Creating Video and Multimedia Products That Are Accessible to People with Sensory Impairments

And How Universal Design Features Benefit Everyone
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DVDs, streaming video on the web, and films present engaging instructional tools. Everyone benefits from dynamic visual displays and dialog. Well, not everyone. Viewers who are deaf miss all audio content not also presented in a visual form. Those who are blind can access the visual content also presented in spoken form. It is usually not difficult to make video and multimedia accessible to viewers with sensory impairments, but special considerations should be made at the design phase to ensure complete access to everyone. It is also easier and less costly than providing accommodations to viewers with sensory impairments once they need to access the media.

Universal Design
Universal design is defined by the Center for Universal Design at North Carolina State University as "the design of products and environments to be usable by all people to the greatest extent possible, without the need for adaptation or specialized design" (*projects.ncsu. edu/ncsu/design/cud/about_ud/about_ud.htm*). At the Center, a group of architects, product designers, engineers, and environmental design researchers established a set of principles to guide the design of environments, communications, and products. The principles ensure that the design accommodates a wide range of individual preferences and abilities; the design communicates necessary information effectively, regardless of ambient conditions or the user's sensory abilities; the design can be used efficiently, comfortably, and with a minimum of fatigue; and appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

When universal design principles are applied, products can be used by people with a variety of characteristics. Expensive options for making the content of an inaccessible product accessible to people with disabilities can be avoided.

Access for People Who are Deaf
Millions of people worldwide experience enough hearing loss to affect their ability to watch a television program at a standard volume level. Some people are born deaf or hard of hearing, some experience a hearing loss from an accident or illness, and many gradually lose their ability to hear. The elderly are the fastest growing group of individuals who are deaf or hard of hearing. Captions on videos allow full accessibility to these people.

To experience watching a multimedia product without the ability to hear, turn off the volume during a video presentation. Some programs, such as sporting events, are fairly easy to follow by watching the visual display. Others, like news programs, make little sense without access to the audio content. To make this content accessible to those who are deaf, the producer could arrange for a sign language interpreter or text captioning to appear on the screen.

Captioning involves synchronizing text with audio content of a video presentation. It is more common than sign language because not all individuals who are deaf know sign language, there is no one standard version of sign language, and the intricate motions of sign language may be difficult to display clearly, especially when scientific or other highly specialized language is used.

Captions benefit other viewers, including those for whom English is a second language. People with certain learning disabilities can also benefit from hearing and seeing the spoken word simultaneously. Some instructors use captioned videos with the sound turned off to teach people how to read. Captions also provide content access to people viewing videos in noisy settings (e.g., an airport) or in situations when it is important to be quiet. They also benefit everyone who wants to know the spelling of words used in the presentation. Closed captions also allow someone to search the captions of a video for specific topics.

Captioning and Transcription

Off-line captioning is created after the video has been shot. The captioner types the captions, which are recorded on the video image. Captions typically appear on the screen as a group and erase as a group; they do not scroll. The captions are either "open" or "closed." **Open captions** are part of the actual image of the video and appear on the screen whenever the video is presented. **Closed captions** are stored in Line 21 of the vertical blanking interval (VBI) between the frames of a television signal and appear when the television's built-in decoders are used.

Real-time captions are created as viewing takes place. They are most often used for live programs such as video conferences and sporting events. Much like a courtroom reporter, a trained stenotypist enters spoken content by typing phonetic codes on a special keyboard that facilitates high-speed transcription. Computer software translates the phonetic codes into words that typically scroll across the bottom of the video image in a continuous motion.

To employ universal design, the production should be filmed so that critical visual content does not appear where captioning will cover it. For example, if you are shooting an ice skating event, make sure the feet of the skaters are not so close to the bottom of the screen that they will be covered with captioned text. Keep in mind that captions should provide content for all of the visual events that occur on the screen, including noises that are not the result of speaking (e.g., a dog barking may translate into the captioned text "Dog barks."). Suggestions for making attractive and functional captions include the following:

- Use one or two lines of text.
- Caption the exact wording of speakers, including slang and grammatical errors.
- Only occasionally edit a few words to facilitate reading speed.
- Caption sound effects that contribute to the understanding of the content.
- Synchronize captions with the aural content.
- Only occasionally change the location of captions on the screen.
- Use both uppercase and lowercase letters

- Use a simple sans-serif font, such as Helvetica, and proportional spacing.
- Ensure high contrast between the text and background.
- Use italics to indicate the narrator, off-screen voices, sound effects, and other vital information presented aurally.

Transcription is word-for-word translation of audio content into a text file. Although an appropriate alternative for audio files, it is best to use captions that are synchronized with the visual content for videos. Having said that, transcription as an alternative format can benefit those who are both deaf and blind, who cannot easily access closed captions, and who do not have technology that allows them to view videos.

Legislation and greater awareness of individual needs has resulted in increasing numbers of video presentations available with captions. Many educational materials and most children's and prime time television programs are closed captioned.

Resources

Center for Universal Design in Eduation (CUDE) Knowledge Base (enter search text "captioning") *www.uw.edu/doit/programs/ center-universal-design-education/search-kb*

Amara
amara.org/en/

Captioning Key
dcmp.org/learn/520

Closed Captioning
en.wikipedia.org/wiki/Closed_captioning

Creating Accessible Videos
www.uw.edu/accessibility/videos

Hearing Loss Association of America
www.hearingloss.org

Media Access Group at WGBH Caption Services
main.wgbh.org/wgbh/pages/mag/services/captioning

National Association of the Deaf Captioning Service Vendors
dcmp.org/learn/10

National Captioning Institute
www.ncicap.org

National Court Reporters Association
www.ncraonline.org

National Center for Accessible Media
ncam.wgbh.org

UDL on Campus
udloncampus.cast.org/home#.WrvX84Ih1T7

YouTube Captions
www.youtube.com/watch?v=qYcj85tBje4

Access for People Who are Blind

People who are blind cannot access the visual content of a video production unless the content is available in audio or tactile format as well. Awareness of this access issue during the design phase of a product's creation can result in speakers or narrators voicing enough of the content to allow a person who is blind to follow along. This is particularly important for educational programming and products used with large audiences where it is unknown to the presenter what visual impairments audience members may have. For example, speakers can introduce themselves rather than having the information presented in a text box. Copyright, acknowledgment statements, and other information at the end of the video can also be spoken by the narrator. Producers can listen to their video product without viewing the screen to help determine how accessible it might be to a person who is blind.

Audio Description

After shooting and editing is complete, specially trained professionals can add audio content to the video soundtrack. When pauses occur in the original production, the speaker reads titles and names and describes scenery, objects, and other visual information for the viewer who cannot see. Credits and contact information at the end of the production can be voiced in the original production or added as an audio described feature. A talking menu on a DVD is another example of how a product can be designed to be fully operable by a person who is blind.

Most video producers use outside services for audio description. Because this additional audio content is not of value to other audiences and can be distracting, audio description is usually not included with the standard product but is provided as an optional format available by request.

Resources

Center for Universal Design in Eduation (CUDE) Knowledge Base (enter search text "audio description")
*www.uw.edu/doit/programs/
center-universal-design-education/search-kb*

Creating Accessible Videos
www.uw.edu/accessibility/videos

Descriptive Video Service
*main.wgbh.org/wgbh/pages/mag/services/
description*

Narrative TV
www.narrativetv.com

Audio Eyes
www.audioeyes.com

VITAC (Vital Access)
www.vitac.com

WGBH
www.wgbh.org

Examples of Accessible Videos and Media Player

For examples of videos that are universally designed, explore the DO-IT streaming video collection at *www.uw.edu/doit/videos/index.php*. These videos are designed so that captions do not cover important visual content, and credits and reference information is spoken. For most videos, there is an audio-described version, a transcript, and a publication with more detail and references. The Able Player media player, whose development was led by DO-IT staff member Terrill Thompson, includes features for displaying various versions of each video's accessible features.

Video

A video, *Making Videos Accessible*, may be freely viewed at *www.uw.edu/doit/videos/index.php?vid=86*. Permission is granted to reproduce DO-IT videos for educational, non-commercial purposes as long as the source is acknowledged.

Legal Issues

Consult "A Guide to Disability Rights Laws" (*www.ada.gov/cguide.htm*) for a summary of legislation that protetcts the rights of people with disabilities in the U.S. The **Americans with Disabilities Act** (ADA) of 1990 and its 2008 amendments require that public programs and services be accessible to people with disabilities, unless doing so would result in an undue burden. For example, the content of a video shown in a college course might be made accessible to a student who is deaf by including captions. Similarly, if a blind student enrolled in the course, the essential content that is presented visually could be audio-described.

The **Television Decoder Circuitry Act of 1990** requires that television sets with screens thirteen inches or larger manufactured for sale in the United States must have built-in closed caption decoders.

Section 713 of the **Telecommunication Act of 1996** charged the Federal Communications Commission (FCC) to create mandates to increase the percentage of television programming that is captioned. It has published rules and set guidelines for gradually increasing the number of captioned programs.

Section 508 of the **Rehabilitation Act of 1973** requires that the U.S. Federal Government develop, procure, maintain, and use electronic and information technology that is accessible to people with disabilities. In the Section 508 guidelines that were developed by the Access Board and became effective in 2001, all training and informational video productions that impart an agency's mission must contain captions for speech or other audio information necessary for the comprehension of the content. Also, critical visual content must be audio described. Although the standards were developed for the federal government, similar legislation and policies of states and organizations as well as voluntary compliance have extended their use beyond federal agencies.

About DO-IT

DO-IT (Disabilities, Opportunities, Internetworking, and Technology) serves to increase the successful participation of individuals with disabilities in challenging academic programs and careers, such as those in science, engineering, mathematics, and technology. Primary funding for DO-IT is provided by the National Science Foundation, the State of Washington, and the U.S. Department of Education. This publication is based upon work supported by the U.S. Department of Education (Grant # P333A990042) and the National Science Foundation (Grant #9800324 and 0833504). Any questions, findings, and conclusions or recommendations expressed in this material are those of the author and do not necessarily reflect the views of the federal government.

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