

AUDIO AND VIDEO DEVELOPMENT FOR MULTIMEDIA AND WEB-BASED APPLICATIONS

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Abstract: Technology allows vocational education teachers to increase their delivery modes in the computer environment—from basically text-based to audio and video inclusion. In this session, appropriate video and audio usage, online audio and video sources, audio and video development options, and integration of audio and video into teaching tools will be emphasized. Available research on audio and video inclusion will be shared.

INTRODUCTION

Instructional technology continues to grow and evolve. Because of its increased use, more interest has been placed in its appropriate integration into teaching and learning. The longest-running effort of technology integration in schools is Apple's Classrooms of Tomorrow (ACOT) project. In these technology-rich schools, students work more collaboratively than in traditional classrooms (Newby, Stepich, Lehman, & Russell, 2000). They are comfortable with technology and use it to find information, analyze the information, and present their findings. In the ACOT classrooms, teaching and learning has been transformed with instructional technology as the catalyst.

The developments in computer power support the use of more and more sophisticated media in the instructional technology environment. In the near future, it will be common place to support audio and full-screen, full-motion video along with text and pictures. Web-sites, which are rich sources of information for both students and teachers, will become increasingly more interactive. Streaming audio and video (audio and video sent out per request over the Internet) will improve and open new opportunities for teaching and learning. In the future, education will be enabled by instructional technology.

Audio and video in the computer environment is a powerful way to capture students' enthusiasm for learning, energize teaching, and extend the educational community. Audio via the computer provides an additional medium for explaining a concept or idea. Computer video brings learning to life, builds bridges to higher-order thinking, provides visual examples, and brings people together.

This paper shows appropriate computer video and audio usage, online audio and video sources, audio and video development options, and directions for integration of audio and video into teaching tools use will be emphasized.

COMPUTER VIDEO AND AUDIO USAGE

Developing and using computer video and audio is “fun” but teachers must resist using these technology tools only because it is novel or because “everyone else is doing it.” Technology merely provides educators with the tools for authentic learning (Schrum, 2000). There are a variety of reasons why teachers should consider using video and audio in the computer environment:

- ◆ Current information can be brought into the classroom.
- ◆ Case studies come alive.
- ◆ Difficult concepts can be explained.
- ◆ Special activities can be archived and used again (field trips, guest speakers, etc.)
- ◆ Student development of audio and video builds critical thinking and team building skills.

The pedagogy of computer audio and video use in the classroom should focus on how this technology lends itself to creativity, exploration, understanding, and documentation of knowledge learned (Schrum, 2000). Students become active versus passive learners, producing knowledge and presenting that knowledge in various formats.

ONLINE AUDIO AND VIDEO SOURCES

Audio and video sources are plentiful on the web but may not be appropriate for educational use. One of the best overall places to go can be found at the Excite website (www.excite.com/search_forms/audio_video_search/). At this web location, a teacher can search for a particular audio or video file format. Any search engine can be used to find audio or video by combining the topic area plus one or more of the audio and/or video formats. The most popular audio and video formats in education are defined below.

Audio

The most common audio formats in education are: WAV, AU, AIFF, SND, MIDI, and RealPlayer (.rm). The file format MP3 is also popular on the Internet but tends to be used for music files. WAV (with file extension of .wav) is a native Microsoft audio format. Because it can be played on a variety of computer platforms, it is one of the most popular types of audio file on bulletin boards and the Internet. The AU format provides a small file size but a poor quality sound, normally only an 8-bit, 8kHz monaural sample. An AIFF file is an Apple (Macintosh) interchange format. It operates in a similar way as a WAV file and can be played on various computers. SND is also a Macintosh format but can only be interpreted by Macintosh computers. MIDIs are electronic music files. The audio file format posed to take over the Internet is RealPlayer. Audio in this format can be played on computers with the RealPlayer plug-in.

Video

The three most popular video file formats are AVI, MOV, and RealPlayer. Window-based computers often use the AVI (Audio Video Interleave) format for digital video but this format can also be read by Macintosh computers. The Apple/Macintosh video development software called QuickTime produces MOV formatted files. QuickTime videos can be produced on either a Macintosh or Wintel machine. QuickTime 5.0, the newest version, seems to be a premier development tool for video, producing small files with outstanding video quality. The RealPlayer

video format has become a standard on the Internet. Both basic QuickTime and RealPlayer video development programs can be downloaded free.

Two key considerations need to be remembered in the development of audio or video files. First, what type of computer the files will be played on determines format. Because each format is compressed differently and if small files are needed, formats that have a more aggressive compression process would be a better choice. Secondly, what format you choose depends on the plug-ins your audience has on their computers. A WAV file plays on most computers without downloading additional plug-ins from the Internet. On the other hand, to play a RealPlayer file, the receiver of the file will need to have the appropriate RealPlayer plug-in on their computer.

AUDIO AND VIDEO DEVELOPMENT OPTIONS

To record sound, you need a sound card, a microphone, and a sound-capturing program. Audio can be developed through the sound programs that come with a computer. In a Windows-based computer, Sound Recorder is available; on Macintosh, Sound Manager. These programs have limited editing capabilities. For more sound editing options, programs as SoundEdit and SoundForge are inexpensive. RealPlayer and QuickTime can also be used to develop sound files.

Developing and editing videos for computer use is a more complex process. In general, a video card, approximately 96MB Ram, a “fast” computer, and video capture/editing software are needed. RealPlayer (www.real.com) and QuickTime (www.apple.com/quicktime) have free, limited functioned software available for downloaded for video capturing, editing, and producing. Additional money can be spent to purchase “pro” versions of each programs. Other software products are available for video editing (as Ulead, MGI VideoWave, and Adobe Premiere) but are more complicated and are not necessary for most educational uses. Digital Origin also produces an easy-to-use video editing software.

Audio and video on the Internet can either be played after the file has been downloaded to a computer or immediately after clicking “play”. The process of immediate playback of a video without downloading is called streaming. The advantage of streaming is that your audience will not have to wait for the downloaded file and the video clip (or audio) is erased from the computer as it is played. This feature is essential in the distribution of copyrighted materials.

Streaming of audio and video is increasing on the Internet. Three key video streaming companies exist: Real Video, QuickTime, and Microsoft Theater Server. If streaming is the goal, a web server with a large storage capacity is necessary. For example, a three minute movie that is 320 x 240 pixels running at an average frame rate will take up more than 600 MB.

Two other innovations in online video are SMIL and Surestream. SMIL (Synchronized Multimedia Integration Language) allows for the synchronization of a presentation that contains multiple clips or media. A teacher or student can combine pictures, video, and text for a truly interactive presentation. Surestream encodes the video or audio file one time but will play at multiple bandwidths. This capability is important if your audience will be downloading from a variety of “modem” speeds. RealPlayer and QuickTime both provide these innovations. More information about streaming video can be found at www.streamingmediaworld.com/video/tutor.

INTEGRATION OF AUDIO AND VIDEO IN TEACHING

How could audio and video be used in teaching? The most exciting possibilities are online video cases, simulations, and virtual tours. Online video cases are starting to appear in teacher education and technology will soon be common enough for all teachers and students to use. Video case studies allow for the presentation of a problem and engagement of viewers in critical thinking activities about possible solutions to the case. Online cases could also be used to present a student's project from its inception to conclusions and solutions.

Simulations also "tell" a story but provide multiple choices on how to solve the problem. Students view possible scenarios via video or audio segments. Based on their choices, students move throughout the simulation. Video and audio segments provide a more realistic context and allow students to evaluate verbal and nonverbal cues.

Virtual tours solve the problem of not being able to take students to all the great resources in business and industry. As field trips or visits are made, video and audio segments can be taken and then compiled into a "tour" format. Students can then proceed through the tour to gather relevant information.

SUMMARY

According to Jonassen, Peck and Wilson (1999, p. 3), "Knowledge is embedded in activity." In this sense, technology provides a means to embed knowledge in an interactive way for students. Technology provides a means to explore, motivation to explore, and a way to organize gathered information to gain understanding. The use of audio and video provides a way to increase participation in learning and engage more senses in the learning process. With the improvements in technology, more audio and video via the computer will be used in the teaching and learning process.

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