

Digital Video and Teaching

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The first moving pictures appeared in the 19th century and transformed the 20th century. Film in the first half of the century was complemented by broadcast television in the second half. Nearly 99 percent of all households had a television by the 1970s, watching more than four hours per day on average. It could be argued that broadcast television not only covered history but altered its course in some instances (Watson, 1997).

The ubiquitous presence of digital video is permeating every aspect of life in the 21st century with equally profound implications. Widespread video recording capability in the current generation of cell phones combined with dissemination via sites such as YouTube has changed the way in which video is created and consumed (Gannes, 2009).

In the first year of use after YouTube was established, individual users created and contributed more video than the three original television networks (ABC, NBC, and CBS) had produced in the half century since they were founded. Five years later, hundreds of thousands of videos are uploaded to YouTube every day, at a rate of more than 20 hours of video per minute (YouTube, 2009). In other words, it would take nearly a full day to watch all the video posted to YouTube in a single minute. Subscription services like Discovery streaming offer thousands of educational titles, and many more educational videos are available across the Web at sites such as NextVista, SchoolTube, and TeacherTube.

Because video can be created and watched on portable devices such as cell phones, its use is becoming casual and conversational. Among many of today's youth it has become a primary form of communication. Although it is not always used in a constructive or responsible manner, video has become a way to share experiences, express creativity, and convey ideas. Because video about nearly any topic is becoming available, some students are beginning to employ it as an initial point of reference when they have questions about a topic (Helft, 2009).

Affordances for Classroom Learning

In the midst of this cultural shift, some teachers and teacher educators have become more open to its use in the classroom, as well, judging by the increasing number of journal articles and conference presentations on the topic (see, e.g., Kearney & Schuck, 2005; Pace & Jones, 2009; Shea, 2000). For decades educators have found films to be valuable for transmitting some types of information in the classroom. Although digital video is easier to capture and more readily accessible, it also possesses some affordances that broaden its usefulness beyond information transmission. A few examples of the affordances of existing video include the following:

- Teachers can isolate short segments (i.e., 30 seconds to 3 minutes) with the most relevant action or information.
- Digital video players allow teachers and students to easily slow down, speed up, reverse, and replay video for review and closer analysis.
- Software packaged with today's computers makes it easy to combine or rearrange multiple clips of the most relevant video.
- Digital video can be overlaid or paired with graphical or numeric data and analyzed in combination with other tools like Geometer's Sketchpad (in math class) or Logger Pro (in science).
- Digital video can include still images with narration and music (including maps, documents, audio clips, and video clips), animations such as Flash movies, and screencasts (i.e., an edited recording of a computer screen) in addition to traditional video.

When students or teachers create their own video, editing is made easier by user-friendly (and often free) software packages. These video files are relatively easy to share, whether the audience is the classroom, school, home and community, or the world.

Digital Video Plus Effective Pedagogy

Despite these affordances of digital video, learning with digital video requires effective pedagogy. Digital video is not a teacher-proof educational tool, just as film never was. Video content should be closely matched to an instructional goal. Students need prior instruction about what to look for in a video and debriefing afterwards to ensure they attended to targeted information (Dale, 1969). Teachers must also attend to potential cognitive overload caused by too much information being presented too quickly or by the simultaneous appearance of moving images, narration, and sometimes onscreen text. (Pace & Jones, 2009; Tversky, Morrison & Betrancourt, 2002). Without an active teacher who attends to these issues, pausing video at strategic points, replaying key segments, and assessing understanding, video and animation may actually decrease students' comprehension of a concept.

As teachers develop technological pedagogical content knowledge specific to digital video, they discover that they can actively engage students by asking them to observe, answer a question, or interpret a message. Video can become an object of analysis, sometimes even in combination with other interactive measurement technologies. Students can also create their own videos as a form of knowledge expression (Hofer & Harris, 2009), synthesizing and communicating what they have learned (Bull & Bell, in press). In each case, video pedagogy is not generic. The way in which teachers can most effectively engage students with digital video is specific to the content being learned (Table 1).

Table 1
Student Engagement with Digital Video by Content Area

Subject Area	Student Activity
Social Studies	<ul style="list-style-type: none">• Watch video clips of people and places outside of students' local experiences and historical reenactments.• Analyze video as a historical artifact or scrutinize political ads or product commercials to encourage critical thinking.• Create mini-documentaries about historical events to hone research and interpretive skills or make movies about current cultural customs and traditions to broaden students' perspectives. (Hammond & Lee, in press)
Science	<ul style="list-style-type: none">• Watch video clips of phenomena that engage them in scientific questions, elaborate on or apply a concept, or invite observation and inference.• Analyze video to make predictions, find patterns, take measurements, or determine classifications.• Create video of events and scientific phenomena that students have an interest in exploring further or that present students' understanding of a concept. (Park, in press)
Mathematics	<ul style="list-style-type: none">• Watch video-recorded events to visualize mathematics in nature and art and to set contexts for mathematical inquiry.• Analyze motion mathematically or examine the pattern and symmetry of choreographed dance, for example, or marching bands.• Create video that enacts a specific function or solves a mathematical problem or demonstrates understanding of a mathematical concept. (Niess & Walker, in press)
English Language Arts	<ul style="list-style-type: none">• Watch video that engages students in meaning making and interpretation.• Analyze video to consider the effectiveness of combinations of spoken word, print text, soundtrack, image, and motion.• Create video as a multimodal text to express ideas and connect with an audience. (Young & Kajder, in press)
Reading	<ul style="list-style-type: none">• Watch video as a prereading visualization activity that builds prior knowledge and engages students in the topic or view video renditions of fiction and drama for critical comparisons.• Analyze students' reading performances for self-reflection and feedback.• Create videos that demonstrate reading and composition skills or reading comprehension. (Michael McKenna & Carrie Simkin, personal)

	communication February 16, 2010)
Physical Education	<ul style="list-style-type: none">• Watch video of others' skill performance to learn techniques.• Analyze students' skill performance for both self-evaluation and teacher feedback.• Create digital video clips of others' skills or performances to demonstrate understanding or make fitness/wellness advocacy/public service announcement videos for an audience. (Jennifer Krause, personal communication, February 13, 2010)
Languages Education	<ul style="list-style-type: none">• Watch video clips of everyday conversations in films or television broadcasts or music that can be replayed and processed in multiple ways.• Interact with native speakers through live video conferencing.• Create video of student conversations or skits or narrations of past events that demonstrate language mastery. (Ruth Ferree, personal communication, February 16, 2010)

Although enthusiasm for educational use of digital video is high in some circles, the body of evidence is still evolving regarding the types of video and associated pedagogical methods that are most effective for teaching specific curricular topics. This special issue on the topic was prompted by a desire to encourage more of these types of studies.

The Special Issue on Digital Video

In this issue the CITE Journal presents a collection of scholarly articles and editorials describing uses of digital video to teach curricular content and skills in the K-12 classroom. The authors also explore the implications for teacher education. For example, [Park](#) notes that current science methods textbooks seldom mention digital video, but suggests that science teacher educators should address the following areas of practice:

- Identifying sources for effective motion pictures for instruction and analysis,
- Making best use of existing short videos,
- Providing instruction on how to shoot, edit, evaluate, and post science video explorations that can be used by the science education community, and
- Involving students in the variety of inquiry methods to explore science using digital video.

[Young, Long, and Myers](#) consider the evolving attitudes of English language arts educators toward film, which has traditionally been considered a second-class medium compared to print texts. They point out that since “digital video is steadily becoming the dominant media in which our student demographic engages” the time has come for educators to reimagine, revision, and rethink both pedagogical approaches and the English curriculum itself.

Mathematics teacher educators [Niess and Walker](#) suggest that

teacher educators need to redesign their programs to provide opportunities that help preservice and in-service teachers in envisioning and implementing videos as instructional items in light of the impact of the capabilities of this technology on mathematics as a discipline as well as a societal tool.

An Ongoing Conversation

Print in a digital medium will often be blended with other media such as video. This trend is already visible in online media such as the Washington Post and New York Times, which feature images and video intermingled with print on the front pages of their respective websites. Just as movies did not replace radio, and television did not replace movies, it is likely that these different media will coexist side by side for the foreseeable future.

More blended textbooks that combine text and media are sure to appear as technologies that make their use feasible appear. Last year the state of Virginia released an online physics textbook (http://www.doe.virginia.gov/news/news_releases/2009/mar16.shtml). A new generation of digital readers such as Apple's iPad and other portable devices that are emerging will make it increasingly likely that tomorrow's students will access texts on handheld devices that support embedded video.

In order to support best use of these emergent technologies, careful thought about effective applications in each discipline are needed. If you find one of the articles in this digital video issue interesting and would like to contribute to the discussion, we invite you to submit a follow-up commentary. Submissions should advance the conversation (rather than repeating previously noted perspectives) and meet the standards applied to other published work in the journal.

If it is accepted, your response will be published in the *CITE Journal* as a separate article with its own citation information, but will be linked to the original article in this issue that inspired your follow-up commentary. Since this is a digital journal, we have the capacity to incorporate video examples in commentaries that are accepted for publication and encourage you to include them.

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