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## Using Video to Teach Content-Area Information: How Can The Web Help Teachers?

The 2004 reauthorization of IDEA is unprecedented in its requirements that students with disabilities have access to the general education curriculum. Furthermore, IDEA 2004 mandates that the progress of students with disabilities be measured by the same standards and accountability systems used for students without disabilities. However, research suggests that general education teachers rarely make the adaptations or accommodations that are needed for learners with disabilities to experience success in the general education setting (Passe & Beattie, 1994; Schumaker et al., 2002).

Some of the difficulties teachers encounter in making accommodations stem from the challenges of a textbook-based curriculum. Learning from textbooks is difficult for all students, but particularly so for students with disabilities. Literacy problems are the most commonly cited difficulties of students with mild disabilities—those who are most likely to be educated in the general education classroom. Even when students with disabilities have sufficient skills to read textbooks accurately and fluently, they may struggle to make sense of their content. Crammed with factual information that can overwhelm students and depress their interest in content-areas, textbooks are rarely organized in ways that help students see the big ideas or the connections among different ideas and events. Information is often depicted in an authoritative manner that ignores the rich interpretative processes and inquiries at the core of many concepts in science, social studies, mathematics, and language arts (Armbruster & Anderson, 1984; Wineburg, 2001). If the goals of IDEA 2004 are to be realized, both special and general educators need options that extend beyond relying exclusively on written text to provide students with access to content-area information. One promising option is to expand the use of video to support content-area learning and instruction.

### CAN VIDEO SUPPORT LEARNING?

Today's students are no strangers to video (e.g., Roberts, Foehr, & Rideout, 2005). Sites that offer video on demand, often produced by students themselves, such as YouTube ([www.youtube.com](http://www.youtube.com)) and GoogleVideo ([video.google.com](http://video.google.com)), are some of the fastest growing sites on the web. Can teachers capitalize on students' affinity for entertainment and information that is presented through video to teach in content-area subjects?

The benefits of using video as an instructional tool are well documented (e.g., Cognition and Technology Group at

Vanderbilt, 1997; Gersten, Baker, Smith-Johnson, Dimino, & Peterson, 2006; Glaser, Rieth, Kinzer, Colburn, & Peter, 1999; Goodyear & Steeples, 1998; Mayer & Gallini, 1990). In fact, research about the use of moving images in education dates back to 1918 (Hoban & VanOrmer, 1951). Briefly, research shows that, for students who have limited background information about a topic, video provides rich visual details about the ideas, events, people, and phenomena. Video can make knowledge more explicit and provide an external representation of information that would remain abstract and tacit when described through words. Video is especially advantageous for poor readers whose ability to gain information from print may be limited. The dynamic nature of video can help students develop a rich mental model of problem situations, leading to higher level reasoning and more effective problem solutions. And, video that tells a compelling story or captures students' interest in other ways is likely to keep students more engaged and motivate students to learn more about the topic.

### HOW CAN VIDEO BE USED TO IMPROVE CONTENT-AREA INSTRUCTION?

Analog video, including filmstrips, television, and videocassettes, has a long history in the classroom. But, as the entertainment sector has evolved to almost exclusive use of digital video, educators find video to be a much more flexible medium for use in the classroom. Two major advantages of digital video are its potential for *interactivity* and for *integration* (Thornhill, Asensio, & Young, 2002). Digital video is interactive; users can exercise control over the pace and direction of the video, leading to instruction that can be better tailored to individual needs and preferences. And, video can be used for a variety of purposes, ranging from education to entertainment. Video can be shown in segments, with a focus on specific sections of the video and with ease of movement between desired information. Thus, digital video is easier than analog video to integrate into the curriculum.

Over a decade ago, the Cognition and Technology Group (CTG) (1992) developed the videodisc-based Jasper series to teach mathematical problem solving. Video was used to present the problem and sub-problems to be solved. Video also served as an anchor to provide all students with the same set of background information required to solve the problems. Subsequently, Bottge and colleagues (e.g., Bottge & Watson, 1992) used video-based problems to improve the problem solving skills of young adults with disabilities. In the CTG and Bottge studies, authors developed their own video to incorporate instructional principles associated with effective problem solving.



Commercially available video was a key component of successful history curricula developed to teach students with disabilities in studies by Ferretti, MacArthur, and Okolo (2001); Gersten et al. (2006); and Rieth et al., (2003). In all three of these studies, the video was shown in segments, with each segment followed by teacher questioning and whole class or small group discussion. Viewing video in this way appeared to enhance students' understanding of complex information.

## WHERE CAN TEACHERS FIND VIDEO THAT SUPPORTS CONTENT-AREA INSTRUCTION?

### Using DVDs in the Classroom

There are a variety of sources available for acquiring commercial video, available on DVDs, that can support, supplement, or replace textbook-based instruction in content areas. Although some teachers may prefer the rapidity with which one can rent a video from a local video store, or borrow one from a school media library, the growth of the web has made video much more readily available, affordable, and flexible for classroom use (Thornhill, Asensio, & Young, 2002). Vast collections of commercial videos are available for inexpensive rental from sites such as Netflix ([netflix.com](http://netflix.com)) and Blockbuster ([blockbuster.com](http://blockbuster.com)). These sites offer a large number of documentaries and commercially-popular films that can support instruction (e.g., *Hotel Rwanda* in social studies, *Winged Migration* in science, or *Proof* in mathematics). Although not exhaustive, Table 1 provides a list of web resources that are designed to help educators locate appropriate videos for use in content-area instruction.

Some of the videos that may be located using Table 1 will be copyrighted. Section 110 (1) of the copyright law enables teachers to use commercial video in the classroom if the use: (a) takes place in a non-profit educational institution, (b) occurs in a classroom or similar location used primarily for instruction, (c) is part of a regularly scheduled course (which does not include extra-curricular or recreational use), and (d) is for the benefit of the instructor and the students in the classroom, in the course of face-to-face teaching activities (Fisher & McGeneran, 2006).

### Streaming Video

A burgeoning source of video is video streaming on the internet. Streaming is different from the more traditional methods of viewing DVDs or downloading video. When downloaded, the clip or movie is copied in its entirety to a computer or other media device before it can be viewed. The disadvantage of this method is that downloading can take time, and thus is less flexible for on-demand use during a lesson.

With streaming video, a file remains on the main server. A chunk of video is pulled onto the user's computer, and begins playing while the remainder of the video file is moved to the

user's computer in the background. Ideally, the movement of video segments onto the user's computer and their subsequent play is smooth and without interruption, so video is viewed as it is being downloaded. Technical requirements for effective use of streaming video are: (a) a high-speed connection to the web and (b) a computer that is sufficiently powerful to decompress the video stream. If this is not the case, then streaming video is not a good option for the educator interested in using video in the classroom (Thornhill et al., 2002).

One popular site for streaming video to support content-area instruction is *Unitedstreaming* (<http://unitedstreaming.com/home>), an internet-based instructional system from Discovery Education. The site contains more than 15,000 clips from 1,500 videos. The service also includes content linked to standards, a content-management system, and links to additional sites with information contained in the video clips. An annual license costs between \$1,500 and \$2,000 per school building. Initial studies show that *Unitedstreaming* increases students' grades on standardized tests (Boster, Meyer, Roberto, & Inge, 2002; Reed, 2003).

Another site for streaming video is *LearnOutLoud* (<http://www.learnoutloud.com>). The site contains over 500 free audio and video titles. Most of the audio files can be downloaded in digital forms, such as MP3, for playback on portable audio devices. Most video titles are available as streaming video.

Undoubtedly, publishers will make increasing use of streaming video to support the content of their textbooks. Thinkwell (<http://www.thinkwell.com>) is a publisher that offers textbooks supported by over 100 online 10-minute tutorials. These books also include interactive exercises, dynamic animations, links to other web resources and content management tools. As Riley, Holleman, and Roberts (1999) note, the use of streaming video to support instruction is only in its infancy. By the time you are reading this column, it's highly likely that additional sources of streaming video will be available to support content-area teaching that benefit learners with and without disabilities.

## GUIDELINES FOR USING VIDEO FOR CONTENT-AREA INSTRUCTION

Regardless of the type of videos teachers use, research suggests that showing a video, from start to finish, without putting into practice the principles of interactivity and integration, discussed above, is unlikely to improve students' understanding. The following recommendations help teachers make effective use of video to support content-area instruction (e.g., Ferretti et al., 2001, Gersten et al., 2006, Paris, 1997, Viney, 2004):

1. Show the video in short segments. Students may be better able to focus on and understand key concepts if they focus on segments of information, rather than



**Table 1.**  
**Web Resources to Locate Videos for use in Content-area Instruction.**

Mathematics Video	Movies with Math: Offers a guide to major motion pictures that contain scenes of authentic mathematics <a href="http://www.std.com/~reinhold/mathmovies.html">http://www.std.com/~reinhold/mathmovies.html</a>
	Math in the Movies: Links to sites that provide descriptions of math and science topics in movies and other media: <a href="http://www.math.tamu.edu/~dallen/hollywood/index.htm">http://www.math.tamu.edu/~dallen/hollywood/index.htm</a>
	My Math Movie Picks: Brief discussion of movies that involve math in some form: <a href="http://www.math.unl.edu/~bharbourne1/MathInTheMovies.html">http://www.math.unl.edu/~bharbourne1/MathInTheMovies.html</a>
Science Video	Science animations, movies, and interactive tutorials: <a href="http://science.nhmccd.edu/BioL/animatio.htm#animal">http://science.nhmccd.edu/BioL/animatio.htm#animal</a>
	Bad Astronomy. Links to movies that misrepresent astronomy, and discussion these misrepresentations: <a href="http://www.badastronomy.com/bad/movies/">http://www.badastronomy.com/bad/movies/</a>
	Top Ten Science Movies: includes a synopsis of each movie and rational for using it: <a href="http://chemistry.about.com/cs/weirdscience/tp/aatp121102.htm">http://chemistry.about.com/cs/weirdscience/tp/aatp121102.htm</a>
Social Studies Video	Science Base. Includes links to descriptions of each movie: <a href="http://www.sciencebase.com/science-blog/science-movies.html">http://www.sciencebase.com/science-blog/science-movies.html</a>
	Teaching History thorough Films. Offers teaching film guides to several popular movies: <a href="http://www.mediapede.org/filmhistory/">http://www.mediapede.org/filmhistory/</a>
	Modern History in the Movies. Offers a chronological list of movies, with descriptions of each and a link to further information about the movie: <a href="http://www.fordham.edu/halsall/mod/modsbookmovies.html">http://www.fordham.edu/halsall/mod/modsbookmovies.html</a>
	Movies to Study Early Modern History By. A list of movies, organized by era and location, that include descriptions of each movie: <a href="http://www.nipissingu.ca/department/history/muhlberger/2155/movies.htm">http://www.nipissingu.ca/department/history/muhlberger/2155/movies.htm</a>
Sites about Teaching with Movies	National Geographic. Offers a collection of videos distributed by National Geographic and a listing of TV shows on the National Geographic Channel: <a href="http://www.nationalgeographic.com/tv/index.html">http://www.nationalgeographic.com/tv/index.html</a>
	DVD Ideas supports "significant and meaningful cinema" by offering a collection of DVDs described as "cultural assets." Many of these fit well into classroom instruction. Titles are arranged into the following categories: popular topics, social/cultural, relationship/family, arts, crime, eras and countries: <a href="http://www.dvideas.com/alltopics.asp">http://www.dvideas.com/alltopics.asp</a>
	Teach with Movies includes lesson plans and discussion questions for nearly 300 movies, which are listed by topic and by age (\$11.99 per year subscription): <a href="http://www.teachwithmovies.org/">http://www.teachwithmovies.org/</a>
	Discovery Channel. Offers lesson plans and other ideas to accompany TV shows (which can also be purchased as videos) on the Discovery Channel: Videos are primarily science-oriented: <a href="http://school.discovery.com/">http://school.discovery.com/</a>
	Public Broadcasting Service (PBS). Offers lessons and activities to support PBS shows and videos for purchase: <a href="http://www.pbs.org/teachersource/">http://www.pbs.org/teachersource/</a>
	History Channel Classroom: Contains teaching guides for History Channel productions. <a href="http://www.historychannel.com/classroom/classroom.html">http://www.historychannel.com/classroom/classroom.html</a>
	The Center for Media Literacy offers guidelines and videos for teaching media literacy within the content areas of science, social science, and mathematics. Although the site doesn't provide explicit guidelines for teaching the content of these subjects, it does offer students and teacher guidance in evaluating the impact of images, words, and video on our understanding of the world: <a href="http://www.medialit.org/">http://www.medialit.org/</a>

- being overwhelmed by too much content.
2. Help students integrate information from videos with information from other sources (e.g., textbooks, tradebooks, websites). Discuss with students how various sources complement or conflict with one another. Take time to discuss with students possible reasons for conflicting facts, opinions, or conclusions.
  3. Encourage students to take notes. Students can refer to notes later to recall key points when completing an activity or studying for a test. Some students may need supported notetaking, in which they teacher creates outlines, blank concept maps, or even "fill in the blank" activities for completion during viewing.
  4. Videos offer an excellent opportunity for *teaching* notetaking skills. Students can take notes during the first viewing of a video segment, and then review the accuracy of their notetaking skills during a second viewing.
  5. Use discussion to clarify and deepen students' understanding of the content. Students are instructed to watch for specific information, and then asked to explain their conclusions, to discuss specific segments of the video that contain key information, and to state any questions they may have about the video they have viewed. Discussion can take place among the whole class or in smaller groups.
  6. Pause a video at key points and ask students to predict what will happen next. Discuss with students the reasons for their predictions, play the subsequent segment, and revisit students' predictions.
  7. Use the Pause feature to have students examine a particular frame of the video in greater detail. For example, students might note the buildings in the



background of a scene, discuss the emotions or positions of actors in the segment, or examine in detail the features of a procedure or each step in a process.

In addition to teaching content, video offers teachers an opportunity to teach principles of *media literacy* (e.g., Thorman & Jolls, 2005). Rather than passively viewing and accepting information presented through video, students should be encouraged to question it and critique the ways in which it is portrayed. By encouraging students' engagement with the video, the suggestions presented above should support the development of media literacy skills. Teachers also can encourage students to consider how the visual and aural aspects of a video (e.g., camera angles, use of color, incorporation of sound and music) affect one's reaction to and understanding of content. When using commercial video, teachers can supply information about the director, intended audience, or time period during which a film was created, and discuss with students how context, cultural practices, and motivations affect the informational content of video.

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