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The Virtual Classroom: Distance Learning In The Information Age

By

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The Virtual Classroom:
Distance Learning in the Information Age

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Introduction

This paper addresses the opportunities and challenges facing distance learning institutions due to recent advances in information technology and, in particular, the idea of the 'virtual', or electronic classroom. In doing this, we aim to examine the progress that has been made with the concept of the virtual classroom, within both distance and mainstream education, and highlight the obstacles that will need to be overcome if the concept is to become a reality.

The term virtual classroom has come to be associated with learning environments in which students receive and interact with learning materials, other students and tutors via electronic means, usually a computer linked to a network. It should be noted, though, that 'the Virtual Classroom™ is NJIT's [New Jersey Institute of Technology's] trademarked name for a version of its Electronic Information Exchange System (EIES2) with special software structures designed to support collaborative learning.' (Hiltz, p. S14-13) However, we will use the term more widely, to encompass the new and emerging educational and information technology that is providing opportunities for new forms of distance learning. That this wider use is finding acceptance is exemplified by the following observation on technology's progress:

... technology's growing capacity to facilitate instruction at remote sites could well produce a watershed for higher education in the 1990s. ... educators point to live, two-way video connections that can bring 'virtual' classroom experiences into students' homes, workplaces, and other settings. (Jacobson, 1994, p. A19)

Distance Education: Leader or Laggard?

In the general sense, distance education institutions can claim that they have always had 'virtual' classrooms. That is, they do not customarily have physical classrooms, but have groups of learners linked to tutors and teachers through learning materials and a variety of forms of interaction, whether it be by television, mail, the telephone, the computer or other means. The institutions have developed sophisticated procedures and practices for providing courses and support remotely to their students. Their course materials, even if print based, most usually exist in digital form. This would thus appear to give them a head start in the application of the virtual classroom in the more specific sense of the electronic classroom.

This apparent advantage would apply equally to both the institutions and to distance education students themselves. The students are accustomed to receiving and discussing their courses remotely, and so their ties to face-to-face education are not usually as strong as their mainstream counterparts.

How can distance education use these advantages in adapting to the ever expanding list
of technologies? The challenges facing distance education in the 1990s with respect to new technology was addressed by Bates, who prophetically claimed that:

... it is the more interactive technologies such as audio- and computer-conferencing that appear to have most promise for distance education, rather than the delivery of tele-lectures to large numbers via satellite. (Bates, 1991, p. 14)

In making this claim, he issued a warning to those who offer distance learning courses. Alluding to the evolution of distance education through a series of ‘generations’ (from the initial correspondence education), Bates stated that:

Third generation technologies ... will require some radical changes in the management and structure of distance teaching institutions, and those that fail to adapt will find themselves under increasing pressure from new institutions set up specifically to exploit these technologies. (Bates, 1991, p. 14)

The conclusion is, then, that the new technologies are placing pressures on institutions to make decisions about how distance educator is to function in the future and, if those pressures are not faced successfully, a new generation of distance teaching institutions will emerge. Decisions to be taken are thus fundamental to the survival of existing institutions, leading to:

... an obligation on both those that fund and on those that manage distance education to understand the strengths and limitations of different technologies, and above all to have an adequate framework or process that leads to appropriate decisions being taken. (Bates, 1991, p. 15)

Further, each country will need to use information technology in ways that are technically, financially and culturally appropriate. Thus each country will develop its virtual classrooms differently. As Bates explains:

... there is no one super-technology for distance education. ... The choice of technology will still be complex, dependent on a combination of the needs of students and the subject matter, costs, and the desired teaching approach. The newer interactive technologies are both widening choice, and making it more difficult to make decisions. ... It is necessary for each educational jurisdiction to choose and apply distance-teaching models, and the technology that supports them, to suit the unique conditions of that jurisdiction. (Bates, 1991, pp. 14, 15)

This observation regarding technology is related to the reasons why distance education is not always able to take the lead in technological innovation. One reason is access, in that distance education institutions usually insist on making their courses available to as many learners as possible, and not all learners have access to new technologies. Another reason is the retarding effect of the commitment of some institutions to older technologies, often involving large investments in resources. Most distance education courses are, for example, still strongly print based.

So then, what are the trends in the advancement of educational and information technology that can guide the evolution of distance education and inform those who manage distance learning institutions?

Global Trends

An example of how distance education might function in the future is found in France,
where that country's Centre for Distance learning is now located at Futuroscope. This new development, an example of the kind of institution that Bates said would appear, ... embodies the crossroads of communications and technology. ... Students ... attend classes on a futuristic campus both as university students and adults participating in ... continuing education. ... High school students pursuing the literary, mathematic, and scientific tracks study side by side with technology students, university students, and adults who are participating in the national continuous retraining program. ... All students – high school, university, and adult – use libraries equipped with CD-ROM, labs with interactive videodisc, networked computer labs, and distance learning classrooms. (Patterson, 1993, pp. 116, 117)

Of interest is that not only is technology being embraced and pursued within Futuroscope, but that distance education is located alongside its mainstream counterparts. This is also a feature of distance education in many countries already (dual mode institutions), but in this case is taken a step further, to encompass a variety of educational levels.

The advent of Futuroscope is partly dependent on a major commitment of the French government to upgrade its telecommunications system. As Patterson further outlines, the aim is to:

... replace France's mediocre phone system ... [with] a system which is 75 per cent fiber optics and digital switching. Through minitels, computerized telex terminals, users have access to electronic mail, dating services, banking transactions, catalog and ticket ordering, business inventory and ordering, and product advertising. ... most French users can access phone information through minitels, which are furnished free of charge to every residence with phone service. (Patterson, 1993, p. 116)

It is this level of national support that can make advancement in the use of technology both possible and available to all potential users. It is of little value to introduce a technology that cannot be accessed by the majority of participants in the system. Not all technologies are suitable for educational purposes, and recent educational history is littered with examples of failures, from mild to spectacular, of technology to live up to its promises. Examples detailed by Laaser (1988) included the overly optimistic expectations for videotext, the limited implementation of the Open University's Cyclops Project, and the closing down of the 30-million dollar Learn Alaska Network.

As mentioned, Bates (and others) foresaw the potential and growth of computer conferencing during the 1990s. Many countries are currently using this mode of interaction for distance education, especially in the United States. Thus far, though, it appears that it is most frequently used for post-graduate classes, which are of a suitable size for this style of interaction (commonly between twenty and thirty persons).

The possible effects of using the computer for interaction has been an issue of concern for some time. As has been noted:

If we use technologies, the technologies will affect us. ...Use of personal computers as transmitters [CMC] does affect the users. The real question is how. If we are to control the computer and not vice versa, we need to be aware of the social consequences of its use. (Chesebro & Bonsall, 1989, p. 116)

This concern about the social consequences of computer-mediated communication (CMC) has been addressed by a number of researchers and developers. For example,
Yates (1992), analysing linguistic aspects of computer conferencing, concluded that computer conferencing sits on the boundary between the domains of written and spoken communication. As this form of communication is not clearly governed by either the social norms of written or spoken communication, it can potentially create great ambiguity and confusion in the minds of users. Thus those creating CMC environments need to understand the unique social system of interaction which it engenders.

That developers of CMC have addressed this issue is clear from the following observation of an experienced CMC researcher:

... even though CMC is considered to be a medium that is low in social presence cues, it can be perceived as interactive, active, interesting, and stimulating by conference participants ... the impetus falls upon the moderators of computer conferences to create a sense of online community in order to promote interaction and collaborative learning. (Gunawardena, 1995, p. S1-10)

Further, it is claimed that students in electronic classrooms tend to be active learners and to show a greater amount of control in problem solving and decision making than their face to face counterparts (Rossman, 1992). This is important for distance education, as it allows a distance education system to transform from one where students learn alone to one where dialogue and collaborative learning are possible. Kaye (1992, p.4) notes that 'Collaboration involves synergy, and assumes that, in some way, the "whole is greater than the individual parts" so that learning collaboratively has the potential to produce gains superior to learning alone'. Senge (1990) elaborates the meaning of dialogue in relation to team learning as follows:

The purpose of a dialogue is to go beyond any one individual's understanding ... In dialogue, individuals gain insights that simply could not be achieved individually ... In dialogue, a group explores complex difficult issues from many points of view. Individuals suspend their assumptions but they communicate their assumptions freely. The result is a free exploration that brings to the surface the full depth of people's experience and thought, and yet can move beyond individual views ... In dialogue people become observers of their own understanding. Dialogue can occur only when a group of people see each other as colleagues in mutual quest for deeper insight and clarity. (Senge, 1990, pp. 241-42 & 245).

It would seem that the possibility exists for effective electronic classrooms to foster both dialogue and collaborative learning.

However, despite these potential benefits, further research is needed (Holt et al., 1994). As well, the development of electronic or virtual classrooms is not to the stage where they are espoused as the answer for all students, or even all staff. As Hiltz explains:

A Virtual Classroom is not the proper mode for all faculty or all students. Faculty must feel comfortable with computers and with writing, and must genuinely enjoy spirited interaction and 'expecting the unexpected' to happen. (No two sections of an online course are ever the same, and one is never sure what a group of students will do). It does not work to have very small classes; a minimum of about ten active participants seems to be necessary in order to establish and maintain a lively interchange. In addition, though on the average students like this medium better than traditional courses, some drop out or dislike it very strongly. In order to succeed, students must have convenient access to a computer and modem, reasonable reading and writing skills, and the time, motivation, and self-discipline to participate regularly, every week. (Hiltz, 1995, p. S14-20)
At the centre of current electronic classroom applications is the Internet, used by millions of academics and students around the world, principally for electronic mail. What is its future?

Currently, the academic community is dominant, with the percentage use of the Internet by commerce being small. However, this is likely to change dramatically in the next few years, particularly as countries invest heavily in new telecommunications networks. Examples of expansion in Asia include Hong Kong Telecom, Singapore Telecom, NTT of Japan and Telecommunications Asia in Thailand, who are creating a fibre optic infrastructure (Javeri, 1995). Another key development is that:

As of April 30th this year, the NSF will stop funding the Internet backbone ... Private operators will take over, leading to the imposition of a service fee for users. ... Academics fear that private ownership of the backbone may undermine the importance of the Internet as a public service network. (Javeri, 1995, pp. 11-12)

There is thus an emerging tension between educational and commercial users of the Internet, and the outcome, particularly with the billions of dollars being invested by government and commercial interests, may not be to the academic community's advantage. As Rossman has claimed concerning the global electronic university, it is only if the needs of all users are addressed, if partnerships are developed and if free universal access to information is given, that it can become a reality (Rossman, 1992).

There is thus both great promise and potential pitfalls facing distance learning institutions as they contemplate their future use of new and emerging technologies.

The Open Learning Institute Response

As an example of how distance learning institutions are currently responding to the challenges, we will briefly describe the approach currently being taken by the Open Learning Institute in Hong Kong.

The Institute is now five years old, and in that time has managed, with initial government 'seed money', to become self supporting. It is thus not an institution that can afford to spend vast resources on technology developments. It has, though, always used well-established technologies, such as broadcast television to supplement the mostly print-based course materials. Audiotapes are also used, along with a few computer applications. In addition, there is limited use of an electronic bulletin board service.

Current planned developments include two management information systems, to enhance OLI's administration. One is the development of Interactive Voice Response Systems for students for selection of tutorial groups, course registration, loan applications, transcription applications, etc. The other enhancement is the development of a document imaging system to store, view, print and scan documents.

The OLI also intends to gradually change its computer network towards up-to-date networking technologies, using standards such as data link, physical layer protocols and network wiring standards. Optical fibres will be used to implement the wiring backbone, and the network will be upgraded to support applications such as client-server, imaging, multimedia and for video-conferencing. A CD-ROM network is planned, to allow staff and students to access CD-ROM databases for learning and for research and development.
The OLI aims to provide electronic bulletin board services and later Internet services to all students, both at the OLI campus and through remote dial-up. Client stations in PC laboratories will be upgraded to more powerful computers in order that these new network facilities can be accessed.

Other student support systems using communications technologies include video-on-demand services (in association with VOD providers such as Hongkong Telecom), and audio- and video-conferencing facilities. VOD provides an interactive video learning environment. Audio- and video-conferences can be used either locally, where tutors can conduct tutorials at a distance, or it can be for students to meet and receive lecturers from overseas scholars.

The Institute is thus making a number of strategic decisions with respect to the new technologies. These decisions are based on both local and global factors, including:

- local conditions;
- the future operation of the Internet;
- the needs of Hong Kong learners;
- the availability of the technologies;
- resource constraints, both on the Institute and its students; and
- the desired teaching and learning approaches.

To further assist in this decision making, the Institute is currently funding a number of research and development projects. Each project is a small-scale example of the application of new technologies. Examples include:

- a CD-ROM package for a course on the history of Hong Kong;
- a computer based learning project, adapting a portion of an existing course; and
- the setting up of a Computer Integrated Telephony system, to assist in the handling of large numbers of telephone enquiries from students (Tan, 1992; Walsh & Murphy, 1993).

The results of these projects will be used to inform the Institute on future directions, especially as it moves into new purpose-built accommodation in 1996.

Conclusion

The information age is opening up a diverse range of possibilities for distance educators. Central to the plans of most institutions is the incorporation of the microcomputer as a tool for individualization of mass education (Moore, 1987). There is thus little doubt that the evolving virtual classroom will increasingly be based on computer applications. Whether the use will be primarily for interaction, the transmission of course materials or for information searching is yet to be determined. The decision, though, will need to be based on pedagogical, rather than technological, reasons. As Bates concludes:

... technological decisions need to be preceded by policy and educational decisions, although at the same time it needs to be recognised that the availability of new
technology does allow for major changes in the way we teach at a distance. The choice to be made, however, is not 'what technology', but 'what kind of teaching we want to provide'. (Bates, 1988, p. 10)

The information age is thus ushering in new opportunities for distance educators to provide enhanced learning environments for their students. They must now be making judicious decisions, based on the factors discussed here, to ensure the development and support of the highest possible quality of education.

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David Murphy is Senior Course Designer at the Open Learning Institute of Hong Kong. He wishes to acknowledge the support and input of the Institute's Director, Prof Gajarat Dhanarajan, in preparing this paper.