Chapter 11

Charting the Evolution of Lifelong Learning and Distance Higher Education: The Role of Research

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Abstract

This personal review of research into distance higher education indicates the large quantity and variable quality of research in this field. The article focuses on research that identifies indicators of success in distance higher education. In particular, the chapter examines research on or developments in: the demographics and characteristics of distance learners; attrition/completion; market needs and the link between online learning and knowledge-based economies; different generations of distance higher education; different forms of learning through online instruction; distance learning technologies; and the organization of research. Despite a shortage of good quality research, the chapter concludes that there is a substantial body of knowledge validated by research that decision-makers ignore at their peril.

The growth and development of research into distance higher education

This chapter focuses on the development of research in the area of distance higher education. I take a broad definition of lifelong learning. For me, lifelong learning is any form of deliberately chosen learning activity by a person outside the conventional campus-based school or college system. Lifelong learning may be for pleasure, intrinsic interest or for career development. However, this chapter focuses on just one of these areas of lifelong learning, higher education provided by distance education.

A significant body of research into distance higher education started to develop in the 1970s and 1980s. As a result of the rapid expansion in distance education, exemplified by Britain's Open University, a number of journals were established to publish research in this area. One of the first was *Teaching at a Distance,* created in 1974 at the Open University. The journal changed into *Open Learning*, which is still published today. *The Journal of Distance Education* (published by the Canadian Association of Distance Education, with articles in English and French) was first published in 1986, followed by *The American Journal of Distance Education*, published by the American Centre for Educational Research at Penn State University, and *Distance Education*, published by the Open and Distance Learning Association of Australia, both in 1987. There are now over 40 refereed journals in distance education, published in many countries. Most are published in English, although there are also journals in French, Spanish, Chinese and other languages.

Taking into account the books on research in distance education and the hundreds of PhD theses on distance education and the many other publications on related areas, such as curriculum design, educational psychology, educational technology, online

learning, educational broadcasting, communications studies, and higher education policy, it can be seen that the research literature in distance higher education is substantial, so any review of the literature in the space available for this chapter will be less than comprehensive.

Although the quantity of research publications in this field is high, the quality is more of a problem. Many articles are based on a single case, are descriptive and qualitative, rather than analytical and quantitative, and most do not build on or contribute to theory, thus making generalization difficult or impossible. Nevertheless, despite these limitations, there is now a solid base of research findings that provides clear guidelines for the establishment of successful distance education practice. Unfortunately institutional decision-makers are often unaware of this research literature, which explains why so many distance education initiatives fail. My focus therefore in this article will be on well-founded research that provides indicators of success (or failure) in distance higher education.

Research into learners and their needs

Demographics

There have been a number of studies on the demographics of distance learners. McIntosh, Calder and Swift (1976) did an extensive analysis of Open University enrolments. They found that OU students were generally older (all were 21 years or over, and 40 per cent were between 25-34 years of age), there was a higher proportion of women than men, students were socially mobile (in 1971 only 6 per cent were from working class occupations, although for 51 per cent of entrants, their parents' occupational category was working class), and the majority were working. About 40 percent of the students in 1971 entered the university without the minimum qualifications for admission to traditional colleges and universities in England.

These characteristics of distance learners have been relatively stable over time and across different kinds of institution, at least in economically advanced countries. For instance in a survey of distance education students at the University of British Columbia in Canada in 2000, the students taking undergraduate distance courses were on average several years older than students taking the same classes on campus, a greater proportion of the distance students were women, and more distance students were employed. These differences in demographics were similar to the Open University, except that the distance students at UBC required the same high academic qualifications as campus-based students to be admitted.

Another common characteristic was that the vast majority of UBC distance education students in the survey were not truly distant. The majority (83 per cent) lived within one hour of travel to the university, and almost half within the City of Vancouver (population 600,000). Only 6 per cent of the enrolments were from outside the province. Thus for many students, distance education is about flexibility and/or open admission, not about geography.

Completion rates

Distance education drop-out - or its converse, completion rates - is a very popular topic for research, particularly for Ph.D. students (presumably because supervising campus-based faculty are suspicious of distance learning). Unfortunately for such students they soon find that the issue is complex, and probably even more disturbing, that it has already been researched to death. The standard text in this area is Kember (1995). Kember has adapted a general model of attrition and non-completion for conventional students to distance education. His and other studies (e.g. Evans, 1994) have identified lack of finances, a history of learning difficulties in school, conditions at home, such as lack of a quiet area to study, unexpected or unavoidable pressures from work, sickness in the family, and a failure to understand the necessary time commitment before enrolling, as all causes of drop-out or non-completion.

Fenner (1998) found that attrition is much higher at the beginning of a distance course than towards the end. Up to 80 per cent of all withdrawals are usually within the first week of a distance course. Fenner also found that if students were enrolled in a distance programme, students who completed their first couple of courses were very likely to complete the whole programme.

The main factor influencing attrition in distance education courses is the overall design. For instance, at UBC, the completion rate for distance education courses is around 85 per cent and for similar campus-based courses 90 per cent. Distance students at UBC have good academic qualifications, and professionally designed online courses with regular and high quality online tutoring, often from the tenured faculty who teach the on-campus courses. In contrast, Belawati (1998) reported attrition rates as high as 95 per cent at Universitas Terbuka, the Indonesian Open University, which she attributed to the poor or non-existent tutorial services. Also, Universitas Terbuka was designed to compensate for a lack of regular university places for high school graduates. However, at the British Open University Woodley and McIntosh (1980) indicated that distance education is not a good alternative to regular campus-based teaching for younger students (18-19 years old). In a pilot scheme, the younger students had a much higher attrition rate than the regular Open University students, who at that time had to be at least 21 years old to be admitted.

The Open University claims that just over 50 per cent of students who initially enrol go on to complete a full bachelors degree from the university. However, many distance students have no desire or intention to do a whole degree. Lifelong learners in particular may be interested in taking only those courses that have a specific interest or value for them. We should in any case expect a higher non-completion rate from distance learners. Many cannot take courses from regular universities because of family or work commitments or lack of qualifications, so such students are often higher risk to start with. Nevertheless, the main outcomes of research into drop-out in distance education is that attrition can be markedly reduced by good course design, and by good quality personal support through tutors (Tait and Mills, 2002; Brindley, Walti and Zawacki-Richter, 2004).

Student characteristics associated with success in distance higher education

There has been considerable research to identify if there are particular characteristics of students associated with success in distance higher education, such as

particular learning styles. Generally, this research has failed to find much of significance. However there are one or two important exceptions.

Independent learning

From the early days of distance education, theorists have argued that distance education requires or must develop autonomous or independent learners. Moore (1983) emphasised that learning is a developmental process, and students can learn to become more autonomous. He argues that explicit design is required to bridge the gap between teacher and learner, to support autonomous or independent learning. Moore and Kearsley (1996) found that learners with previous experience of using the media of communication and with higher knowledge levels of the subject matter tend to participate more interactively and independently in learning activities. Subsequent research has established that not surprisingly students already with independent learning skills do better at distance education and that such learners are more likely to be found in distance education courses compared with face-to-face courses. This has practical consequences for designing distance education programmes. For instance, at UBC, distance education is focused on third and fourth year undergraduate, and graduate, programmes, where students already have higher levels of subject knowledge and have begun to develop more autonomous learning skills.

Lifelong learners generally make good distance education students because they are more likely to have developed learner autonomy during their previous face-to-face education, especially if they have already been to college or university. This research also suggests one reason why drop-out is often high in open universities in less economically advanced countries: for financial reasons distance learning is used to replace rather than supplement conventional university education for 18-21 year olds, but many of these students will lack independent learning skills.

Research into market needs

Market demands of knowledge-based economies

Unable to compete with low labour costs in developing countries, more advanced economies are trying to create highly productive (and high wage) knowledge-based industries, such as computing, telecommunications, financial systems, health, and education itself. Such industries depend on a highly educated work force, thus leveraging an advantage over less economically advanced countries.

Education and training of the workforce is now a high priority for many governments, and this education and training must be continued throughout a person's lifetime, given the continuing pressure to remain competitive. It is hard to quantify the need for "work-force" education and training. However, if we assume that a person will need to re-train at least five times in a working life-time, and that such re-training requires the equivalent of three months full-time learning (probably a gross underestimate), then the current capacity of the education and training market, public and private, probably needs to be at least doubled in most knowledge-based economies (Open Learning Agency, 1992).

In knowledge-based economies, there is a need for skills such as seeking, analyzing and applying information, independent and lifelong learning, problem-solving, creative thinking, and teamwork. The education of knowledge-based workers requires an approach that enables them to learn both inside and outside conventional higher education institutions. Such learners must be encouraged to analyze and criticize, to offer alternative solutions and approaches, and to take risks. This kind of learning cannot be easily done in large lecture classes or through mass communications such as broadcasting (see Bates and Poole, 2003, for more discussion of this issue).

Governments see two quite distinct roles for online learning (or e-learning), delivered through the Internet. They see online learning as a new knowledge-based industry, able to lever the advantage of advanced educational systems to create educational products and services that can be marketed internationally, and indeed, many new companies have been created to provide online learning for both the corporate and to a lesser extent the public sector. Governments also see online learning as an important tool for improving the quality of education and for producing technology-savvy graduates, able to use new technologies in the new economy.

Business also sees a value in online learning as a way of increasing competitiveness through ensuring that the work-force is continually learning and improving. In particular, online learning is seen as an essential component of knowledge management, allowing companies to become "learning organizations" (see Senge, 1990, and Rosenberg, 2001). Because training is costly, efforts are being made to find more cost-effective ways to train. Consequently, in the last few years, online learning has been applied on a large scale in corporate training. Some major companies have demonstrated substantial financial and operating benefits as a result of switching to online training (Strother, 2002).

Most importantly, *individuals* see distance learning providing the flexibility they need to continue their education or training while still working or with family responsibilities. The rapid growth of knowledge in areas such as health, technology, and management require people working in these areas to continue to study and learn, just to keep up with the knowledge base of the job. Distance education, and in particular online learning, are ideal methods for lifelong learners.

Irrespective of the country, it is likely that agricultural, industrial and knowledge-based economies will exist side by side, but the proportion of the workforce in each sector will vary. However, it should be noted that the skills required in knowledge-based industries, and the teaching methods needed to develop them, may not be so relevant for industrial or agricultural economies. Thus teaching methods and the choice of technology will need to vary depending on the dominant economic sector for which workforce preparation and training is needed. The implication for less economically advanced countries is that print- and broadcast-based open universities may be the priority for public funding, but some form of online learning will also be needed for professional elites, possibly privately funded (Bates, 2001).

Research into teaching

Generations of distance teaching

Distance education has gone through several stages of development. Taylor (1999) has proposed five generations of distance education:

- correspondence education;
- integrated use of multiple, one-way media such as print, broadcasting or recorded media such as video-cassettes;
- two-way, synchronous tele-learning using audio or video-conferencing;
- flexible learning based on asynchronous online learning combined with online interactive multimedia;
- intelligent flexible learning, which adds a high degree of automation and student control to asynchronous online learning and interactive multimedia.

The progression through these stages of development has been driven less by research than by changes in technology and educational theory. The first two generations (correspondence and multiple media approaches) have been associated more with systems-based and behaviourist or cognitive approaches to learning. These may be considered more teacher-focused and "industrialized", in that all students get the same material. Open universities and distance education units in dual-mode institutions adopted these methods, which are particularly suitable for industrial or agricultural economies. The third stage aims at replicating as far as possible the classroom model through the use of synchronous interactive technologies, such as video-conferencing, and relies heavily on lecturing and questions. It offers no economies of scale, lacks flexibility for learners, and is expensive, but is popular because instructors do not have to change or adapt their classroom teaching methods to any extent. This however encourages or reinforces traditional approaches to teaching such as lecturing, rather than developing the new skills needed in knowledge-based economies. The fourth generation is flexible learning based on asynchronous communication through the Internet and the World Wide Web (online learning). This stage is generally but not exclusively influenced by constructivist approaches to teaching and learning. Taylor's fifth stage is still experimental, and applied mainly in his own institution (University of Southern Queensland).

Is distance education effective?

Moore and Thompson (1990) did a review of more than 300 studies on the effectiveness of distance education. They summarised this study as follows:
The literature points overwhelmingly to the conclusion that teaching and studying at a distance, especially that which uses interactive telecommunications media, is effective, when effectiveness is measured by the achievement of learning, by the attitudes of students and teachers, and by cost-effectiveness (p.34).
As Moore and Thompson themselves point out, simple comparative research between distance and campus-based teaching is not particularly helpful, because results in both contexts will depend on a wide range of variables. More useful research focuses

on the conditions for success. Conditions for success in distance education teaching and learning can be broken down into constitutent parts:

- *students*;
- *course design* (including: the organization of the design process; the choice of pegdagogical or epistemological approach; and choice and use of media);
- *course delivery* (including: tutorial support; faculty development and training; and student assessment).

Through the analysis of research and best practice in all these areas a quality assurance process can be established. This is a set of steps in developing and delivering programmes that if not guaranteeing success (Twigg, 2001), will at least ensure that programmes have a fair chance of succeeding.

Research into online learning

I will focus primarily on online learning (fourth generation), because it probably best reflects the current state of the art in more economically advanced countries, and because it relates strongly to the needs of knowledge-based economies.

It is no co-incidence that online learning arrived at a point in time when constructivist approaches to teaching were being advocated in North American universities (see for instance, Jonassen et al., 1995). 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. Thus online learning became seen as a valuable tool for furthering constructivist approaches to teaching and learning; online learning was seized upon as a way of teaching *differently* from large lecture classes. With respect to online learning, research and theory aims at informing both the initial course design, and the online communication between students and instructors or tutors.

Knowledge construction

Harasim et al. (1995) provide a good description of knowledge construction: Understanding ... grows out of interacting with information and ideas - for example, reconstructing ideas, setting ideas within frameworks, viewing multiple perspectives on ideas, questioning implications of ideas, and posing theories or hypotheses about ideas....the learner actively constructs knowledge by formulating ideas into words, and these ideas are built upon through reactions and responses of others to the formulation (p. 98).

A lot of the literature implies that just by creating an online environment these skills will be developed. However, this is not supported by research. For online discussion forums to enable learners to construct their own meanings, increase their depth of understanding of key concepts and principles in a subject, and apply concepts and ideas to new contexts, research has indicated that very careful course design and online moderation are needed. What is not clear from the research is whether learners develop new knowledge that has not been constructed and validated before (although it may be

new to them). It is also dangerous to assume that knowledge construction will always lead to better understanding of a subject area.

Moderators of online discussion forums then need to ensure that students are meeting the necessary academic standards in their online discussion, such as evidence-based argument, setting argument within a conceptual framework, and relating discussion to the concepts and ideas covered in the course materials. If not, the discussion can easily deteriorate into a swapping of unsubstantiated opinions among students. Paloff and Pratt (2001) and Salmon (2000) provide guidelines for moderators to enable knowledge construction, although these studies are based more on direct experience than scientific research.

Critical thinking

The development of critical thinking skills is another argument put forward for Web-based learning. There are several reasons why educators favour asynchronous computer conferencing for more reflective, critical thinking. The opportunity for students to challenge course materials, to challenge other students' conceptions and arguments within a course, and to find and compare multiple and perhaps conflicting sources of information should all help promote critical thinking.

Because computer conferences can be archived and analyzed later, it is easier to evaluate these discussions than those that occur in the classroom. Despite this, once again it is difficult to find in the literature studies that relate specific design features of online teaching to the development of empirically validated critical thinking skills, although MacKnight (2001) and Scardamalia and Bereiter (1999) provide some guidelines on facilitating critical thinking skills and knowledge construction online within school settings. Thus Web-based learning provides the *potential* for the development of critical thinking skills, but there is still a need for active intervention by moderators and designers to ensure that critical thinking skills are actually developed.

Collaborative 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.

There is though evidence that using the Web for collaborative learning is not without its own problems. The teacher must pay particular attention to ensure that students are clear as to their tasks, that they have adequate resources for the tasks, and that there are clear guidelines for working collaboratively. There must be procedures in place to deal with conflict resolution within groups, and for dealing with students who do not participate fully, or at all, in group assignments. Assessment of individual students can be particularly challenging when they are working in groups. In this respect, once again, the general literature on collaborative learning applies just as strongly to online as

to face-to-face teaching. *Distance Education*, Vol. 23, No. 1 is devoted to research on collaborative and problem-based learning in distance education.

Cultural and ethical issues in international distance education
      The development of online courses aimed at international audiences has led to concerns about cultural imperialism and the possible dominance of American programming (e.g. Boshier, et al., 1998). Mason (1998) came to the following conclusions following five case studies of international distance education programmes:
- a preponderance of English as the language for international distance programmes
- cultural issues were not being explicitly addressed in these programmes,
- there was considerable diversity in the approaches to international distance education,
- going international forced a very careful consideration of the educational process in all the case-studies
- there was a focus on business, IT and educational technology topics, reflecting the demands of the lifelong learning market.

      Bates (2000; 2005) has criticised the ethics of some of the for-profit distance education programmes being developed by more economically advanced countries. Bates (2000) has also described some of the cultural issues in teaching at a distance that arise from differing approaches to teaching and learning in different countries, especially the differing relationships between teachers and students. He also noted the need for local cultural adaptation of courses, and recommended joint and equal partnerships between institutions in different countries to ensure cultural relevance.

      Possibly for these reasons, the fear of American domination of the international distance education market is so far unfounded. In major studies of international education providers for the Australian government, Cunningham et al. (2000) and Ryan and Stedman (2002) found little evidence that there would be "a tidal wave of new providers emerging … in the short term". However, they did warn that

> the implications of commercialization are profound. The new providers are not bound by norms or ideals of traditional higher education such as collegial governance, linked research and teaching, or academic autonomy and control (Cunningham et al, 2000, p. 153).

      Similarly, Murphy, Zhang, and Perris (2003), reporting on online learning in Asia, commented: "Arguably, any simple 'imperialist' strategy has failed, for a variety of reasons", pointing out that "many Asian countries are already supporting others in the region and offering cross-border studies at a quality and cost that cannot be met by their Western counterparts." Thus, while caution is needed, experience is growing on developing successful international distance education programmes that respect and re-inforce different cultures. The whole of Volume 22, No. 1 of *Distance Education* is devoted to articles on cultural issues in international distance education.

      There is clear evidence that when well designed, distance education can be as effective as face-to-face teaching, across a wide variety of subjects and target groups. As a result of constructivist theory, some very strong claims have been made for the benefits of online learning. However, to date, there is very little research to either deny or support those claims. Perhaps more importantly though the development of online learning is

seen as meeting the needs particularly of knowledge-based economies. In contrast, second generation distance education, based on the mass media of print and broadcasting, may give greater economies of scale while still meeting the needs of industrial or agricultural economies, and thus may be more appropriate for less economically advanced countries.

Research into technologies

There have been hundreds of comparative studies, comparing for instance the effectiveness of a broadcast lecture versus a face-to-face lecture, or an online course with a face-to-face course. Generally, such studies have not proved very valuable. From Schramm (1974) through Clark (1983) to Russell (1999), analysis of these studies have shown that when properly designed, there are no significant differences in learning between different media or technologies (face-to-face can be considered a medium of teaching). The reason for this is that the medium of teaching is only one of many different variables that influence the effectiveness of learning. In particular, the *way* a particular medium is used - more accurately, its quality - is very important. Thus a poorly prepared and delivered lecture will be less effective than a professionally produced television programme - and vice versa. Well designed teaching in any medium is likely to be effective.

However, this should not be interpreted to mean that the choice of technology does not matter. Once again, it is important to look at the conditions that lead to the successful or inappropriate use of different media in specific contexts. Research by Bates and his associates (Bates: 1995, 2005) has shown that technologies vary in terms of their access for distance learners, their costs, the kinds of learning they best support, the type of interaction they provide, their organizational requirements, their novelty value and their speed of development and maintenance. From this, Bates developed a decision-making model called **A C T I O N S** (**A**ccess, **C**ost, **T**eaching function, **I**nteractivity, **O**rganizational issues, **N**ovelty and **S**peed) to help choose the most appropriate combination of media and technologies for a particular context.

Current research into new technology

Also, at the time of writing there is considerable research and development into emerging web-based technologies. These will be briefly mentioned.

Learning objects
A learning object can be anything from a single graphic or paragraph of text, a single slide of a physiological cell, a self-assessed test, a simulated laboratory experiment, or a short module of teaching. As well as the object being created in a digital format, a whole set of other data can be digitally "tagged" to the object, such as verbal descriptors, transaction software for charging a small fee for accessing the source, copyright holder information, links to similar objects, etc. The importance of the 'tags' against each object is that they enable Internet search engines to locate appropriate learning objects matching the descriptors used by the person searching for the object. A course designer then could build a teaching programme with many such links integrated

within the overall teaching context, without having to create those objects from scratch (see Wiley, 2002, Downes, 2001, and McGreal, 2004, for good explanations and critiques of learning objects).

There is a lot of research interest in the technological aspects of learning objects, such as the determination of common standards for tagging. However, there has to date been very little application of learning objects on a large scale in distance education. There are still unresolved questions about appropriate instructional design models, about the business model (who pays and how will the cost be recovered), and institutional policies towards the cost and maintenance of learning objects. Underlying the research into learning objects though is the need to find convenient ways to store and manage the large amount of digital materials now being created.

Student portals and e-portfolios

The more distance teaching moves online, the more important it becomes to provide services to students over the Internet. To enable students to access all the services they need in a user-friendly manner, a number of institutions have created student portals, which provide a structured screen through which students can access their online services, such as online self-enrolment, fee payment, course registration, access to online course materials, grades, and instructor or tutor contact information. One such service being developed is student e-portfolios, which allow students to create web-based collections or summaries of their work, career and interests.

Social software

This is a generic term to describe a number of online software developments that allow for the development of communities of practice, by enabling groups of people to communicate and build resources of mutual interest. The simplest forms are e-mail, bulletin boards, and online discussion forums, but more recently include weblogs (blogs) and wikis.

A weblog allows any person with an Internet connection to publish to the Web. Weblogs are a series of "posts" on a webpage, collections of hyperlinks and personal observations, usually organized chronologically with the newest content at the top. Wiki is the Hawaian word for "quick". Wikis use a very simple programming language to create common, shared web-sites that can be altered by anyone accessing the site. Some institutions such as the University of British Columbia are integrating these technologies into their online courses, to provide tools for students to create their own online learning materials. Outside formal education, some areas of professional practice are using blogs and wikis to share professional experience or build communities of practice.

Internet-based synchronous technologies

These are technologies that operate in "real-time" over the Internet. They include Internet telephone service (VoiP), web conferencing (text and audio conferencing), and mobile computing, using wireless. Web-conferencing currently focuses more on audio, graphical and text communication in real time. Individuals can speak with one another and collaborate on text-based projects using data conferencing tools such as document sharing, white-boarding and typed "chat" or live audio. Bates (2005) provides a full discussion of the issues associated with Internet-based synchronous technologies.

Learning objects, student portals and e-portfolios, social software, and Internet-based synchronous technologies are just examples of the rapid technological changes occuring. With the possible exception though of student portals and e-portfolios, applications in distance education to date are limited by the need for access to high-speed Internet services and the high cost of technology. Nevertheless there is a good deal of experimentation going on in the USA, Canada and Europe in these new technologies, which are likely to spread as high speed Internet access becomes more widely available.

The organization of research in distance education

Research into distance education has generally been the responsibility of individuals working in the distance education field, or the subject of individual Ph.D. theses. This is one reason why there is a large quantity of research, often of low quality, although there are several individuals working relatively independently who consistently produce high quality research.

High quality research that has had a measurable impact on the practice of distance education has come generally from small research groups within distance education universities or departments, such as the British Open University, the American Centre for Distance Education at Penn State University, the Open University of Hong Kong (RIDAL), Fernuniversität in Germany, the Open University of the Netherlands, and the MAPLE research group in the Distance Education unit at the University of British Columbia. In most cases these small research groups are internally supported, but seek external funding for specific projects.

National research funding agencies and the European Commission have often funded research into the underlying technologies of distance education, especially information and communications technologies, but have been less keen to fund research into distance education itself. In particular it is more difficult to get external research funding for the "softer" areas such as policy research, cost-benefit analysis, instructional design or learner support than for technology applications.

One well funded national programme was the TeleLearning Network of Centres of Excellence (TL-NCE), a Canadian national consortium of researchers formed to advance knowledge, technology and practice in networked collaborative learning. TL-NCE received C$13 million (just under US$10 million) from 1996 from the Canadian Federal government. Its focus again though was mainly on software development, and its output was disappointing, considering the level of funding.

Similarly, the European Commission has provided extensive funding for projects on the use of information and communication technologies in education, again with little impact on overall practice. Besides an over-emphasis on technology, the European Commission projects are too big and unwieldy to produce high quality research. For instance, European Commission projects often require participants from a balance of economically advanced and less advanced countries, partnerships with industry, and an even spread of money across member nations. This may be good politics in that it supports the integration of Europe but it usually results in poor research.

Small, well-focused, professionally staffed research teams, working systematically over a five year time period, and extensively networked through collaboration with other research teams through the Internet, publications and

conferences, are the most productive and sustainable models for research in this area. Without institutional and government support, though, such teams will be difficult to sustain.

Conclusions

Distance education presents major challenges for managers and teachers. The growing importance of lifelong learning needs new approaches and new financial models for public sector higher education institutions. Above all, distance education requires major changes to the way teaching and learning are organized.

Research can be a useful tool for change. It can support innovation, help develop effective business models, and improve current practice. For this to happen, though, research into distance education needs to be integrated within the decision-making of any institution considering the use of distance education. In particular, there needs to be a greater focus on policy research, research that can help decision-makers implement and support lifelong learning.

Lastly, in recent years there has been a major shift in policy with respect to distance education, a move away from increasing access as its core rationale, to the commercialization of education. In many countries, though, access to higher education remains a major challenge. Even in economically advanced countries, access to lifelong learning is becoming more and more important. Policy-makers should be aware that distance education can bring increased access, support innovation in teaching, and be used to organize higher education more effectively. Distance education research can play a strong supportive role in such change.

Policy points

A number of policy recommendations can be drawn from this review of research into distance education:
- there is a large body of research-based knowledge that provides clear guidelines for the successful practice of distance education; institutional decision-makers ignore this knowledge base at their peril;
- research has shown that student success can be markedly increased by specialized distance course design and good quality personal support through distance tutors;
- distance education is not a good substitute for conventional higher education for students straight from high school; but distance education is a powerful mechanism for supporting lifelong learning;
- online learning is seen as a means to better prepare learners for knowledge-based economies; in contrast, mass media distance education may be more cost-effective for agricultural- or industrial-based economies;
- research has indicated that very careful course design and online moderation are needed for student success; however course design in distance education is driven more by theory than research; more research

on course design and online tutoring is needed, particularly in terms of developing critical and original thinking;

- programmes that are delivered internationally require local cultural adaptation; joint and equal partnerships between institutions in different countries are one way to ensure cultural relevance;
- there is an undue emphasis on funding research into distance education technologies; more funding needs to be devoted to the "softer" areas of research in distance education, such as policy research, cost-benefit analysis, instructional design, and learner support;
- research can inform decision-making but needs small, internally-supported professional teams working in collaboration with other similar teams to produce and disseminate meaningful results.

Relevant Internet sites

The following provide a good overview of refereed *distance education journals*:
http://www.irrodl.org/journalpg.html
http://cade.icaap.org/vol13.2/haughey.html

National Strategies for E-Learning in Post-Secondary Education:
http://unesdoc.unesco.org/images/0012/001262/126230e.pdf

The International Center for Distance Learning (ICDL) is an internationally-recognised centre for research, teaching, consultancy, information and publishing activities based in the UK Open University:
http://www-icdl.open.ac.uk/

The Commonwealth of Learning has released a series of print modules (20-40 pages each) on a variety of topics relevant to *distance education research*.
http://www.col.org/resources/startupguides/prest.htm

UNESCO's *Asia Pacific Open and Distance Learning (ODL) Knowledge Base* contains a searchable database of information relevant to ODL, including information on regional experts, best practices and policies
http://asiapacific-odl.oum.edu.my/

Quality assurance guidelines:
http://www.wcet.info/projects/balancing/principles.asp
http://www.center.rpi.edu/PewSym/mono3.html
http://www.futured.com/library_cp0299p11.htm

Learning objects:
http://www.reusability.org/read/

Student portals:

see http://www.nottingham.ac.uk/is/about/projects/unopod/index.phtml for a good description of student portals and the process involved in development

E-portfolios:
http://www.estrategy.ubc.ca/news/update0401/040121-e-portfolios.html

Wikis:
Description: http://www.commoncraft.com/archives/000644.html
see http://www.e-strategy.ubc.ca/news/update0403/040324-wikis.html for examples of how UBC has been using wikis

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