The popular term “distance learning” refers to the use of state-of-the-art telecommunication tools to educate people without the constraints of time and/or location. Distance learning – or technology-enhanced learning (TEL) - is particularly significant in health professional education as a means to train professionals in the communities where they practice, and where isolation in rural areas can inhibit opportunities to take advantage of continuing education.

Telecommunication technologies such as videoconferencing, use of the internet for email, web searches, online learning programs, and video streaming have developed to a point of reliability, speed, and convenience that are required for the delivery of health professional education. The University of Minnesota Academic Health Center is continuously expanding its capacity to take advantage of telecommunication opportunities in order to deliver continuing education and health professional curricula to health care professionals and students.

**Patient support: training at a distance.**

Patients at Fairview University Medical Center who have been implanted with a left ventricular assist device while awaiting a heart transplant can feel more secure by having their local community trained on how the pump works, in case of an emergency. The device is surgically implanted in the patient’s abdomen and is attached to the patient's
heart. It is then electrically powered by batteries worn externally by the patient. Before being discharged from the hospital, the patient receives extensive training on how to care for and live with the pump. Other than participating in contact sports, the patient is usually able to live a normal life and participate in most activities. Although very reliable, any malfunction of the pump can be life threatening and must be immediately serviced. Jeanne Thompson, RN, works closely with these patients before discharge and has used videoconferencing to reach patients' home communities to train their families, local nursing staff, ambulance drivers, police, fire departments, first responders, cardiac rehabilitation personnel, and other community caregivers. The live, interactive training features a demonstration of the pump and how to manually override the system in an emergency, and allows the community members to ask Ms. Thompson questions. Ms. Thompson saves many “windshield hours” by not having to travel, yet she can still train diverse groups of family and support people in patients' home communities.

Enhancing health professions programs

As part of a land-grant university, the Academic Health Center’s mission includes helping prepare the next generation of health professionals who can improve the health and well-being of Minnesota communities and families. The AHC's Greater Minnesota Strategy commits the University to focus upon the development of rural-based health education programs in order to partner with communities to increase program efficiency, reduce costs, and share in financial risks of providing health care. The Minnesota Area Health Education Center (AHEC), supported by a federal-state matching funds grant, is now regionalizing training of health professions students in underserved areas throughout
the State, and helping to address unique community health and health workforce issues in rural Minnesota. Telecommunications - from videoconferencing to online learning programs - will allow the University to link students of all ages with experiences and information that were once only accessible in the Twin Cities and other urban areas. Specifically, telecommunications will allow the University to 1) communicate with and train health professional preceptors in rural community clinics to educate students according to a standard curriculum; 2) allow students on clinical rotations to collaborate with fellow students on rotation in other communities; and 3) participate in the assessment of students at distance sites.

Telecommunications and online learning also allow students from across the country to participate in courses offered at the U of M, Twin Cities. A recent, one-hour oral exam for a Bismark, North Dakota master's degree candidate in the Nursing School meant a 7-hour drive to and from Minneapolis. Videoconferencing facilities using ISDN phone lines in both cities provided a virtual setting for the exam and a convenient alternative to travel. According to Melissa Avery, CNM, PhD, of the Nurse Midwifery Program in the School of Nursing, “Both sides of this conference appreciated the convenience that it provided. The validity of the exam did not suffer, and the student saved the costs and time of a 14-hour trip”.

Training 20,000+ people in less than four months

A recent test of the University's capacity to develop and deliver training for the federal Health Insurance Portability and Accessibility (HIPAA) privacy regulations resulted in
the successful online training of faculty, staff, and students at University of Minnesota campuses through the state. Instructional designers within the Academic Health Center (AHC) Office of Education collaborated with U of M legal, clinical, research, and technology experts to develop interactive, online 'modules,' that would meet HIPAA training regulations. U of M faculty and students, and physicians and staff members employed by U of M Physicians were notified throughout the state via email of the modules they were required to complete. A simple click on the URL contained in the email brought HIPAA learners in to the University portal system, where they signed in and were authenticated by centralized software programs. Software that integrated the online modules with enterprise software systems electronically documented each learner's completion of training. Upon completion, each of the more than 20,000 learners received an email thanking them for completing HIPAA training.

While meeting the April 14, 2003 HIPAA deadline was itself a success, the University of Minnesota has gained other long-term benefits from that experience as well. Software applications and integration of various programs now allows for registration and tracking of online learning that weren't possible in the past.

In addition, the AHC Office of Education has been approached by health professions faculty to develop a number of new, interactive, online learning programs. For example, a physician in the Medical School has recently led in the development of a course for pediatricians, family physicians, nurse practitioners, and physician assistants on the topic of oral health prevention and treatment to children at risk for tooth decay. The online
course includes interactive activities as well as demonstration videos. The online or CD formats means that physicians and other health practitioners can access the program at any time and place convenient for them, and receive CME credit for doing so.

**Applications in videoconferencing**

Health professional faculty are also benefiting from the cost- and time-savings of videoconferencing. During the 2003-2004 academic year, the U of M School of Nursing and College of Pharmacy have extended their programs to Rochester and Duluth, respectively. Videoconferencing has played a central role to connect these campuses for the purposes of cross-campus curriculum planning, faculty communication, and some teaching, Interactive television has been an additional means to support large group classroom teaching and learning.

Videoconferencing has also demonstrated its convenience and time- and cost-saving benefits during a nation-wide search for a new Dean of the School of Dentistry. For the initial screening of candidates, videoconferencing facilities were identified in each of the preliminary candidate's cities, for example, at their local Kinko's. At designated times, the search committee simply called the site and conducted the interviews as though the candidate were in the same room. Despite initial skepticism and concerns, committee members were quite positive about the results. According to Mark Paller, M.D., one of the search committee members, "The advantages of videoconferencing clearly outweighed the limitations. In the past, candidates would fly to Minneapolis for a single one-hour interview held at a hotel near the airport. Candidates were saved the
inconvenience, time commitment, and expense of flying to Minneapolis. The search committee was, therefore, able to interview more candidates in a shorter time period. That's a reasonable trade-off for not being able to shake hands. I hope this becomes standard for us." Videoconferencing proved a valuable means to conserve funding for time and travel of multiple candidates, and apply that funding for on-site visits of those who emerged as primary candidates.

What's next?

At a recent University of Minnesota symposium focused upon video and wireless technologies, a live image from an operating room was sent to a server and then to a handheld personal digital assistant (PDA) to demonstrate the viability of PDA videoconferencing. Using wireless connectivity, the PDA was able to see, hear and interact with the other site. While still in development, this technology will permit a physician to stay in contact with a patient while across campus, in an airport, or wherever internet access is available.

In the very near future, we will also see increasing use of these technologies to connect research partners such as the Minnesota Partnership for Biotechnology and Medical Genomics partners - the University of Minnesota and Mayo Clinic - to conveniently collaborate, plan, and share results over internet videoconferencing. Telecommunications has become a critical means for health care service, education, and research at the U of M Academic Health Center.
Marshall Hoff coordinates videoconferencing for the Academic Health Center at the University of Minnesota and telemedicine for the Fairview University Telemedicine Network. Janet Shanedling is the Director of Educational Development for the Academic Health Center Office of Education at the University of Minnesota.