Training Via the Internet: Where

THANKS TO THE INTERNET and other new technologies, learning is no longer tied to the classroom. And nowhere is this more apparent than in higher education. Today, college students can matriculate without ever setting foot inside a classroom. Could this emerging trend be indicative of a revolution in how all levels of education, including K-12 and corporate training, will be delivered?

In his book *School's Out: Hyperlearning, the New Technology, and the End of Education,* Lewis J. Perelman suggests that today's schools are headed for obsolescence, to be replaced by the new wave of knowledge technology. Perelman observes that the traditional concept of the "school," with its rows of desks, classrooms, and bureaucratic administration, was modeled on the 19th-century factory. Until the industrial revolution, formal schooling was not available to most people. "Education developed in scale and bureaucratic density to mimic the industrial bureaucracy it was styled to serve." Perelman argues that because the knowledge age has brought about the decline of the bureaucratic organization, education will and should follow suit. While business and higher education are relying less on classroom instruction, students from kindergarten through high school are using the Internet and other computer-based technology as supplemental learning tools—not as substitutes for formal classroom attendance. Despite Perelman's projections, some speculate that schools will continue to exist because of built-in daycare.

In corporate training, the increasing use of performance support systems, sophisticated computer simulations, and multimedia computer-based training programs are diminishing the role of the traditional corporate classroom. In "Kanban to Kanbrain" (*Fortune,* June 6, 1994) Perelman suggests that the shift in business to just-in-time delivery of information signals the forthcoming obsolescence of the corporate classroom. He reports, for example, that some divisions at Hewlett Packard have eliminated 90 percent or more of classroom training.

BY KATIE WULF

While corporations are indeed leading the high-tech revolution in the delivery of education via simulations and multimedia, the use of the Internet for training is just beginning to be realized. Nevertheless, a growing number of independent training providers and universities are tapping this potentially large market and are using online delivery as a less expensive and more convenient alternative to the classroom. For instance, Microsoft's Online Institute (MOLI), accessible via the Microsoft Online Network, offers a variety of computer-related courses from more than 30 independent training providers. Microsoft claims to offer a classroom course that normally costs $2,800 for $395 on MOLI. In addition, the growing use of internal corporate "intranets" (in-house versions of the World Wide Web accessible only to employees) provides corporate trainers with new possibilities for internal training delivery.

Training delivery methods

Instruction via the Internet can take place in many ways. Learning can be a solitary endeavor, in that the learner may never communicate with other people during training. If one is on the receiving end of an e-mail list or downloads a tutorial from an Internet site, the Internet has simply facilitated self-study. On the other hand, with Internet-accessible discussion groups and real-time computer conferencing, the instructional experience can be just as interactive as a classroom discussion. The following five primary modes of Internet delivery are used individually or in any combination with other instructional methods:

E-mail. Students receive class content and communicate with the class group, instructor, and individual students by e-mail. The instructor may also set up a "listserv" discussion group for sharing information. Comments or questions sent to the listserv e-mail address will be redistributed automatically to the group. For example, two employees in the ASTD Information Center recently took a course on World Wide Web topics,"Make the Link Workshop", which was delivered by e-mail for $20.

Bulletin boards. Students communicate by posting comments and questions directly to an electronic bulletin board, forum, or newsgroup. Users must go to the host server to read the postings. This allows for a more organized kind of electronic conversation than a listserv, because users can choose which topics to read and respond to. Most bulletin board software permits "threading" through

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such topics, whereas with a listserv, the participant receives all postings in the order they are posted, and the electronic conversation is more random and disjointed. Three hundred employees at a large multinational energy company are using the forum environment provided by the Meta Network (described on page 52) to learn about building future scenarios for the company.

Downloading. Students retrieve documents, tutorials, or software by using FTP (File Transfer Protocol), by downloading items from a bulletin board, or by using the download option available on the World Wide Web. The tutorial can then be brought up on the student's computer for printing or reading. This is the least interactive, but probably most commonly available type of training on the Internet. The difference between this and the e-mail method is that students are not automatically sent materials to download: They must go to the Internet site that has them and download. Employees at Tandem Computer access the WWW to download training courses licensed from CBT Systems, a provider of computer-skills-training products.

The use of the Internet for training is still in its infancy. Nevertheless, a potentially large market looms. Here's a look at the pros and cons of Internet instruction and a list of specific sites.

Illustration by Steve Dinnino

Interactive tutorial. Students go to an Internet site (usually on the World Wide Web) and take a tutorial while online. The tutorial may involve reading, linking to new WWW sites, answering questions, and taking a test. Some tutorials allow you to proceed at your own pace: After you register for the tutorial and designate your password, you can log in at a later time and continue where you left off. Employees wishing to brush up on their French can take a course from Professor Jacques Leon at Teleglobe Company in Canada. This is a fully interactive tutorial that even includes some audio capability to help with pronunciation. Reach him at http://www.teleglobe.ca/%7eleo/french.html

Real-time conferencing. Whereas bulletin boards and e-mail are sometimes referred to as "asynchronous communication" in the distance learning literature, real-time (live) communication is "synchronous communication." This is the closest the Internet comes to emulating a classroom. The discussion may be moderated or it might be less structured. This can be facilitated within a "MOO" (Multi-user Object Oriented) environment, an interactive system accessible by many users at the same time. MOOS are based on the MUD (Multi-User Dungeon) concept, in which participants assume roles and can interact with a simulated environment. This Internet tool, along with other Internet-based, real-time conferencing systems, such as "IRC" (Internet Relay Chat), has many possibilities for real-time learning experiences. Diversity University (listed on page 55) a MOO-based cyberspace learning platform, has offered courses in such areas as information systems and instructional strategies. CyberCorp Inc.'s Virtual Gymnasium (also listed on page 55) has its own "GymV-MOO" which facilitates real-time conversations that supplement the company's course offerings in C Programming, Unix, networking, and online education.

Internal training networks

In addition to accessing courses offered on the Internet from universities and independent training organizations, companies can use various Internet utilities for customizing training for their own needs. For instance, companies with the capability to set up listserv discussion groups might set up ones specific to various groups of trainees or employees. Commercial networks, such as The Meta Network (http://www.tmn.com) of Metasystems Design Group in Arlington, Virginia, specialize in setting up private networks for organizations, often for training and organization development applications. Users can access the system by the Internet or direct dial, then they can access various "public" areas, as well as their organization's private forum area. Primarily, the focus at the Meta Network is on asynchronous communication. Chief Executive Officer Lisa Kimball says they've found the asynchronous mode to be more powerful for serious work because it supports the kind of reflective conversation required for real development and change. Here are some examples of how companies are using the Meta Network:

- Health Systems 2020 is a 12-month joint project of the U.S. Army, Navy, Air Force, and Veterans services to forecast clinical and nonclinical technologies and methodologies for health care from today through the year 2020. More than 300 people are involved in online teams on the Meta Network where they learn about new approaches to health care and develop scenarios for how these might be applied to healthcare delivery in the Defense Department.
- The Department of Defense Dependent Schools has created a virtual academy on the Meta Network to support training its teachers all over the world.
- The Federal Judiciary Center, a body that provides training to the U.S. Court System, is using the Meta Network as a virtual campus. FJC uses both the online-only model of training along with a combination of face-to-face conferences and online training.

Increasingly, companies are using WWW "intranets" for information sharing within the organization. The WWW is a multimedia, hypertext interface for navigating the Internet. Corporate intranets allow employees to navigate through the company's information just as they would navigate through the Internet. Most companies use standard Web browser software such as Netscape or Mosaic and run their Web server on a local area network. Of course, intranet Web sites must be securred, or "firewall-protected" from external computer users. Some corporate intranets initially started out as testbeds for publicly available Web sites. For instance, Turner Broadcasting Company's Entertainment Group "rehearsed" Web technology using its intranet before making it public on the Internet. The human resources department at Unisys is the first department at that company to develop and deploy internal applications on their intranet, using Edify Corporation's Electronic Workforce software. The first applications to be deployed will be various human resource functions such as address updating, W-4 status changes, and training course selection and registration.

At JC Penney, company announcements and training manuals are published on its intranet. At consulting firm Booz Allen, 20 self-study courses are accessible via the company's internal World Wide Web. US West Communications, Inc. has launched the "Global Village" project, an intranet application that aims to help the company become a learning organization. Eli Lilly's intranet, ELVIS (Eli Lilly Virtual Information Service), is used for various purposes, such as distributing the employee handbook, posting internal jobs, and providing online help to computer users. At Silicon Graphics, Inc., there are more than 300 Web servers within the company firewall, and more than 100,000 internal Web pages. Silicon Graphics is studying the use of its intranet as an interactive training device.

The potential importance of internal corporate webs has been affirmed by research and consulting firms. International Data Corp (IDC) research report, "Using the Web to Deliver IT Training and Education: A Current Assessment of the Competitive Environment" reveals that competitors, tools,

and technology are beginning to emerge and define just what business education on the World Wide Web will look like. The report also asserts that advances in Web page development, such as the arrival of Java software from Sun Microsystems, bring a new age of capability for distance learning. Gartner Group Inc. in Stamford, Connecticut, predicts that more than half of all large organizations will have internal Webs by 1998. According to a survey of 1,690 medium-size and large companies by Business Research Group, Newton, Massachusetts, 23 percent of the sites use or plan to use the Web internally.

When to use the Internet for training

Thomas Fox McManus, at the University of Texas, Austin, identifies characteristics of the Internet that make it appropriate or inappropriate for use as an instructional medium. If you have only a few students and they are not geographically dispersed, then there is little need for the connectivity and distance-negating features of the Internet. (An exception would be to take advantage of an Internet-delivered course provided by an outside training organization.) However, if you have a large number of students or students that are spread out geographically, the Internet may be an ideal training medium. Furthermore, when you're short on time, simple Internet-based instruction can be set up quickly. For instance, online conferences can be set up as easily as a telephone conference, and e-mail can be distributed virtually instantaneously. Text documents can quickly be created as Web pages.

McManus identifies the Internet's two real advantages over other media: "It conveys video and sound better than a book, is more interactive than a videotape, and, unlike a CD-ROM, can link people from around the world cheaply; it can also be a content provider....the Internet is arguably the largest and most diverse information resource in the world today." Indeed, the ability to have immediate access to such a wealth of information is the foremost feature of the Internet; this is a capability that cannot be found within any other medium. Trainers can take advantage of this wealth of information and enhance the learning process by creating links to these outside sources from within their own instructional Web pages.

Internet training can be cheaper or more expensive than other instructional methods. The cost could be almost free if you use pre-existing resources such as e-mail or conferencing systems. Or it could be quite costly if you choose to run several Web pages or MOOs on a high-end, well-connected server, or choose to develop Web pages with expensive graphics or features that are labor-intensive to develop, such as elaborate tutorials or online testing modules.

Here is a summary of some advantages and disadvantages of Internet-based instruction:

Advantages:

- Time and place-independent. Save on costs of travel and being away from the office. Except for synchronous conferencing, users can choose to log on whenever and wherever they want to. Groups of learners can be brought together from around the globe. Provides new opportunities for collaborative learning and instruction with new groups of people. Trainers can coordinate instruction with colleagues from other locations and organizations that they probably would have never had the opportunity to work with in other instructional settings.
- Multi-platform capability. The Internet's TCP/IP protocol allows computers with different operating systems to communicate with each other. It doesn't matter if the employee is using a PC, Mac, Unix, or some other platform.
- Quick development time. Compared with computer-based training, a finished Web-based training product can be developed quickly.
- Variety of capabilities. Various Internet utilities are available for unique training requirements. Can use e-mail, bulletin board format, real-time conferencing, interactive tutorial, and so forth.
- Easy updating of content. Compared with updating a CD-ROM training product, it is quick and easy to update the content of a Web page. In addition, unique archival capabilities for listserv discussion groups and topical threading capabilities of bulletin boards or forums provide a rich resource for all participants and basically eliminate the need for students to take notes.
- Learner control. Participants have more control of the pace of the course and also more opportunity to concentrate on content most applicable to them. Furthermore, they can apply what they are learning during the course and come back online at any time for more help and clarification.
- Opportunity for interaction. Instructors of internet-delivered courses have found that both student-student and student-instructor discussion is substantially increased online compared with traditional classroom discussion. Participants in the Internet learning environment are unaffected by gender, race, and age differences. In addition, for asynchronous conferencing, students may read and reflect for as long as they like before posting their comments to the class.

Disadvantages:

- Limited bandwidth. Limited bandwidth means slower performance than is possible with computer-based training, especially when incorporating sound, video, and elaborate graphics into the training. Whereas an average page of text translates to about 2,500 bytes of stored computer data, a 10-second, half-screen Quicktime movie can take up to five million bytes. Even with an ethernet connection, it could take 10 minutes for the user to transfer the videoclip. Presently, the Internet is not the best delivery medium if video or many elaborate graphics are essential to the instruction. You are also limited by the type of connection and software your learners will be using. If your learners have a slower speed modem without access to a graphical Web browser such as Netscape, your carefully designed Web page may have lost much of its value.
- Authoring systems still new. Current authoring systems for the Web are still very new and are generally less sophisticated than CBT authoring systems, but developments in capa-

bilities of authoring software, such as Sun Microsystem's JAVA, provide a promising outlook for easy-to-use yet powerful authoring software.

- Unreliable Internet links. If your Web page contains links to outside Internet sites, you must routinely check the accuracy of your links, because Internet addresses will change or simply disappear from one day to the next. This "dead-end" syndrome is a problem that only seems to be getting worse as the Internet grows exponentially and many inactive sites provide false links to deleted or other inactive sites. It's as if the Internet has become a maze with more places to go, but with more and more dead ends.
- Lack of Internet skills. Employees may not have the computer skills or Internet knowledge to use this method of training. Internet training will be required in many cases.
- More reliance on student initiative. Unlike in a traditional course, in which the student is told where and when to arrive for training, is given a workbook or textbook, and has the opportunity to take notes in class, a student who takes a course on the Internet has more flexible options. The learner has more responsibility not only in choosing when and to what extent to participate, but in maintaining and organizing course "materials," which are accessed electronically and may or may not be selected by the learner for later reading and reflection.

Examples of Internet courses

- E-mail course. "Adapt-it," a three-week, interactive workshop on making computing and electronic information systems at your school, college, or business accessible to people with disabilities. The course is delivered every quarter entirely through e-mail. Another course is also available, "Disability Law: The Americans With Disabilities Act." Participants have come from more than a dozen countries and almost all 50 states. The "Adapt-it" classes cover such topics as: reasons to adapt, legislative history, Americans with Disabilities Act, and how to set up lab environments. Registration fee is $125, and is offered through the distance learning office at Rochester Institute of Technology and EASI (Equal Access to Software and Information). To request a syllabus, e-mail: listserver@listserv.isc.rit.edu with this one line of text: info workshop

  To register, send e-mail to listserver@listserv.isc.rit.edu with this one line of text: sub adapt-it "your name" (include your first and last name).You will receive an automatic reply informing you that you are part of the discussion list and also providing full payment information.
- Interactive tutorials. "Internet for Everyone," a course offered by Network Training Materials Project, University of Newcastle, UK is a tutorial on how to use the Internet. This is a free tutorial that uses the World Wide

INFORMATION FOR WEB-BASED TRAINING DEVELOPERS

Listservs & Internet Sites

- WWWDEV (WWW Courseware Development, sponsored by the University of New Brunswick). To subscribe, e-mail: Listserv@listserv.unb.ca Leave subject line blank. For the message, type: Subscribe WWWDEV (and add your name)
- DEOS-L (Distance Education List, sponsored by the American Center for the Study of Distance Education, Pennsylvania State University). To subscribe, e-mail Listserv@psuvm.psu.edu. Leave the subject line blank. For the message, type: Subscribe DEOS-L (and add your name)
- Web-based training links. This is a WWW site that provides links to demonstration sites and examples of how the WWW is being used to provide training. http://www.clark.net/pub/nractive/wbt.html
- World Wide Web Courseware Development Home Page. This is a WWW site at the University of New Brunswick Education Center. http://www.unb.ca/web/wwwdev/

Authoring Software for Web Courseware

- WEST version 1.0, produced by Web Educational Support Tools, Ltd. of Dublin, Ireland. A courseware delivery system that provides a multimedia environment for courseware providers to present their material over a network such as the World Wide Web or on a corporate local area network. For more information, go to http://west.ucd.ie/demo/overview.html
- Iconauthor 7.0, produced by AimTech Corporation of Hasua, New Hampshire. This application lets users create interactive multimedia applications for delivery on the Internet. For more information, go to http://www.aimtech.com/
- WWW PC v.3.0, freeware. For more information and to retrieve the software, go to http://www.lib.siu.edu/mmwwwpc/mmwww-pc.html at Southern Illinois University. Demonstrations of instructional applications that use this software are available at this site, but you must have the software to use the demonstrations.
- Shockwave for Director, produced by Macromedia, Inc. of San Francisco, California. Used together with Macromedia's Director authoring software, allows users to present multimedia applications on the Internet. Available for Macintosh, Windows 95, and Windows 3.1. http://www.macromedia.com/
- JAVA, produced by Sun Microsystems, Inc. A November 1995 report from the International Data Corporation proclaims that "the arrival of Java from Sun heralds a new age of capability for distance learning." For more information, go to http://www.javasoft.com/
- IBTauthor, produced by Stanford Testing Systems of Spokane, Washington. Macintosh and Unix versions available. Sample five IBT courses at: http://ibt.testprep.com
- CU-SeeMe, produced by Cornell University. Not an authoring tool, but may be useful for trainers launching Internet-based training. CU-SeeMe is a desktop videoconferencing program available free from Cornell University. Available for Macintosh (with audio) and PC (without audio). http://cu-seeme.cornell.edu/

Web for both form and content. Once you "register" for the course and choose a login password, the system keeps track of where you are so that each time you log in, you can pick up the instruction where you left off. Learners can follow the course in linear fashion or may choose to skip to various portions of the tutorial through its hypertext links. This tutorial also features interactive quizzes. Access the tutorial at http://www.netskills.ac.uk

"Introduction to HTML," prepared by Eric A. Meyer at Case Western Reserve University, is another free tutorial to be taken online, accessible through the WWW. Covers the basics of Hypertext Markup Language. Also features an interactive quizzing system. Access the tutorial at http://www.cwru.edu/help/introhtml/toc.html

- Real-time conferencing course. "Online Instructional Strategies Course" offered at the Diversity University MOO (Multi-user Object Oriented) environment. A ten-week course covering learning theories, models, motivation, online curriculum development, and instructional strategies effective for online use. Participants meet once a week for two hours on the MOO using synchronous communication. A small fee is required to register for the course. Access Diversity University MOO by telnet to: moo.du.org 8888 Or, by web gateway: http://moo.du.org:8888 Or, by home page: http://www.du.org
- Downloadable tutorial. Internet Public Library, sponsored by the University of Michigan School of Information & Library Studies, offers a dowloadable tutorial, "The Internet Roadmap." More courses are in the planning stage. A current lesson is available for browsing in Web-format. Users can also access the "lesson archive" to download past week's lessons. To access, go to: http://ipl.sils.umich.edu/classroom ■

Katie Wulf *is an information specialist in ASTD's Information Center, 1640 King Street, Box 1443, Alexandria, VA 22313-2043. Phone: 703/683-8100; fax: 703/683-0250; e-mail: katie.wulf@astd.noli.com*

Examples of Sponsors of Internet-based Training

Universities and colleges are presently the major providers of Internet-based training. Some institutions are set up as "virtual universities" in that they offer only online programs, while other institutions offer traditional classroom-based programs as well as distance learning options. Some of the courses are designed to lead to an academic degree, while others might have been designed to meet the training needs of the business market or continuing education of adults. Here is a list of some educational institutions that offer courses over the Internet, along with their World Wide Web addresses:

- Virtual Online University: http://www.athena.edu
- Rochester Institute of Technology: http://www.rit.edu
- Open University IT & Society: http://www.open.ac.uk
- Southampton Institute MBA: http://www.cecomm.co.uk/
- Knowledge Media Institute: http://kmi.open.ac.uk/
- Globewide Network University: http://uu-gna.mit.edu:8001/uu-gna/index.html (an index to institutions offering distance learning options, including internet-based learning)
- Foothill College: http://www.fhda.edu/ctis/fga.html
- Christopher Newport University: http://cnuonline.cnu.edu/
- Regent University: http://www.regent.edu:80/acad/schcom/phd
- University of Mass.: Dartmouth Division of Continuing Education, CYBERED: http://www.umassd.edu/cybered/distlearninghome.html
- Open University, Orlando, FL: http://www.openu.edu
- Front Range College: http://mosquito.frcc.cccoes.edu/courses/courses.html
- Diversity University: http://www.du.org
- JANUS (Joint Academic Network Using Satellites): http://www-emrg.open.ac.uk/janus/janus.html
- University of Geneva, Tecfa (Educational Technologies Unit): http://tecfa.unige.ch/tecfa.html
- City University, EDROADS: http://hal.cityu.edu/html
- Walden University: http://waldenu.edu
- Spectrum Virtual University: http://horizons.org/campus/

Independent training providers are increasingly offering courses using the Internet. Here are five of these organizations, along with their World Wide Web addresses:

- ICS Learning Systems/Business and Learning Division. Apprenticeship programs and skills upgrade curricula meet US Department of Labor's Bureau of Apprenticeship and Training standards. Programs and courses available in such areas as building trades, business management, electrical and electronics, mechanical maintenance, and utility industries. http://www.icslearn.com
- Microsoft Online Institute. More than 30 independent training providers offer computer-related training at this virtual campus. http://www.microsoft.com
- Interface Technologies Online Training Center. This company, in addition to providing onsite corporate training services and software design and development services, offers downloadable tutorials on a variety of topics, including Visual C++ Programming, Windows NT Topics, and Blitzen Simulator tutorials. http://wwwiftech.com/iti/itioltc.htm
- Flex Learning Systems. This organization offers e-mail-delivered courses on such topics as writing skills, selling what you write, and job searching. Course fees range from about $75 to $150. http://www.flexlearn.com
- CyberCorp Inc.'s The Virtual Gymnasium. This company offers eight-week courses delivered via e-mail with supplemental real-time conferences. Courses offered on such topics as C Programming, Unix, and networking. Course fees range from about $150 to $190. http://www.cybercorp.net/gymv/