Using the Internet for distance education delivery and professional development

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The development and connection of the world's major electronic networks into the 'Internet' provides unprecedented opportunity for distance educators to develop new modes of program delivery. Equally important, the Internet provides a vehicle for the development of personal and professional competence through collaborative learning projects and discussion with other distance educators. As with any communication medium, electronic communication carries with it a 'worldview' (Mandviwalla, 1994) which opens new communication and learning opportunity at the same time as it imposes a set of cultural and technological restraints upon that communication and learning. This article attempts to explain what the Internet is, how it is currently used by distance educators and outlines its potential for supporting a new model of distance education delivery and support.

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What is the Internet?

Electronic mail has been used in the corporate and university worlds for over 20 years. Only recently however, has access to networks and relatively inexpensive hardware expanded to support electronic communications by users outside these specialized groups. The major set of standards upon which this new communications medium is built is referred to as the Internet. The Internet is a 'network of networks, currently providing connectivity to at least 20 million individuals in over 70 different countries. The Internet connects 2,217,000 host computers (SRI, January 1994) and is growing at the rate of over 2,000 host machines per day and traffic increases of over 20% per month. It also connects, through "mail gateways", all of the major commercial networks such as Compuserve, Genie and most of the larger Bulletin Boards networks including FidoNet, FrEdNet, RIME and K12net. Thus, one can think of the Internet as a very decentralized post office system which sets standards and addressing schemes so that the users of local, regional and national networks can communicate with each other.

The most common communication genres supported on the Internet are text based electronic mail, computer conferencing and data retrieval. Recent developments in graphic interfaces (Mosaic) as well as broadcast audio (MBone), and video conferencing (CuSeeMe) have shown that the medium is capable of richer media support than text alone. However, these higher grade

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services require larger capacity connections to the Internet which currently restrict their use to urban locations in developed countries.

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The Internet's approach to funding itself has contributed to its widespread adoption and presents exciting opportunities for distance educators. Charging for services has evolved into a distance and in most cases time insensitive pricing structure. As a 'network of networks' the price for an individual user depends upon the rate established by the local network service provider. Traditionally, Internet services have been priced by the speed of the connection to the network, based upon 24 hour a day access. These rates are insensitive to distance, such that it costs an Internet user no more to control a remote machine in New Zealand than to request a file from a machine in Norway. Similarly for many institutionally based users, access 24 hours a day results in no greater usage bill than access for only 10 minutes a week. Although there are different pricing schemes being investigated and piloted, use of the Internet for group or personal communication, information retrieval or access to remote services is much cheaper than competing telecommunications or mail based alternatives

Pedagogical issues

The Internet recreates the 'agora' or meeting place in which knowledge is not only shared but created and recreated.

The single most important pedagogical characteristic of the Internet is its support of human interaction, unbounded by the restraints of time and distance. The Internet can be used to support distribution of traditional media used in distance education such as print based course guides and texts or even audio and video clips. However its capacity to support interaction between and amongst students and teacher is its greatest asset. In distance education, as in most commercial information technology applications, computer resources have been expended on storing, organizing and retrieving records from the past. These records typically consist of financial records, planning documents, research reports and data sets, desk top published course guides, student records and library collections. By contrast, on the Internet emphasis is placed upon creating new knowledge and connecting individuals to this knowledge and with others - both teachers and learners. This support of knowledge creation, rather than dissemination, opens distance education to the application of learning theory based upon constructivism (Merrill, Li & Jones, 1991; Prawatt, 1992), cognitive apprenticeship and situated learning (Brown, Collins & Duguid, 1989), social cognition (Resnick, 1991), peer based teaching and learning (Damon, 1984), and cooperative learning (Slavin, 1990). The Internet has the potential to support many types of learning activities and strategies including:

- support for a 'community of learners' (Lipman, 1991) in which crucial social and affective components of learning can be explored and developed;
- provision of student access to conversations amongst leading practitioners in nearly every academic and professional field;
- support for exploration of library collections and data bases of thousands of educational and government organizations;
- low cost subscription to electronic journals and professional discussion groups which disseminate emerging knowledge from many disciplines;
- support for students to pursue their interests and academic curiosity with other students, professionals and interested amateurs.

In summary, the Internet recreates the 'agora' or meeting place in which knowledge is not only shared but created and recreated. The capacity for students to 'talk back' and add to the dialogue provides opportunity for development, application and linkage of new knowledge to the students' own learning context.

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The medium of teaching & learning

Distance education has moved formal instruction from the campus and situated it in the home of individual learners. However, the content of most distance education is still located within the domain of the teacher and the academic discipline and packaged in 'Fordist' style (Farnes, 1990) with minimum input or control (Garrison & Baynton, 1987) by learners. The Internet moves the location of instruction outside of both the institution and the home and locates it in a 'cyberspace' (Wooley, 1992) in which new rules of contact, power and interaction must be developed. This cyberspace is a social construct which mirrors many of the communication and power relationships imported from face-to-face and earlier telecommunications media, but it is also developing a unique social culture of its own. This culture is defined both by the active participants who develop their 'netpresence' through text interaction with others. At the same time as the medium supports active users it allows vicarious participation by any number of mostly silent 'lurkers' who monitor interaction - contributing only when they desire to do so. Thus interactions have characteristics found in classroom discussions, letters to the editor, scholarly journal debates, and cafe conversation - all swirling in an ill-defined, and constantly changing mixture.

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Into this medium plunge distance educators with a mandate to educate and to accredit. Unlike other telecommunications such as television, video or audio teleconferencing, Internet supported computer conferencing or email cannot easily import models of teaching and learning from the classroom. Teachers and learners must devise new techniques for creating and sharing knowledge - techniques which capitalize on the freedom of time and place offered by the medium and which minimize the constraints which accompany lack of body language and voice intonation and the absence of synchronizing time schedules. The norms of contact and ideal conditions for learning are still being discovered and there is much we have yet to learn about mastering this medium for effective teaching and learning.

Issues of access

The Internet is not particularly easy to access and usually involves mastery of new technical, social and communication skills. Although Internet access tools continue to improve, both in power and ease of use, the mastery of the Internet remains a challenge to even those comfortable with other computer based tools and applications. The use of Internet also demands considerable literacy skills and access to both computer and telecommunications equipment. The lowest level of connection to the Internet requires dial-up telephone access, which remain problematic for many users in developing nations. Even those located in countries with highly developed telephone infrastructure may find that long distance tolls or hourly connection charges restrict access to those with significant amounts of disposable income.

How can the Internet be used by the distance educator?

The Internet provides educational opportunities for distance educators at two levels. First, it provides resources for continuing education which allow the small number of distance education professionals around the globe to share in the development of theory and practice and provide support to one another. Secondly, the Internet provides a vehicle for course delivery. The following section outlines these two uses.

Internet for professional development

The Internet provides very inexpensive and convenient access to electronic mail. An internet address, printed on a business card, allows millions of other users to begin electronic conversations on a infinite variety of topics. Electronic mail provides a level of cost effective and convenient service unmatched by post of fax. For example, those who requested a copy of a paper I recently delivered at a national distance education conference by email, have received their copies the day after my return. Those who left cards for postal delivery are awaiting on my having the time (and resources) to photocopy, address, stamp and find a post office box.

Easy to use mailing front ends, available on most Internet connected systems, allow individual users to establish informal mailing list groups, organize storage of incoming correspondence and perhaps most importantly, allow users to filter incoming correspondence and forward relevant posting to other groups and professional acquaintances.

These programs ... provide resources such as statistics packages, graphic creation programs or simulations which a course developer can use as an inexpensive way to provide course activities for distance learners.

The second use of the mailing system is support for subscription to any of the over 3500 different discussion 'lists' which circulate on the Internet. Space obviously doesn't allow listing of all the groups (it's faster to search them electronically in any case) but a few lists of interest to distance educators include DEOS-L (Distance Education Online Symposium) from Pennsylvania State University, The CADE (Canadian Association for Distance Education list), ADNET (Adult Education discussion list) and numerous lists specific to different academic disciplines (PHIL-L philosophy; CHEM-L, Chemical engineering) and different distance education technologies (EdTech; Satellite Educator).

Thirdly, most Internet connected hosts provide access to the USENET News groups. These groups provide a daily 'newspaper type' service of over 3,000 separate discussion groups on a variety of topics guaranteed to satisfy even the most esoteric interest. A full Usenet feed provides over 50 megabytes of news each day, thus reading (and responding) to all groups in this electronic newspaper could easily fill up one's entire day! Selective reading can provide informal access to valuable, and very current items of scholarly, personal or professional interest.

Fourthly, the Internet supports downloading of computer files for reading or execution on local machines. Educational programs, lesson plans, course descriptions, software reviews are among the many thousands of files which are archived on anonymous FTP (File Transfer Program) sites located throughout the Internet. These programs can be useful in distance education program development activities. They provide resources such as statistics packages, graphic creation programs or simulations which a course developer can use as an inexpensive way to provide course activities for distance learners.

The linkage of these resources via hypertext links allows retrieval and sharing of information unavailable to even those with large research libraries in the pre-Internet world of the past.

Finally, most hosts provide access to various Internet tools such as Telnet, Gopher, WWW (World Wide Web) and WAIS (Wide Area Information Server) to search information posted by government, educational or commercial enterprises. The linkage of these resources via hypertext links allows retrieval and sharing of information unavailable to even those with large research libraries in the pre-Internet world of the past. For example, I recently used Gopher to access the American Centre for Research in Distance Education to obtain a newly released report from the Task Force on Distance Education at Pennsylvania State University. I then used telnet to access the ICDL data base in England to obtain more global examples of strategic planning in distance education.

The Internet thus provides an unprecedented resource for professional development and self directed learning. The expansion of resources available makes cataloguing and efficient retrieval of information on the Internet problematic. There is no universal 'card catalogue' which lists all that is available. Thus, the experience of 'browsing the net' can lead to frustration as well as return of invaluable information resources. However the experience itself introduces learners to awareness of this vast new learning resource.

The Internet for course delivery

The Internet as a delivery medium for distance education programming remains a largely untapped resource. Experiments using the medium for course delivery have used one of two different Internet tools and approaches - with accompanying tradeoffs of power, ease of use and access.

The most common method is to use the Internet as a transportation vehicle (telnet) to access a full featured computer conferencing system - usually located on a university campus (Mason & Kaye, 1989; Harasim, 1990). These systems allow remote users to logon to accounts created for them on an institutional host machine and access a variety of educational resources including structured class dialogue, coffee rooms, library resources etc. Student and teacher contributions are organized under appropriate class topics and available for review or retrieval by current and future students. This model requires that students have full telnet access to the Internet which precludes access from most local bulletin boards and many electronic mail services (FidoNet, UUCP, Rime etc.) which provide only store-and-forward mail access to the Internet. Thus the rich communicative environment provided by the conferencing system is restricted to those with high levels of accessibility.

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A much simpler, but pedagogically less powerful Internet delivery tool, is the use of mailing lists or UseNet groups for delivery and student interaction. This model supports only sequential and relatively unstructured mail interaction amongst participants. An interesting experiment by Richard Smith of the University of South Western Louisiana provides a glimpse of the potential of the media. Smith advertised a free course titled 'Navigating the Internet' in September 1992. He expected between 30 to 50 participants to enrol. Much to his surprise, 878 students enrolled from 23 countries. Smith ran the course a second time two months later after promotion items were further circulated on the Internet. As result he had to curtail student registration when it reached 12,000 students! A more current example is the series of courses instructed by Professor Norman Coombes from the Rochester Institute of Technology on adaptive technologies (Coombes, 1994). The January 1994 course was delivered using electronic mail distributed by a listserv mail processor. The course lasted for four weeks, contained ten lessons and was delivered to 95 students each of whom paid a tuition fee of US$95

The email/usenet model of program delivery provides lower level access to anyone with access to electronic mail since most systems are or will shortly be linked to this lowest level of Internet access. This model is much cheaper to administrate since most systems already have electronic mail or usenet services and the learning curve for students and teachers is lower, as competence with the local mail system or News reader is the only technical skill required. This email/usenet distribution model was used during the Bangkok Project (Anderson & Mason, 1993) with the International Conference on Distance Education and will be used in conjunction with other tools to support interaction around the Birmingham World Conference of the ICDE. (There is more information about the Virtual electronic conference to coincide with the ICDE Birmingham conference in Noticeboard, page 3.)

The Internet is thus capable of supporting individual and group interactions between and amongst distance teachers and learners. New tools continue to evolve which help to organize and structure this interaction. Yet, even in its most primitive support of electronic mail, distance educators are using the Internet to support a wide variety of learning interactions.

Summary

This article has only begun to describe the services and accessibility potential of the Internet. The journey down the road to 'Internet literacy' requires a commitment of time and access to computer and telecommunications hardware. Nonetheless, there is an ever expanding wealth of resources and personal contacts available on the Internet that provide a high return on this investment for the distance learner or teacher.