Delivering video-streamed library orientation on the Web

Technology for the educational setting

by Karmen N.T. Crowther and Alan Wallace

As college and university libraries prepare to meet the challenge of delivering quality services to an increasingly divergent 21st-century population, traditional methodologies for providing those services also are changing. The development of the Web has greatly increased the electronic options that libraries now have available for service delivery. Despite the fact that libraries have been among the first on many campuses to use new Web-based technologies, one such technology—streaming media—has been little used. Yet it holds considerable promise for instruction and orientation, especially to the burgeoning number of remote library users on campus and in distance education programs.

What is streaming media?

Streaming media is an audiovideo presentation, delivered via the Internet, that may be viewed while simultaneously being downloaded to a user's computer. It differs from other network delivery systems by delivering a continuous stream of video after only a few (typically 10–30) seconds for initialization. A combination of a client (player), a server, and an appropriate network protocol is needed to stream media. Typically, a click on a Web link will activate delivery from the client. After receiving a few seconds of video sufficient to create a buffer, the client begins playing the media stream in the foreground while continuing to receive and buffer new data from the server in the background. The stream may be a few minutes or several hours in duration. Both live and prerecorded media may be streamed.

Streaming media is widely seen in commercial applications. Many news organizations provide streamed video and audio on their Web sites; entertainment venues present clips of current music and film offerings; and corporations provide product demonstrations to customers and training to employees. Internet radio is a particularly popular application. But streamed media also is increasingly seen in educational settings from primary schools to universities. One of the most common applications in higher education is the distance education program. Classroom lectures and demonstrations are obvious candidates for streamed presentations.

The UT Libraries' experiments with video streaming

The University of Tennessee (UT) Libraries has been experimenting with video-stream-

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ing technology since 1998, and our experience illustrates how a library, even with limited resources, can take advantage of this technology. Our first project was a "tour" of our main library's reference room with business students as the target audience. Business students are a large and active group of library users on UT's Knoxville campus. A library instruction program reaches about 1,000 of these students annually, but class time is too limited to allow library tours. Consequently, students experience some frustration in their initial attempts to locate materials in the library.

Motivation for our project

The size (350,000 square feet) of our central library facility, the John C. Hodges Library, also contributes to students' difficulties in locating materials. First-time users generally must ask for directions to materials they seek. What if we could provide an orientation to the location of materials in our reference room, one that would reduce the need to ask for directions? What if students could have access to the orientation whenever they needed it? The solution to these two questions would reduce user frustration and long lines at the reference desk.

Though often discussed, such needs were not a service priority until circumstances led us to consider streaming media. The co-creator of our project was selected for a UT initiative placing university faculty in local public schools for a year to lend their expertise to enriching the curriculum. Assigned to a local middle school, he found new Macintosh computers in their library loaded with QuickTime software that not only allowed movies to be downloaded and played but also had the capability to create digitized videos. This exposure to digitized video, together with an interest in subsequent advances in streaming media technology, led us to consider video streaming as a possible answer to our own library orientation needs.

Equipment and technical support

Initially, equipment posed a challenge to our video-streaming experiments. The UT Libraries' network servers could handle the anticipated access and storage capacity, but we lacked in-house video and audio production equipment. To meet the need, we sought solutions outside the libraries. Telecommunications and Network Services (TNS), a unit of UT's Division of Information Infrastructure, offered assistance as a pilot project to demonstrate the potential of streamed media on campus. Because TNS offered free network support as well as help with digitizing our files, we initially opted to house our files on its server.

Classroom lectures and demonstrations are obvious candidates for streamed presentations.

Our campus television services unit offered to do filming and editing for us at no cost as part of the pilot program. Although its professional assistance was tempting, we wanted to try to do the work ourselves. By experimenting with photographic and digitizing techniques, we could discover our production capabilities. We could also update and revise the completed video more easily and economically when needed. If successful, our project would demonstrate the instructional potential of video-streamed media as well as the possibilities of what could be done in-house. This would be eloquent justification for the library to acquire its own production equipment for future streaming projects. Should our amateur efforts prove unsatisfactory, we reasoned we could accept the offer of production assistance at a later time.

Planning and scripting

With equipment needs satisfied, we laid plans for the video content. We proposed highlighting several areas in the reference room where business materials are located, displaying a selection of items found there, and indicating possible uses of the materials. From observing Internet-user behavior, we decided that our video presentation should be brief, because users unhesitatingly exit uninteresting or difficult programs with the click of a mouse. Thus, our finished product would consist of several segments, each three to four minutes long. Eye-catching graphics and direct, simple-to-understand narration also were essential. We drafted succinct, descriptive scripts and, with these in hand, roughed out

camera shots and scenarios, aiming for variety, color, and action.

Filming and narration

We used a personal camera for filming—a Sony analog 8mm camcorder with a tripod. Generally we shot twice the amount of film we anticipated needing, about 15 to 30 seconds for each segment of the scripts, planning to edit the footage later to fit the time needed for script narration. Colleagues and student assistants were drafted to "act" when needed. Careful preplanning meant that only limited script rewrites and film retakes were necessary.

The next step was to merge film footage with narration. As we lacked digital editing equipment, we improvised and developed our own method. First, individual camcorder film shots were transferred to a standard, high-quality videocassette. We knew roughly how long each segment of the completed video would last because we had timed our camera shots to the script. Prior to the transfer, we selected and timed the length of each film sequence to closely match the time needed to narrate the script. Although we were concerned that there might be noticeable degradation in the second-generation video images, this was not the case.

Audio was added last. Because home video equipment typically does not allow for overdubbing of sound, a TASCAM 4-track tape recorder was used to create the sound track. It offered high-quality sound as well as the ability to overdub tracks. This proved important when we later decided to add background music. After assembling the video segments, we synchronized the film with the narration on the TASCAM's track counter. Knowing that a particular segment of the script had to start and end at given numbers on the tape made recording of the narration easy.

Background music

After viewing and listening to our first effort on tape, we decided that background music was needed. We had deliberately chosen not to have continuous narration in order to provide transition between scenes and allow viewers time to digest the information presented. However, this left "dead" spots that needed to be filled. Aware of copyright issues involved in using commercial recordings, we found an alternative by using a simple four-chord blues progression created

A selection of helpful URLs for video streaming

- **Apache Software Foundation:** (http://www.apache.org)
- **Apple:** Provides the latest information on their streaming-friendly computer, the iMac DV and editing suite "Final Cut Pro" (http://www.apple.com).
- **Interview:** A solution for digitizing media to non-AV Macs (http://xlr8.com/ProductInfo/interview/).
- **QuickTime:** Includes an overview (including downloads) of their products and technologies, plus information for individuals interested in learning to make and deliver video on the Web (http://quicktime.com).
- **QuickTime Developers' Information:** Provides conceptual as well as technical information for using QuickTime to its fullest capabilities (http://devworld.apple.com/quicktime/).
- **RealMedia:** An overview of Real's products (including downloads) and valuable suggestions for producing streamed media productions (http://www.real.com/player/index.html).
- **Terran's Media Cleaner Pro:** A review of several high-quality products designed to enhance streamed video. It includes an excellent (free-to-download) booklet "How to Produce High-Quality QuickTime," which offers top-notch advice to anyone wishing to enter the world of streaming (http://www.terran.com/).
- **UT Library Video:** View the results of our experiment with video streaming (http://www.lib.utk.edu/refs/business/biztour.html).
- **Video Shop by Strata:** Provides information on this first-rate video editing system (http://shop.3d.com/strata/videoshop/).

by a widely available music software program called Band in a Box.

Digitizing and delivery on the Web

Blending the film, the narration, and the background music put the final touches on our project. Once completed, we delivered the video—one for each of the segments—to the TNS offices for digitizing and mounting on its server.

We chose QuickTime as our media software technology because, after 10 years of widespread use, it is an industry standard. It is also inexpensive, viewer plug-ins are free, and it is available for both Macs and PCs. After digitizing, we needed only to create a link to the TNS file server from the UT Libraries Web pages to make the video accessible to our users. Only two months in preparation, our project was ready for use.[1]

Pros and cons of video-streamed orientation

A few basic instructional and technical considerations should be addressed before embarking on an in-house streaming media production. On the plus side:

- Video streaming is available on demand—an attribute important to any self-directed instructional program.
- It can reach an unlimited number of users at any given time.
- By providing basic information to large numbers of users via this medium, librarians can concentrate their efforts on providing in-depth and one-on-one instruction and assistance.
- Today's students are comfortable with audiovisual formats and enthralled by the Internet. With well-crafted content, their interest can be engaged by streamed media projects.

On the minus side:

- Equipment is needed, and even basic equipment costs money. You must budget for this or find willing collaborators and supporters who can provide what is needed.
- Careful analysis of instructional needs and thorough conceptualization of a possible project are necessary for a successful end product. If you are not comfortable with such conceptualization and planning, you should enlist help from someone who is.
- Updating may be necessary. When changes occur that affect the content of your video, you must revise the product or deliver out-of-date information. Careful planning can mitigate this problem, but it is important to consider when deciding what content to deliver via streaming.
- Bandwidth can be a barrier. Although products continuously improve, streaming still works best on high-speed Internet connections not often found in private homes. If you are hoping to deliver instruction to distance education students via a phone line, streaming media is not yet the optimal solution.

. . . we consider video streaming to be yet another way the UT Libraries can be visible and accessible to our students and faculty wherever and whenever they need us.

Potential applications of streaming media in libraries

Although aware of the challenges of using this new technology, we envision a number of library applications of video streaming. For example, our current project is a brief introduction to the UT Libraries that will serve as a public relations tool. It will show the facilities and services available to prospective students, their parents, or anyone interested in the libraries. Video streaming also may be used successfully in library instruction, especially for multisection classes with similar assignments.

First-year studies and freshman English classes at UT typically serve as venues for an introduction to the library, the catalog, and database-searching techniques. Using video-streamed presentations for such basic instruction would allow students to view the orientation day or night, whenever appropriate or convenient. In fact, any user new to the library or wanting a refresher could view such orientation. It has the added appeal of presentation in a medium that is familiar to and liked by students.

We also anticipate applications of video streaming to library instruction for upper-division and graduate students. By using a video-streamed presentation for general orientation—one that students could view be-

fore the library instruction session—class time can be spent on more specialized needs. Tutorials for especially challenging research materials could also be created as video-streamed files. Any or all of these video-streamed applications would be useful in teaching distance education students how to do library research. Even in-house training for student assistants or library staff could be done effectively with video streaming.

As our campus turns increasingly to Web-based instruction, we consider video streaming to be yet another way the UT Libraries can be visible and accessible to our students and faculty wherever and whenever they need us.

Essential equipment for producing streamed videos

Although our initial production was done with personal equipment and a lot of improvisation, we have subsequently upgraded our equipment and technology. Here are two suggested configurations to help you begin planning to create streamed video. The suggestions are based on use of a Macintosh computer. Although similar equipment is available for PCs, so many different configurations are possible using a Windows platform that it is more difficult to generalize.

Level 1: "Bare bones"—analog equipment

• **Camera:** Any good-quality video camera will serve for basic production. Analog models are available at a range of prices. A tripod is needed to ensure steady video images from these handheld cameras.

• **Digitizing equipment:** If not using a digital camera, a product such as Strata's InterView device is needed to digitize the analog camera's video output. You also will need a production program such as Strata's VideoShop. VideoShop is a full-featured software program that allows digitized clips to be assembled into a coherent, professional-looking video. InterView and VideoShop are available bundled together for around $100. VideoShop also allows the addition of high-quality background music free of copyright problems.

• **Video delivery system:** QuickTime Pro is an industry standard. It is available for only $30 and allows digitized video to be converted into either http or rtsp streaming formats. The rtsp protocol is generally considered the true streaming standard because it sends information as needed rather than downloading an entire file before viewing can begin. The http protocol downloads an entire file, but by virtue of innovative compression and file manipulation, it allows videos to appear to be streamed. QuickTime includes several compression packages to help manage the size of video files. QuickTime players are available free for both Mac and Windows platforms.

• **Server software:** Aside from a standard Web (http) server, QuickTime's http type streaming requires no special software for delivery of video. If you choose the rtsp protocol, an rtsp server such as the MacIntosh OSX is necessary. QuickTime streaming protocol has an open platform and various third-party software solutions for Unix servers such as those from Apache Software Foundation are available.

More applications to enhance your videos

These options provide added features to assist in creating high-quality videos for the Web.

• **Final Cut Pro** from Apple is a professional-level studio for creating and editing digitized videos. Although not inexpensive, it provides a complete array of editing tools.

• **Media Cleaner** from Terran provides additional professional-level compression software designed to allow high-quality videos to be streamed over the Web using minimal bandwidth. This program allows videos to be saved in a variety of formats, including QuickTime and RealMedia.

• **RealMedia** from real.com is a well-known alternative to QuickTime technology. It produces its own high-quality streaming system for both Mac and Windows formats. Http and rtsp streaming are available, but RealMedia requires its own server software. Information on both the server and delivery software is available on the Web site.

Level 2: Basic plus—digital equipment

• **Camera:** Many excellent, relatively inexpensive (under $1,000) digital video cameras are available. The UT Libraries is using a Sony DCR-TRV 103. It not only has excellent digital image quality but, important for our planned usage, also a zoom lens for close-ups. The camera also has an IEEE 1394 (also known as FireWire or i.LINK) port to transfer digital images directly to a computer for editing.

• **Digitizing equipment:** The iMac–DV is an obvious choice. This computer has revolutionized the process of creating digitized video. It includes everything needed to produce iMovies, plus lots of bells and whistles to produce very professional-looking videos. The iMovie format, although not Web compatible, may be exported to QuickTime for use on the Web.

Note

1. The videos may be viewed at http://www.lib.utk.edu/refs/business/biztour.html. The QuickTime viewer plug-in is available from http://www.quicktime.com. ■

("Sharing a vision" continued from page 277)

• "I used and appreciated the PowerPoint presentation we developed as a group."

• "The partnership has helped me teach research to my students more as a series of steps rather than just saying, 'Go research your topic.'"

• "I found out that the computer does not increase or decrease critical thinking skills. It is worth mentioning that all but two of my ninth graders completed a research paper; whereas formerly only 60–75 percent would have.

• "This made me more capable of instructing my students and guiding them through their own research."

Implications for partnering

Here at the undergraduate library, plans are under way to develop additional information literacy partnerships with educators at those high schools that send a significant number of their students to WSU.

Our experience has developed lasting educational relationships with local educators. As a result, we can see long-term benefits in expanding those relationships to benefit teachers and students in the Detroit area and, ultimately, the education of those students continuing their education at WSU.

From the experience over the past three years in planning, facilitating, and evaluating the information literacy partnership, the following points have become evident:

• Administrative support is critical to the success of such a partnership.

• Library media specialists and key teacher leaders should be included in the initial planning, development, and presentation of the workshops.

• Taking the time to plan meaningful activities and listening to educators' needs is critical to success.

• Those involved in the planning process appreciate the fresh perspectives of the university participants and the university connection.

• Planning workshops using the schools' facilities and resources provides a comfort level for the participants in knowing what they will have access to in their own classrooms and in becoming more familiar with the technology and other resources they can use in their teaching. This was emphasized during the planning process as extremely important for the success of the project.

• School administrators immediately see the benefits of developing partnering opportunities with local universities for staff development opportunities.

• K–12 educators are dedicated to preparing their students to be lifelong learners and are very interested in the improved articulation with higher-education professionals that such a partnership allows.

Note

1. Janet Nichols, "Building Bridges: High School and University Partnerships for Information Literacy," *NASSP Bulletin* (March 1999). ■