Live Via Satellite and Streaming Media:
Taking Satellite Courses Via Streaming Media

Brandon C. Taylor
Educational Technology Specialist, Adjunct Faculty Member
College of Lake County, Lakeshore Campus
bctaylor@clc.cc.il.us

ABSTRACT

This paper describes a participant's experience of using synchronous streaming media broadcasts over the Internet in order to participate in interactive courses that are offered live via satellite. With adequate and well-managed resources, live streaming media webcasts can be a viable alternative for delivering effective instruction to students who might not otherwise have access to it.

KEY WORDS

Streaming media, Interactive satellite courses, Web-based instruction, Webcasts

INTRODUCTION

In the summer of 2000, I wished to participate in Western Illinois University's (WIU) graduate-level interactive satellite TV courses <http://www.wiu.edu/users/miebis/>. These courses are delivered live using one-way video, two-way audio -- students can see and hear their professor on a TV/monitor and interact with the professor during the telecast by dialing a toll-free number to connect to the WIU classroom studio. While there are more than 2,500 downlink sites across the United States that are capable of receiving satellite broadcasts delivered by the Center for the Application of Information Technologies (CAIT) <http://www.cait.org/2000/>, there are no such sites conveniently located in Lake County. Unfortunately, the College of Lake County's existing satellite system and equipment are analog and are not capable of receiving the digital satellite broadcasts.

WIU/CAIT currently delivers World Wide Web courses using streaming technologies, so I suggested that they use the same streaming technologies to deliver their satellite courses. They agreed and as it turns out, my request to use live streaming media webcasts to participate in the two interactive TV courses for the Summer, 2000 semester was somewhat of an experiment for all involved. It was the first time that WIU/CAIT enrolled a student using streaming media webcasts to participate in an interactive satellite course. Moreover, it was the first time that the CLC hosted a participant in live interactive programming offered via satellite. (Typically, CLC records the live satellite programming on a VCR tape for asynchronous viewing.)

OVERVIEW OF STREAMING MEDIA

Before describing my experience as a student using streaming media, it would be helpful to discuss certain aspects of this technology. Streaming media, simply put, is "technology that allows you to listen to music and view video in real-time over the Internet without lengthy downloads" (Yfantis, 2000). In a Faculty Development workshop at Virginia Tech, Ed Schwartz (Schwartz, 1999) states that "there are four necessary [software] components to the streaming media model: a web server (e.g. Microsoft IIS, Netscape Enterprise, etc.), web client (Microsoft Internet Explorer, Netscape Navigator, etc.), streaming media server (e.g. RealNetworks Real Server, Apple QuickTime Server, etc.), and streaming media client software (e.g. RealNetworks Real Player, Apple QuickTime Player, etc.)." There are two types of streaming: HTTP (hyper text transfer protocol) and RTP/RTSP (real-time transfer protocol/real-time streaming protocol). HTTP streaming downloads an entire movie to your hard disk. RTSP is a just-in-time streaming technology that keeps your computer in constant touch with the server running the movie. Digital data is transferred and displayed, then discarded once you've seen it. With HTTP streaming, live broadcasts are not possible because Web servers can only deliver media clips that must be stored on disk. Therefore, RTP/RTSP streaming is used for the streaming webcasts. (For more technical information on streaming media, see "Apple – Quick Time Streaming Servers" <http://www.apple.com/quicktime/servers/> and "RealNetworks -- RealSystem G2 Production Guide" <http://service.real.com/help/library/guides/productiong27/realpgd.htm>).

There are a number of streaming media products that would be appropriate for this kind of project, the most popular being Windows MediaPlayer, QuickTime, and RealNetworks. To participate in my satellite courses, I used RealNetworks Real Player, which is thought to be one of the best products currently available. If you wish to deliver low bandwidth content to Mac and PC users at high quality levels, no other technology can match what RealNetworks offers, according to an evaluation by Department of Instructional Technology at the University of Wisconsin <http://emt.doit.wisc.edu/streamcompare/Real/realeval.htm>.

PARTICIPATION IN COURSES

Some preparation was necessary before I began to participate in the satellite courses. First, a member of the CAIT's technical support staff sent to me via e-mail the web address for the live streaming media webcast, a toll-free telephone number for dialing into the course's instructional studio, and a toll-free telephone number for the CAIT's technical support staff.

Next, I installed RealNetworks, Inc.'s Real Player 8 Basic software on a computer in one of the distance-learning classrooms at the College of Lake County's Lakeshore campus (CLC-LSC). Although I could have easily taken the course from the computer on my desk, I chose to use one located in a distance-learning classroom at CLC-LSC because these classrooms are fully equipped with a computer, printer, high speed Internet access, speaker telephone, fax machine,

VCR, and a number of large screen monitors. Also, by taking the course away from my office, but still on campus, I would minimize the possibility of being disrupted during the scheduled course meetings.

Participation in this type of live course required me to perform a variety of different tasks. Therefore, it was necessary to have several software applications open at the same time. I had to open at least two browser windows in order to view the web broadcast, use the asynchronous conferencing tool in the Web site and view the course syllabus. In addition, I had a word processor and an e-mail program open. Thus, I could readily type, save, and print my class notes; read, post, and/or print messages in the asynchronous conferencing tool; view and print online resources referenced in the class lectures and discussions; and send e-mail messages. One instructor even asked me to access some web-based resources and share the information during class a number of times. Having access to a multimedia-ready computer during the class times was an advantage that the other downlink satellite sites in the course typically did not have.

CHALLENGES AND ROADBLOCKS

There were a number of challenges that were unique to my use of streaming media. One problem was the poor quality of the video reception. Often I was unable to clearly see a slide presentation or other objects being broadcasted. To respond to this challenge, I asked the instructors to send me a copy of the documents by fax, to post/upload a copy of the documents to the course's asynchronous conferencing tool and to send the documents that were not clear via e-mail. In addition, the instructors systematically posted an outline of their slide presentations in the course's asynchronous Web-based conferencing tool prior to the start of each class session.

Another unique challenge was created by the one-minute delay of the audio and video delivered via streaming media in relation to the satellite broadcast. I saw and heard what took place and was broadcasted via satellite about one minute later via the streaming media broadcasts. This problem was exacerbated when I called into the classroom studio to ask questions, answer questions, and/or make comments, because the other participants in the course would receive my questions and responses late. The cause of this delay seems to be primarily due to Internet traffic and the processing time of converting the live satellite broadcasts into streaming media webcasts. The CAIT technical support staff provided a partial solution for this problem. Each of the instructional studios has one full-duplex telephone line (simultaneous two way audio) that is used for remote guest speakers to interact with the students in the classroom, rather than using the standard one-way audio classroom studio telephone lines used by remote satellite course sites. Since there were no remote guest speakers scheduled to participate in the course, the CAIT's technical staff asked me to use the full-duplex instructional studio toll-free telephone number to talk and listen to the courses. I was then able to ask questions, answer questions, make comments, and listen via the full-duplex telephone line in real-time and view the class via the live streaming media webcasts. I minimized the volume on the computer's speakers because their audio output was no longer required. This solution worked very well.

RECOMMENDATIONS

There are a number of recommendations that I have for others who are interested in participating in or offering an interactive course live via satellite using streaming media webcasts. These recommendations would be helpful for most, if not all online/distance learning and remote conferencing endeavors.

1) Students should have access to a receiving site and room that has the adequate resources to fully support participation in live streaming media broadcasts and distance learning in general. Minimal adequate resources include:
- a multimedia ready computer workstation with speakers and high-speed Internet access
- a compatible streaming media player
- a fax machine, or computer faxing capabilities
- a scanner in close proximity to the multimedia computer
- a printer
- a speaker telephone or telephone with hands-free earphone and microphone headset with mute function.

Additionally, if the Internet access is via a telephone line, a second telephone line will be required to dial in to the classroom studio.

2) Communication between all parties (i.e. student, instructor, support staff, etc.) is very important for having a successful streaming webcast. The technical support group at the broadcasting site, and the local instructor of the course should be in contact with each other as soon as possible before the first class session. A toll-free telephone number should be made available so that participants in the classroom studio can communicate with the other participants at the remote satellite sites.

3) Archives of the streaming media broadcasts, copies of the presentation, lecture notes, and worksheets should be available and accessible.

4) Contact information for technical support, including the broadcasting site's technical support group, and the technical support for the remote sites, should be easily accessible to students and instructors. Other essential information to compile is the classroom studio telephone number(s), the Web address of the online syllabus, and the Web addresses of any other web-based resources referenced or used in the course. Keep these contacts and resources readily accessible in case you need to access them during your course.

5) With any distance learning experience or experience involving technology, plans must be made in advance for how to effectively deal with potential technical difficulties. In addition, a student must make preparations ahead of time to feel comfortable participating in this type of

learning experience. Having had some experience in similar formats of online/distance learning would be helpful, although not required.

6) Course broadcasts should be accessible to persons with disabilities. For example, a person that is hearing impaired would have had difficulties participating in the course because the course delivery relied heavily on audio materials.

CONCLUSION

In conclusion, with adequate and well-managed resources, live streaming media webcasts can be effective and viable alternatives for participating in or delivering live interactive satellite courses. Again, adequate resources are the hardware, software, and personnel required to implement and support the use of live streaming media broadcasts at both the sending and receiving sites. As streaming media technologies and products continue to develop, there are and will continue to be, a number of other experiences confirming that streaming webcasts can be a very useful learning resources (Lowe, et al., 1999).

ACKNOWLEDGEMENTS

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BIOGRAPHICAL STATEMENT

Brandon C. Taylor is the Educational Technology Specialist at the College of Lake County's (CLC) Lakeshore campus, in Waukegan, IL. In this role, Brandon is responsible for technology services, equipment, staff, training, etc. used in the teaching and learning process, which includes a number of computer labs, distance learning and multimedia classrooms, A/V, etc. Brandon also has dual adjunct teaching assignments in both CLC's Math and Computer Science Department and Multimedia Department. In addition, Brandon is an online adjunct faculty member at Chicago State University.

Brandon was a speaker/presenter at UIUC's/ION's Faculty Summer Institute 2000. He has also lectured at Illinois Institute of Technology and has been a technology instructor and consultant for the Lake County Regional Office of Education. Brandon's primary research interests include bilingual and multicultural distance learning and instructional technology programming development. Brandon holds a B.S. in Computer Science from Prairie View A&M University and is currently working towards a M.S. in Instructional Technology and Telecommunications at Western Illinois University where he is a Presidential Minority Graduate Access Program (PMGAP) Fellow. He is also a graduate of the General Electric Company Company's (GE) Information Management Leadership Program (IMLP), a two year IT and business management development program.