Chapter 16

Equine Instructor Reaches Irish Students Via DVC

Steve Evans

As we continue to become more and more technologically literate it appears there are certain assumptions that guide our use of technology. One of the key assumptions is that "more is better". Our computers operate at faster and faster speeds with bigger hard drives. Hardly a day goes by without being enticed by advertisers who suggest that our old 35mm camera should be replaced with a digital camera. A printer is nothing without an integrated FAX, copier and scanner. And, a web-based search that yields less than a million hits probably is flawed in some way.

Our ability to effectively communicate with sound and pictures has not been left behind either. New generations of interactive communication systems continue to be developed - components have been reduced to being microscopic in size, transmission of information over large distances is easily accommodated, and black and white images seem to be something only our ancestors can remember.

> *"Every generation that has grown up since the 1950s is part of the video age. This age has given rise to visual immediacy. In this age, television has shaped the world's social, political and economic climate. The video age has evolved from a store-and-forward environment to a real-time bombardment of information and images." (Rosen, 1996)*

As can be expected, the evolution of interactive communication systems has had a tremendous effect on distance education. And, it is this effect on distance education, especially a concern for limiting the cost of the technology that can be used for 2-way interactive television, that is the focus of this article. The frame of reference for the article is the use of distance education within higher education and the challenge of building distance education programs around technology that is affordable. Certainly, it would be wonderful if we had all the resources in the world to provide distance education programming - but we don't. As institutional resources become more scarce it is incumbent upon us to explore the effective use of less expensive technology that may have been prematurely discarded and to identify ways in which such technology can serve a viable purpose.

Personal Videoconferencing

Personal videoconferencing is just a case in point.

> *"Personal videoconferencing includes desktop, laptop, palmtop, TV set-based videoconferencing, and real-time video kiosks. These are primarily personal communication devices." (Rosen, 1996)*

A few years back the focus of personal videoconferencing was Desktop Video Conferencing (DVC) for the home P.C. - it was the rage. It seemed that everyone had to own one of those miniature cameras, carefully taped to the top of the monitor, so that you could communicate with voice and picture over the Internet. For most DVC owners, the equipment, which transmitted signal over dial up telephone lines, was inexpensive enough to allow you to purchase it and gamble that it would work. And, for many, it was fun the first few times. Then interest waned when the pictures, transmitted over a 56k modem, weren't very clear, the motion was rather jerky and annoying, and sometimes you had to wait forever to get your screen to "refresh" and show a new image. It seems that DVC had been destined to gather dust sitting atop the monitor like a hood ornament on an old Hudson. Ahh - the wonderful world of disposable technology!

In spite of these inherent problems, Michigan State University Extension felt that the investment that had been made in DVC was worth further exploration. DVC units had been purchased for 70 of the 83 Michigan county extension offices when the technology was first introduced. Were there appropriate instructional applications that could successfully use desktop video conferencing, even with its inherent limitations?

Understanding DVC

Desktop Video Conferencing (DVC) is computer facilitated two-way interactive voice and sight communication between two or more individuals at distant locations. DVC allows users to communicate face-to-face over distances from a few feet to thousands of miles. In a state as large as Michigan, where a trip from one end to the other is nearly 12 hours in good weather, the DVC systems are a convenient way of getting a group of people together to discuss an issue without scheduling a meeting that would require extensive travel. In such cases, users forgive the lack of high-resolution images and the slow scan rate. The idea of having visual images to supplement voice communication without having to travel great distances seems to be a large enough reward to encourage people to use this rather basic form of personal television.

Desktop video conferencing units transmit signals over a variety of communication lines. Low-end systems use dial-up telephone lines at a rate just less than 56 kilobytes (KB) per second. Higher end systems, such as the early systems used by MSU Extension, communicate via dedicated ISDN[1] telephone lines at a rate of 112 to 128 KB per second. These systems come with the rather significant cost of a fulltime ISDN line. It is quite common for ISDN users to pay as much as $150 per month for an ISDN line. Add to that the cost of using the line on a per minute basis and it is easy to see that using ISDN as part of the communications infrastructure for a DVD system can be cost prohibitive for many small and medium sized businesses and educational institutions.

For Desktop Video Conferencing to be cost effective, the operating costs need to be lower. One key to the success of today's desktop video conferencing system is its ability to operate over the Internet and therefore not needing costly dedicated telephone lines for transmission. An added bonus is that these newer systems can run over most networks comfortably at around 256KB per second. And, the picture quality is improved substantially over earlier systems. For educational institutions and many

[1] ISDN is an acronym meaning "integrated services digital network." It is an international communications standard for sending voice, video, and data over digital telephone lines or normal telephone wires. ISDN supports data transfer rates of 64 Kbps (64,000 bits per second).

small and medium sized businesses that already have internet access via cable modem, DSL[2] or T1[3] phone lines, this is another way of maximizing the potential of those lines without having to pay for a dedicated line. The software in your computer translates the audio and video DVC signals into small packets of digital information and sends them zooming back and forth via the Internet to their destination.

Many secondary and higher education institutions use two additional forms of 2-way interactive audio/video. At Michigan State University we commonly refer to these as conference room-based and classroom-based CODEC[4] systems. The conference room based systems are typically comprised of a camera, microphone and two video monitors communicating to a similar system over a pair of ISDN telephone lines. A classroom-based system typically consists of multiple cameras and microphones with multiple viewing monitors communicating to a similar system over T-1 telephone lines. These systems, though superior to DVC in picture quality, audio quality and speed of transmission are considerably more expensive. And, of course, one of our main goals was to see if we could achieve the instructional objectives with an inexpensive system like DVC.

Comparing Audio/Visual 2-Way Communication Systems

System	Advantages	Disadvantages
DVC via internet	System can be used with an existing high speed internet line	Heavy internet traffic can negatively impact signal quality
Conference Room-Based Systems	Dedicated lines guarantee basic signal quality	Dedicated lines can cost $150 per month
Classroom-Based Systems	Dedicated lines guarantee highest level of signal quality	High grade dedicated lines can cost hundreds of dollars per month

Using DVC for Classroom Instruction

MSU Animal Science Assistant Professor Brian Nielsen's specialty is Equine Exercise Physiology and he provided an ideal opportunity to try out the DVC system in a purely instructional context. Yes, DVC could facilitate meetings at a distance but could it also facilitate classroom learning at a distance? Could the disadvantages of DVC be overcome to the extent that such disadvantages would not stand in the way of learning?

---

[2] DSL stands for "digital subscriber lines." DSL technologies use sophisticated modulation schemes to pack data onto copper wires. They are sometimes referred to as last-mile technologies because they are used only for connections from a telephone switching station to a home or office, not between switching stations.

[3] A T-1 line is a dedicated phone connection supporting data rates of 1.544 Mbits per second. T-1 lines are a popular leased line option for businesses connecting to the Internet and for Internet Service Providers connecting to the Internet backbone.

[4] CODEC is an acronym standing for compressor/decompressor. A CODEC is any technology for compressing and decompressing data. In telecommunications it is a device that encodes or decodes a signal, often a television signal, so that the signal can be efficiently transmitted to another location.

In the spring of 1998, Nielsen accepted the invitation of an Irish colleague, Professor Gary Connally, to travel to Ireland's Enniskillen Agricultural College to guest lecture in a number of classes. One of Nielsen's lectures to Agricultural Engineering students on how various horse track surfaces impact the mobility of horses went over very well. So well, in fact, that Connally asked Nielsen to deliver the same lecture to a new group of students the next year. The cost and time of flying to Ireland just to deliver one lecture was prohibitive. Fortunately, both Enniskillen College and Michigan State University Extension had made investments in desktop video conferencing. Neilsen, in reflecting on the experience, said:

> "We got started with Desktop Video Conferencing after having spent two weeks in Northern Ireland at Enniskillen Agricultural College. One of the lectures I had given to the Irish students dealt with training surfaces and how they affect the way a horse moves and potential injuries. It turned out that the instructor for the class had no expertise in that area and really enjoyed the lecture. As a result, he asked me to give this lecture to his class the following year. Since making a trip to Northern Ireland to give a single lecture was not economically feasible, we did the next best thing and gave a lecture using Desktop Video Conferencing."

Nielsen is now in his second year of teaching the class from a conference room in Agriculture Hall at MSU. A dozen undergraduate students, many of whom will someday manage a horse training or breeding facility in Ireland, have learned what physical impacts a poorly designed track surface can have on a horse's ability to run. And they learned it "live" via the Internet from an expert who was thousands of miles away.

At MSU, Nielsen sat at a computer where he could see the students on the monitor. His image and voice were carried back to Ireland through the small video camera mounted on top of the monitor and an audio headset with a built in microphone. Nielsen's slides of actual track surfaces and the injuries caused by them were incorporated into a PowerPoint presentation. Recognizing the bandwidth problems associated with trying to use a PowerPoint presentation in real time over the Internet while the DVC class was in session, the presentation was emailed to Gary Connally at Enniskillen the evening before the class. For the class, Connally loaded the PowerPoint presentation into his computer and projected it on a large screen for the students to view as Nielsen made live remarks via DVC keyed to each slide. The DVC image of Nielsen lecturing was also displayed on additional monitors throughout the classroom. Students were able to ask questions through microphones that were fed back into the DVC system.

The system worked well. Nielsen could call on a student as he saw him/her raise a hand. And the students were able to learn from a PowerPoint presentation that was facilitated live by a guest instructor in Michigan. According to Neilsen:

> *"At first it seemed a little strange, basically teaching to a video screen while a camera recorded you. However, it turned out to be a great way to interact with the students. To begin with, I made them go around the room and introduce themselves and tell me a little bit their horse experience. As they were doing so, I tried to personalize my comments to each one of them. That helped them fully realize that this was a two-way interaction that was occurring. Then, as I began to lecture, in order to get the students to better comprehend the material I presented, I made students stand up and demonstrate how they would walk "if you were walking on slippery ice" or "if you were in deep mud." Obviously such actions made for humorous moments. To be able to watch the students demonstrate such conditions, and to be able to laugh with them while they were doing so, really helped me connect with them. Such connections couldn't exist if they were watching a video-tape of a lecture or if only audio was*

available. It definitely requires some effort to put on a good lecture. There is a slight delay in signal so there is a little pause before you receive feedback from your group. That takes a little getting used to. However, that is a minor inconvenience considering the advantages this system offered. To be able to provide a lecture at such a low cost to a classroom on the other side of the world, and to be able to interact with the students on a very personal level, certainly make this technology a wonderful tool to have at one's disposal."

The project has worked so well that Nielsen and Connally have begun talking about the feasibility of teaching a 15-week course for students in Ireland using desktop video conferencing.

Design Considerations for Making Effective Use of Desktop Videoconferencing

Design Consideration	**Rationale**
Use the DVC in a Supportive/Secondary Role (not a primary role)	Don't try to use the DVC segment as a "stand alone" teaching activity. Instead use it in combination with other instructional media – PowerPoint presentation, live instructor, on-site discussions, models, note taking guide, etc.
Try out the technology ahead of time	Use the system a day or two ahead of time to identify unique characteristics that must be accommodated, technical problems that may occur, and how to operate special features.
Establish meaningful objectives	Define both instructional and learner objectives that can be fulfilled through the instruction that takes full advantage of the unique capabilities of DVC.
Rehearse the Presentation	Carefully review the content to be presented, the order in which it will be presented, and how it will be integrated with DVC.
Minimize unnecessary instructor movement	Be seated while teaching in order to minimize distraction that may be caused due to the slow scan rate (non-continuous motion).
Reduce the use of print material	Minimize the difficulty of trying to read on-screen print material by sending handouts to students ahead of time.
Maintain audio quality	Use a small headset-mounted boom microphone to maintain uniform instructor speaking level.
Use a remote location facilitator	Have a person on-site with the distance learners to help facilitate as needed.
Keep the presentation interactive	Provide opportunities for the distance learners to participate by sharing ideas, respond to questions, and ask for clarification. It can be very helpful in identifying communication problems that may not be obvious to the DVC instructor.
Prearrange "signals" between the two sites	Establish simple signals that can allow the remote facilitator to let the DVC instructor know when audio quality is low, presentation is too fast, picture is distorted, etc.
Send supplementary materials ahead of time	Reduce bandwidth requirements during the class and allow more local control of supplementary materials by having them distributed at the remote site – not attempted to be seen on the screen.

References

Rosen, E. (1996). *Personal Video Conferencing: Chapter 1.* Retrieved June 14, 2005, from http://www.manning-source.com/books/rosen/rosen_ch01.zip.