector</i>	
e-Learning in the workplace	4,000,000
Total	9,000,000

ilege of a small minority, and for such target groups the large public sector print and broadcast-based autonomous open universities will continue to be important.

PEDAGOGICAL ISSUES: A NEW PARADIGM OR OLD WINE IN NEW BOTTLES?

Is e-learning a fundamentally different approach to teaching and learning, as some have argued, or is it merely a more convenient and flexible way of teaching in the same manner as in a face-to-face situation? Does it lead to the automation of teaching, as Noble has claimed, or is it an emancipation of learners, freeing them from institutional constraints?

These are difficult questions to answer. The use of the web for teaching is still less than ten years old, and hence its application to teaching and learning is still evolving. As a result, there are few convincing evaluative studies based on student learning outcomes that allow for widespread generalization. Furthermore, the actual applications of e-learning are highly dependent on the way in which teachers choose to teach, and, above all, on their epistemological preferences. What is clear is that e-learning enables a wide range of approaches to teaching and learning to be accommodated. At the same time, greater attention or promotion has been given to certain teaching methods over others.

For instance, those teachers who take a more behaviorist approach can give students tasks that are broken down into small units of work. Using a course platform such as WebCT or Blackboard, each unit of activity can be accompanied by immediate feedback on the learner response. As Bates and Poole (2003) describe:

Feedback can take the form of test results or automated responses, such as mouse clicks against the multiple choice answer options on the screen, accompanied by the words "correct" or "wrong," or sounds such as cheering or boos. Feedback can include remedial activities to be repeated until the student has mastery over the item (defined usually as 100% correct performance). The use of technology is particularly valued by behaviorists, as it allows for repetition, for "objective" assessment, and for tight control and management of the learning activities. (Bates and Poole, 2003: 199–200)

This is an example of the automation of teaching criticized by Noble. However, this form of teaching is mostly used in empirical sciences or engineering, and is also just as likely to be found in campus-based teaching, where graduate students act as the automated markers of multiple-choice tests. Bates and Poole (2003: 200) argue that:

teachers taking a more cognitive approach are more likely to give students activities, exercises and assignments that facilitate or test analysis or synthesis of learning materials, application of principles to real world examples, and an evaluation or a critique of different situations, viewpoints, or processes. Media can be particularly useful for providing student activities and exercises of this kind, since text or video can be used both to model and to test cognitive processing.

If comprehension is the main learning outcome, common student questions can be collected, and an area of the Web site created called "Frequently asked questions," with the response to the questions. This limits the number of one-on-one communications between student and instructor . . . Some course development software such as WebCT allows instructors through the use of tests to identify specific parts of the course where students are having difficulties.

However, these more objectivist approaches to teaching are not, in fact, the ones where the most interest has been shown in e-learning in colleges and universities. Bates and Poole (2003: 200–1) point out:

It is no co-incidence that online learning arrived at a point in time when constructivist approaches to teaching were at the height of their popularity (in North American higher education). For constructivists, reflection and discussion are key activities through which knowledge is constructed by the learner. The asynchronous nature of online teaching, enabling students to control to some extent the pace and timing of their learning, allows for and encourages reflection. Online forums provide the opportunity for students to test ideas, and build and construct knowledge through collaborative learning.

Most publications on moderating online discussion forums focus on helping learners to develop their own meanings of concepts and ideas presented in the course or offered by other learners (a constructivist approach to learning). Scardamalia and Bereiter (1999) and MacKnight (2001) provide some guidelines on facilitating critical thinking skills and knowledge construction online within school settings.

Another major trend in education is the move to problem-based learning, and this is an area where online learning has been used successfully. At the University of British Columbia, the Faculty of Medicine has moved entirely to a problem-based learning approach. In general, program content is provided entirely through the web and printed readings. Classroom time is used for developing clinical skills, laboratory work, and the setting, discussion, and analysis of problems. Students work on problems mainly online.

In some cases, the whole of a problem-based course is delivered online. For instance, two instructors at the University of British Columbia, Dr Niamh Kelly and Dr Elisabeth Bryce, have developed a fourth-year undergraduate course on microbial infections (Pathology 417). The course explores human bacterial infections focusing on both the virulence factors of the micro-organism and the

patho-physiology of the host response. Students in small online groups work through case scenarios. The groups discuss each case, and answer questions posed to them by the instructors. Then the multiple groups share their answers with each other, after which the instructors give online feedback to the whole class on their answers. Students work to a tightly scheduled process, completing one problem set each week (see Bates and Poole, 2003, for further details).

Bates and Poole (2003: 236) also identify collaborative learning as a strength of e-learning:

One great advantage of online learning is the opportunity for students separated by time and place to work together on a common task. Learning to work together online is an increasingly important work-place skill, but it also provides opportunities for students to share experiences, to learn how to work collaboratively, and to test and develop their own ideas, without being physically present. It is particularly valuable for courses where students are from different countries or cultures, and for continuing professional development, where participants have relevant professional experiences to share and draw from.

Market Demand

Electronic learning is also attractive to collections of individuals sharing similar interests who cannot or do not want to be attached to a particular institutional approach to teaching and learning. For instance, they may want to pick and choose courses from different institutions, or may not want to study for credit or formal qualification. They may wish to share professional experience with other professionals. They may have come together through an institutional course or program, but wish to continue their collective learning in an informal way (with or without a formal instructor). The aim here is to build a self-sustaining community of learners.

In particular, the area of continuing professional education is proving to be particularly appropriate for e-learning. For instance, the University of British Columbia has developed several graduate programs aimed at those who already have bachelor or even postgraduate degrees who need to update or develop new areas of expertise. Usually in partnership with another institution, the University of British Columbia has developed both postgraduate certificates (consisting of five one-semester online courses) and fully online masters degrees, where students can incorporate the certificate courses within the masters program. These programs have several distinct features that separate them from traditional graduate programs:

- they are aimed at working professionals who study part-time;
- students can take single courses, or combine five courses toward a certificate, or ten courses toward a masters degree;

- the courses are delivered globally, often with an international partner, and in two languages;
- the program is available almost entirely online;
- the students themselves contribute extensively to the knowledge base, through collaborative online discussion;
- there is no research dissertation, but the programs are often project-based, drawing on the experience of diverse professionals working collaboratively online;
- the courses are entirely self-funded through tuition fees, allowing the university to hire additional tenured faculty;
- the programs are self-sustainable because they meet a market demand.

Lastly, in a corporate training environment, e-learning may be used for “just-in-time” learning, allowing employees to develop skills as and when they need them. A typical example would be an employee wishing to develop a graph from an Excel data spreadsheet for a company presentation. The company has arranged with an external e-learning company access for its employees to short modules of training for Excel. Using a pre-assigned identification and password, the employee goes online and chooses a module on creating graphs, and has on-demand and continuous access to that module until mastery of the task is achieved.

Stability and Change

Returning, then, to the questions posed at the beginning of this section, e-learning in general does *not* change the fundamental processes of *learning*. Students need to read, observe, think, discuss, practice, receive feedback, be assessed, and accredited. These requirements are not changed by e-learning. Furthermore, e-learning does not really transform the traditional methods of face-to-face teaching. Indeed, face-to-face methods transfer very easily to technology. Information can be transmitted over the web probably more effectively and just as easily as in a lecture theater. Online discussion forums replicate most of the features of face-to-face seminars, although there are some losses, such as visual cues, and some gains, such as the opportunity for reflection before participating. Problem-based learning and project work can be just as easily replicated online as in class, with probably greater access to resources. Even a great deal of laboratory work can be simulated, at a cost.

In this sense, then, I do not share the view of Harasim et al. (1995) or Peters (2002) when they argue that e-learning is a “paradigm shift.” Rather, it is old wine in new bottles, at least at present. But one needs to be careful here. Developments in computer-based expert systems, simulations, learning objects, virtual reality, and the vast resources available over the Internet, are

likely to result in a greater emphasis on methods that are not so prevalent in face-to-face teaching, and may lead eventually to radically new formats for teaching.

As a result, there is already a shift to more project work and problem-based learning, the creation by students of multimedia projects and assignments, and more student choice in learning and the curriculum, through e-learning. Radically different ways of structuring learning materials may be developed to support new forms of learning, and innovative teachers will discover and create new methods of teaching that better exploit the potential of e-learning. E-learning opens up new markets for higher education; indeed, it is meeting needs in professional continuing education that have otherwise been largely ignored by universities. Nevertheless, the old methods have well served the basic processes of learning for over 800 years. It would be surprising if they disappeared entirely from e-learning applications, although they may be continuously adapted as the technology changes.

Where e-learning is having an effect is by facilitating and making more efficient or more effective the learning *process*. Electronic learning no more automates learning than traditional large classes and multiple-choice testing. What it can do, though, is to shift the balance of work from teacher to student. By providing self-controlled activities, student time on task can be increased. Electronic learning can provide more opportunities for practice, and more flexible access to a wider range of materials.

Electronic learning also enables teachers to offer alternative approaches to learning that suit the needs of different kinds of learners. It can offer access to resources that would not otherwise be available in a traditional classroom. Thus while not changing the fundamental ways in which students learn, e-learning can *add value* to the process of teaching and learning, by creating richer or more authentic learning environments, and by providing more options to meet individual needs in learning.

ORGANIZATIONAL ISSUES

Where e-learning *can* lead to fundamental change in education is in the *organization* of teaching. Electronic learning provides teachers and students with opportunities to organize teaching and learning in radically different ways. Neither teachers nor students have to be (always) present in the classroom. They can be freed from the requirement to be at a specific place at a specific time in order to teach or to study. Electronic learning allows for access to materials that would otherwise not be available in a classroom, and allows teachers and students to structure learning materials in a variety of ways. It enables different preferences for learning to be more easily accommodated,

and makes it easier for part-time or working students to access learning. In particular, e-learning provides lifelong learners with a flexible and convenient way to continue to study and learn throughout their lives.

The biggest impact, though, is in the work organization of the teacher. There are many different ways in which a course can be developed and delivered. The choice of model will depend on the scale and complexity of the course, and the centrality of the use of technology. By far the most common model of e-learning course development is what I have called the “Lone Ranger” approach, after an old Hollywood cowboy film and subsequent television series (Bates, 2000). Teachers work on their own, usually using a course management system or platform such as WebCT or Blackboard. This fits well with the autonomy of the classroom teacher. Furthermore, Lone Rangers are essential for getting innovation started, for demonstrating the potential of technology for teaching, and for ensuring e-learning is used when there is no systematic support from the institution. Usually, Lone Rangers are dedicated teachers who put a great deal of time and effort into experimenting with technology for teaching. However, there are considerable limitations of the Lone Ranger approach to the use of e-learning. The main problems are workload and quality.

For a teacher to work alone, the Lone Ranger has to deal with all the activities associated with the use of technology, as well as choosing and organizing content and learner interaction. Consequently, the Lone Ranger model usually results in a great deal more work for the teacher compared with a regular face-to-face class. Furthermore, quality in teaching with technology requires expertise not just in content, but also in course or program planning, instructional design, media production, online moderating, student support, and course or program evaluation and maintenance. It is very difficult for teachers to become experts or even experienced in all these areas without their workload increasing to unsustainable levels. Therefore, a number of alternative approaches to the Lone Ranger model are being developed

Hartman and Truman-Davis (2001) describe the *boutique* approach to e-learning course development. A teacher approaches an instructional support unit for professional assistance on an individual, one-to-one basis from an instructional designer or technology support person. As Hartman and Truman-Davis (2001) explain, this is a satisfying experience for both teacher and support person and works well when there are relatively few instructors needing help. However, the model starts to become unsustainable as demand increases because of the resources needed. It causes particular difficulties for the instructional support unit or person, as there is no obvious way to determine priorities between multiple requests for help, and there is no boundary around the support commitment. Furthermore, because the teacher usually initiates the process, the wrong kind of assistance may be requested. For

instance, the request may be limited to purely technical assistance, when what may be required is a different approach to course design for the technology to be used effectively. Nevertheless, the boutique model can be useful in helping individual teachers to get started in using technology in a systematic and professional way.

Another model that is beginning to emerge is the *collegial materials development* model. In this model, several teachers work collaboratively to develop e-learning materials. The teachers may be from the same department or from different departments in the same institution, or subject experts from different institutions. By working collaboratively, they can share ideas, jointly develop or share materials, and provide critical feedback to each other. In collegial materials development, each participant in the project is free to decide what materials to include in his or her own courses, and what materials to share with other colleagues. Often, the material is made public.

Another feature of collegial materials development is that rarely is a whole course produced. The focus is usually on developing materials that other teachers and students may find useful within their own courses. However, at some stage, even collegial development approaches are likely to reach a point where there is a need for more formal management of the process, some form of evaluation or peer review of the materials, and the need for professional design and graphics. At this point, a project management approach is needed.

Project management is common in creative media areas, especially where the project is complex, such as film and television production, advertising, video and computer games design, and also in many building, engineering, and information technology-based projects. Project development and delivery involves a team of individuals each contributing different skills, and the process is managed by a team leader or project manager. There is a defined set of resources, usually determined at the outset of the project, a timeline, and a clear “deliverable,” that is, it is clear what the project has to achieve and it is obvious when it is completed. Project management has been used for many years in education for course development and delivery. However, it has tended to be restricted to distance teaching and educational television. Nevertheless, as the use of e-learning in regular teaching becomes more complex, project management will become increasingly important as a means of controlling workload and quality.

The decision whether to adopt a Lone Ranger, boutique, collegial materials development, or project management approach depends on a number of factors. The most critical are the size, complexity, and originality of a project, and the resources available. Thus, a teacher thinking of adding PowerPoint presentations to her classroom teaching will not need project management for this. However, if a whole course is to be delivered online and at a distance, or if a multimedia expert system is to be developed, or if a large lecture class is

to be completely re-designed, then project management becomes essential. It is more difficult to determine whether mixed-mode courses, which combine a reduced face-to-face teaching load with substantive online learning, require a project management approach, but they would certainly benefit from collegial materials development. In general, though, the more important the role of e-learning becomes in a course, the more important it becomes to use a full project management approach.

Lastly, successful boutique, project management, and collegial materials development require access to resources, such as instructional designers, graphics designers, web programmers and, above all, someone who understands and is experienced in project management. Project management and collegial materials development therefore require a significant shift in management strategies and approaches to teaching, as well as resources dedicated to funding staff other than teachers. However, even a Lone Ranger can use many of the principles of project management when developing courses using e-learning.

LEARNER SUPPORT

Support for e-learners is perhaps the most important and least understood aspect of e-learning. Noble's fear of the automation of teaching has not proved a reality in most cases because, without adequate support for learners, programs collapse. Learner support covers a wide range of topics, but the most important are:

- marketing/course information;
- registration and tuition-fee payment;
- course admission/passwords/technical help;
- ordering and delivery of materials;
- online moderating;
- student counselling;
- student assessment and feedback.

With the possible exception of online moderating, these issues are not any different from those of regular campus-based learners where e-learning is merely used as a classroom aid. However, as the proportion of time devoted to e-learning compared with regular classroom teaching increases, then so does the importance of equivalent online learner support services. The more time students spend on e-learning, the more they need and expect other services, such as online admission and registration, online counselling, online payment of tuition fees, and online ordering of materials to be available. For students

who study entirely online (that is, distance students), the provision of these services online becomes essential. This means that administrative systems need to change alongside teaching systems.

One of the big mistakes that many institutions made in setting up for-profit e-learning operations was to underestimate the importance and the resulting high cost of these learner support systems. This is particularly true with respect to online moderating. It is the ability of students to interact not only with a teacher but also with each other over time and distance that gives e-learning its pedagogical advantage. Experience and research have shown quite clearly that, for quality learning to take place in most subject areas, the ratio of teachers to students in online classes has to be carefully controlled and managed (see Salmon, 2000; Paloff and Pratt, 2001; Bates and Poole, 2003, for more on online moderating).

THE DIGITAL DIVIDE AND OTHER SOCIAL AND CULTURAL ISSUES

The same pattern of Internet development found in economically advanced countries seems to be spreading to other less economically developed countries. The first locations are institutional, in universities, large multinational companies, and select areas of government, such as the military and ministries. Services then spread to community centers, schools, and public cybercafés, smaller companies, and local government. At the same time, home access is gradually increasing, initially in the homes of the more wealthy, then spreading to middle-income and, later, relatively low-income homes. The very poor, though, may never get access at home. In Canada, only 32 percent of homes with incomes in the lowest quartile used the Internet, compared with 87 percent in the highest income quartile (Statistics Canada, 2003). Access to the Internet, then, will spread, and high speed access will increase. The only question is the rate at which this will happen, and this will depend primarily on economic factors in different countries.

The post-secondary sector tends to be more privileged with regard to Internet access, with universities often being pioneers within a country for providing access for students on campus. It is difficult to separate cause and effect with regard to the digital divide. The digital divide can be seen as yet another manifestation of inequalities between the rich and the poor. Indeed, a comparison of Canada with the United States suggests that where the wealth gap is wider, so is the digital gap. However, it is a moot point as to whether the Internet increases or reduces inequalities in itself. What is clear is that strong policies at governmental level can help reduce some of the digital divide by ensuring that schools and local community centers enable all

students to have access to the Internet, irrespective of home conditions. Post-secondary institutions, in particular, can play an essential role in developing countries in providing at least a presence in the information society.

Although a great deal of attention is given to the digital divide in educational circles, less attention has been paid to other social and cultural issues. An OECD study (2001) noted the trend toward private and public partnerships in managing the costs and complexity of e-learning in the face of global competition, and raised questions about the public interest of such partnerships. The potential also for cultural imperialism and economic exploitation is high when programs emanating from more economically advanced countries start attracting the more wealthy students from less-developed countries. For instance, students from some countries find the approach to learning based on social constructivism alien, at least initially, compared to more traditional teacher-focused and information-based courses offered in their own country. Thus, as well as the disadvantage of working in a second language, students from foreign countries also have to overcome cultural barriers to learning online. Nevertheless, for many students in less-developed countries, the prestige and opportunities to learn from well-established Western institutions without the cost of leaving home more than compensate for the extra difficulty. (For more on the cultural issues of international e-learning programs, see Bates and Escamilla de los Santos, 1997; Mason, 1998; and *Distance Education*, 2001, vol. 22, no. 1: the whole edition is devoted to this topic.)

CONCLUSIONS

Underlying this debate is the critical issue of who benefits most from e-learning. As access to computers and the Internet is not equal, and because students differ in their learning needs, it is important not to treat e-learning as a panacea for post-secondary education. It is a useful method that serves some groups better than others. It is particularly appropriate for students who need to work and study at the same time. This might include students who have to work part-time to cover living costs or tuition fees, and especially lifelong learners who have families and jobs, and have probably already been through a conventional state higher education institution once already. It is also appropriate for students in rural areas or areas without good local post-secondary education institutions. It is appropriate for employees who need to learn continually in the workplace.

Electronic learning is less appropriate for immature students, for students unable or unready to learn independently, and for students in need of close and personal interaction with other students (although an introduction to e-learning under controlled conditions is probably beneficial even for this group of

students). In particular, given the cost of developing and sustaining high-quality e-learning, governments and institutions need to pay careful attention to cost-benefit analysis. For some groups, more conventional educational provision may be a better investment; while for others, e-learning will be the best option.

There is certainly strong pressure, particularly from some American interests, to commercialize post-secondary education, and e-learning was seen as a major means by which this could be achieved. The initial optimism around this strategy crashed with the dot-com bust of 2001, although it is unlikely that pressure to use e-learning to privatize higher education will disappear.

Electronic learning can and perhaps should change the nature of teaching and the relationship between teacher and learner in post-secondary education, but to date its applications in general have been quite conservative, replicating, either virtually or at a distance, many of the traditionally valued approaches to teaching, such as seminars, testing, and searching, analyzing, and applying information. However, as the technology improves, allowing for both synchronous and asynchronous interaction, video as well as text, and as instructors begin to understand the power and potential of e-learning, it is likely that we will see new and more powerful approaches to teaching and learning emerging.

This is unlikely to happen, though, without some fundamental changes in the way in which faculty work. The technology raises the skill requirements of faculty, and, in particular, successful applications of e-learning depend on harnessing the skills of other professionals, such as instructional designers and media producers. This means that faculty will need to pay more attention to instructional design and to teamwork if they are to use e-learning cost-effectively.

Lastly, e-learning has suffered as much from over-exaggeration of its benefits as it has from fear and resistance to change in very conservative institutions. Nevertheless, there is growing evidence that e-learning is a useful tool for post-secondary education, as long as it is used with skill and discrimination.

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