Using Educational Video in the Classroom:
Theory, Research and Practice

By Emily Cruse
M.Ed., Curriculum Director, *Library Video Company*

> Without question, this generation truly *is* the media generation, devoting more than a quarter of each day to media. As media devices become increasingly portable, and as they spread even further through young people's environments— from their schools to their cars—media messages will become an even more ubiquitous presence in an already media-saturated world. Anything that takes up this much space in young people's lives deserves our full attention.
>
> —Kaiser Family Foundation

For 8- to 18-year-olds—dubbed Generation M for their media use by the Kaiser Family Foundation—television and video remain the dominant medium of choice. Turning our full attention as educators to this fact requires harnessing the power of educational video for teaching and learning.

Overview of Educational Video

Using audio-visual materials in the classroom is nothing new. Since filmstrips were first studied during World War II as a training tool for soldiers (Hovland, Lumsdaine & Sheffield, 1949), educators have recognized the power of audio-visual materials to capture the attention of learners, increase their motivation and enhance their learning experience. Both the content and the technology have developed considerably since that time, increasing the availability and the value of A/V materials in classrooms. Content has developed from instructional television (ITV) of the 1950s and 1960s, which allowed replay of taped lectures, through educational television (ETV), intended to complement classroom instruction rather than compete with it (Corporation for Public

Broadcasting, 2004) to educational standards-based videos designed specifically as supplemental classroom tools. Delivery technologies have also advanced, from filmstrips to cable television, to the versatility of VCRs, DVDs and laserdiscs. Finally, with the advent of digital technology, the field is evolving to newer and ever-greater potentials of adaptability in delivery.

The use of educational video and television in classrooms has risen steadily over the past 20 to 30 years, according to a series of studies conducted by the Corporation for Public Broadcasting. These surveys measured both patterns of use and teacher attitudes and expectations for outcomes. Not only is this technology widely used, according to the most recent study, but it is also highly valued as a means of teaching more effectively and creatively (CPB, 1997).

Perhaps the most significant survey finding that supports the value of these multimedia tools is the direct relationship between frequency of use and perceived student achievement and motivation. Among frequent users (teachers who report using TV or video for two or more hours per week), two-thirds find that students learn more when TV or video is used, and close to 70% find that student motivation increases. More than half of frequent users also find that students use new vocabulary as a result of video use.

According to a summary of current research and educator surveys, educational television and video:

- Reinforces reading and lecture material
- Aids in the development of a common base of knowledge among students
- Enhances student comprehension and discussion
- Provides greater accommodation of diverse learning styles
- Increases student motivation and enthusiasm
- Promotes teacher effectiveness (CPB, 2004)

This paper will be exploring the theory and research supporting the educational use of video and its implications for classroom practice. Unless otherwise noted, "video" is used as a unifying term to refer to this range of multimedia, A/V content used in schools, whether delivered by VCR, DVD or digitally.

How does video promote learning?

There is a pervasive belief, increasingly being challenged by research, that television and video viewing is a passive activity in which viewers are only superficially reactive to what they are watching, and one that will, over time, hamper or displace academic achievement. However, recent studies support the theory that viewing is instead an active process, one which can be "an ongoing and highly interconnected process of monitoring and comprehending" and "a complex, cognitive activity that develops and matures with the child's development to promote learning" (Marshall, 2002, p. 7).

Mayer (2001) explains that viewing, while it may appear to be passive, can involve the high cognitive activity necessary for active learning: "well-designed multimedia instructional messages can promote active cognitive processing in students, even when learners seem to be behaviorally inactive" (p. 19). The content and context of the viewing are both crucial elements for engaging students as active learners. Content should be age- and skill-appropriate, as "the content one watches may be a truer determinant of future academic success than the amount of time one spends watching television" (Stanovitch & Cunningham, as cited in CPB, 2004, p. 8). Other aspects of video that have been demonstrated to engage students in active learning are its address to

multiple forms of intelligence, its use of multiple modes for content delivery and its emotional appeal to viewers.

Multiple Intelligences

According to Gardner's multiple intelligences theory, an individual possesses, in varying strengths and preferences, at least eight discrete intelligences: linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, interpersonal, intrapersonal and naturalistic (Gardner, 2006). "The relative strengths and weaknesses among and between these intelligences dictate the ways in which individuals take in information, perceive the world, and learn" (Marshall, 2002, p. 8). This represents a great departure from the traditional view of intelligence, which recognizes only verbal and computational ability (Brualdi, 1996).

Gardner's theory suggests that the manner in which subject matter is conveyed will influence that individual's ability to learn, and that teachers need to take all of these intelligences into account when planning instruction (Brualdi, 1996). While traditional textbooks often take a primarily linguistic approach to learning, video's multiple modes can take a variety of approaches, such as aesthetic, logical or narrational, in addition to linguistic, thus addressing the needs of a broader range of learners: "These 'multiple entry points' into the content are especially valuable in a formal educational setting, as they offer greater accommodation to the multiple intelligences of a diverse group of students" (CPB, 2004, p. 7).

Multimodal Learning Styles

There are three widely accepted types of learning styles: aptitude-based, which draws on Gardner's theory of multiple intelligences; personality-based, measured by using the Meyers-Briggs test; and sensory-based, which looks to the modalities through

which students take in information (Pruitt, 2005; Miller, 2001). What all of these conceptions of learning styles express is the need to expand instruction beyond single modes of instruction.

There are three primary modalities through which people take in information: visual, auditory and tactile. Silverman (2006) relates these three modalities to how students process information, deriving three basic learning styles: visual-spatial, auditory-sequential and tactile-kinesthetic. Visual-spatial learners take in new information through visualization of the whole concept and think in holistic, often three-dimensional, images. Auditory-sequential learners, by contrast, think in words, processed auditorally, and generally learn in a sequential, step-by-step process. Finally, tactile-kinesthetic learners take in information through physical touch and sensation, and they benefit from demonstration or application more than from verbal explanations.

The benefits of video—where much of the content is conveyed visually—for visually-oriented learners is immediately apparent (CPB, 1997; Denning, no date). However, video also benefits auditory learners, with its inclusion of sound and speech, and can provide demonstrations not otherwise possible in classrooms for tactile learners.

Dual-Channel Learning

In fact, all students, both with and without a strongly dominant modality preference, benefit from instruction that includes video. Marshall (2002) cites the conclusions of Wiman and Mierhenry (1969), extending Dale's "Cone of Experience," that: "people will generally remember:

    10% of what they read
    20% of what they hear
    30% of what they see
    50% of what they hear and see" (pp. 7-8).

Video is a form of multimedia that conveys information through two simultaneous sensory channels: aural and visual. It often uses multiple presentation modes, such as verbal and pictorial representations in the case of on-screen print and closed-captioning (Mayer, 2001). This multiplicity means that video communicates the same information to students through simultaneous learning modalities and can provide students with "multiple entry points" (Gardner, 2006) into the content:

> The richness of these forms of information [images, motion, sound, and, at times, text] benefits learners, by enabling them "…to learn through both verbal and visual means, to view actual objects and realistic scenes, to see sequences in motion, and to view perspectives that are difficult or impossible to observe in real life" (Wetzel, 1994). …[M]ost researchers agree that "…when viewed together, each source provides additional complementary information," thus increasing the chances that comprehension will take place (Kozma, 1991)." (CPB, 2004, p.5)

Citing Wood (1995), Aiex (1999) notes that video can be used "to promote awareness of the interrelationship between modes (picture, movement, sound, captions)" (p. 2). Kozma (1991) found that the mix of spoken language, text, still images and moving images in television and video results in higher learning gains than media that rely primarily on only one of these symbol systems. Wetzel et al.'s 1994 review of research concluded that combining sound with either still or moving images resulted in more learning than simply adding motion to still images (cited in CPB, 2004).

Motivation and Affective Learning

One of the greatest strengths of television and video is the ability to communicate with viewers on an emotional, as well as a cognitive, level. Because of this ability to reach viewers' emotions, video can have a strong positive effect on both motivation and affective learning. Not only are these important learning components on their own, but they can also play an important role in creating the conditions through which greater cognitive learning can take place.

Marshall (2002) details three theories that explain how learning may occur via well-selected video "based on the ability of the entertaining media to engage the learner, activate emotional states, initiate interest in a topic, and allow for absorption and processing of information" (p. 7). Arousal Theory deals with how communication messages evoke varying degrees of generalized emotional arousal and how concomitant behavior can be affected while a person is in this state. Short-Term Gratification Theory deals with affective and motivational components such as enthusiasm, perseverance and concentration. Finally, Interest Stimulation Theory posits that entertainment promotes learning and creativity by sparking a student's interest in and imagination about a topic.

The visual messages of multimedia are processed in a different part of the brain than that which processes textual and linguistic learning, and the limbic system responds to these pictures by triggering instinct, emotion and impulse (Bergsma, 2002, as cited in CPB, 2004). Memory is, in turn, strongly influenced by emotion, with the result that educational video has a powerful ability to relay experience and influence cognitive learning (Noble, 1983, as cited in CPB, 2004).

How does research support the use of video in the classroom?

In the era of No Child Left Behind, any educational initiative must result in increased student achievement as measured by systematic, empirical research. Television has been evaluated for over 50 years for its educational value, and an ever-increasing body of research indicates that television and video are effective teaching tools, with positive outcomes in both academic and affective learning. A survey of this research conducted in 2004 by the Corporation for Public Broadcasting concluded that "children's

viewing of educational television has been shown to support significant and lasting learning gains" and that "a positive relationship has been found between childhood viewing of educational television and cognitive performance at both preschooler and college levels" (p. 2).

Early Literacy Development

The largest body of research has been conducted on the impact of educational television and video on young children and their early literacy skills.

Causal relationship between children's viewing of *Sesame Street* (the most extensively researched educational television program) and their academic and cognitive development has been documented for a period of over 35 years. Fisch (2005) summarizes studies conducted since the early 1970s, which "provide powerful evidence for the educational effectiveness of *Sesame Street*" (p. 11). Among preschoolers, heavy viewers of *Sesame Street* showed significantly greater growth in a variety of academic skills and in school readiness. These effects have long-term positive benefits for students, as shown by a "recontact" study that found middle and high school students who had watched *Sesame Street* and other educational TV as preschoolers had higher grades and showed higher academic self-esteem that peers who had not watched educational television (Anderson et al, 2001; Huston et al.; cited in Fisch, 2005).

A study on the impact of the early literacy program *Between the Lions* found that kindergarteners who watched this program outperformed their peers by nearly 4 to 1 on specific program content, and that they were also able to transfer this content to show significantly improved growth in key early literacy skills and overall reading ability (Linebarger, 2000). A later study concluded that watching the program, combined with supporting classroom and at-home activities, helped low-income children, children in

rural areas and children who speak English as a second language significantly outperform control groups on several key reading skills (Prince, Grace, Linebarger, Atkinson & Huffman, 2002).

In a study recently reported in the U.S. Department of Education's What Works Clearinghouse, the television program *Arthur* was shown to have a positive effect on the language development of English language learners.

Other Studies

A variety of other studies have supported the use of video with older students and in a variety of content areas and social skills. Some of these include:

- A study by Rockman et al. (1996) of the academic impact of home and school viewing of *Bill Nye the Science Guy* showed that students who watched the program were able to provide more complete and complex explanations of scientific concepts after viewing the show. Additionally, the gaps in knowledge base between boys and girls and between minority and majority students were smaller and closer to parity after viewing the program.

- A study of the impact of *Cyberchase* on children's problem-solving skills found that viewers outperformed nonveiwers in solving problems and produced more sophisticated solutions (Fisch, 2003).

- In two unrelated studies, the use of video to "anchor" instruction to a shared classroom experience resulted in improved vocabulary use, greater understanding of plot and characterization and increased ability to draw inferences based on historical information (Barron, 1989).

- A six-week study on the use of instructional television with eighth grade students found that students in the classes which included the television programming

outperformed the control groups in test scores, writing assignments, in variety and

creativity of problem-solving skills, and in their engagement in class discussion

(Barnes, 1997).

How can video address the needs of special populations?

Video use is an effective educational tool for all students, but its positive effect on

special populations of students is gaining greater attention all the time. According to a

survey by the Corporation for Public Broadcasting, these media are "highly valued as

teaching tools" and "seen as especially effective for reaching visual learners and special

populations" (CBP, 1997, p. 12). More than half of teachers surveyed describe TV and

video as "very effective" for teaching students with learning disabilities or economic

disadvantages.

Denning summarizes the benefits of video to a range of special student

populations:

> Videos may help to promote learning in students with high visual orientation in
> their learning styles. Video can also provide visually-compelling access to
> information for many learners with learning difficulties who might miss learning
> opportunities provided solely by print-based materials. In this respect, videos
> provide important learning opportunities to students working in a second
> language. (p.2)

As Barron (1989) argues, not only can video create learning contexts that would

not otherwise be accessible, "in some situations video is even superior to a field trip …

because the video can be replayed and reviewed as often as necessary" to ensure learning

by students with learning disabilities or who are otherwise at-risk for poor school success

(p. 3).

There are numerous advantages for such "at-risk" students when instruction is supplemented by the use of video:

> First, [video-based contexts] provide rich sources of information with opportunities to notice sensory images, dynamic features, relevant issues, and inherent problems. Second, they give students the ability to perceive dynamic moving events and to more easily form rich mental models. This advantage is particularly important for lower achieving students and for students with low knowledge in the domain of interest. Third, video allows students to develop skills of pattern recognition which are related to visual and auditory cues rather than to events labeled by the teacher. In sum, video images are ideal for creating a common experience for the teacher and learner that can be used for 'anchoring' new knowledge. (Bransford et al. cited in Barron, 1989, p. 3)

For students learning English as a second language, video and film demonstrate communicative language within a language environment and cultural context (Wood, cited in Aiex, 1999). Video, especially film, provides a social context for English language learners; it can be played either with the sound on, so that students hear the language being spoken, or alternatively, with the sound off, so that learners can use their own language skills to provide the dialog or narrative.

How can video support the development of 21st-century literacies?

Over the past decade, researchers have increasingly turned their attention to the question of what "literacy" means in this era of rapidly expanding information and communication technologies, particularly the Internet. What skills do students need to navigate, interpret and assess information in a world no longer primarily dependent on print as a means of communicating? These "new literacies" are an evolving target, as new technologies are appearing at a rapid pace, and identifying what literacy skills students need to successfully "read" and use such tools as multimedia web pages, video editors,

virtual worlds, etc., has provoked a great deal of theorizing (see Semali, 2001; Coiro, 2003; Leu, Kinzer, Coiro & Cammack, 2004).

An interesting pattern to emerge is renewed attention to literacies that were identified long before the current explosion of digital media, but that are now being reprioritized as critical 21st-century skills. While the definitions—and the exact boundaries drawn between literacies—vary slightly, organizations such as the The Pacific Bell/UCLA Initiative for 21st Century Literacies, The New Media Consortium (NMC), and NCREL (North Central Regional Educational Laboratory) all agree that the ability to learn from and through multimedia like video remains central to functioning as a fully-literate individual, and all prioritize visual and media literacies as crucial skills. The PB/UCLA Initiative includes visual literacy and media literacy as two of its four central skills, while the NMC's New Media Literacy & Learning Initiative "centers on the abilities and skills where aural, visual and digital literacy overlap" (NMC Projects). NCREL's *enGauge* framework for understanding 21st-century skills includes visual literacy as a central component.

Although students spend more than a quarter of each day engaged with various forms of media, and television in particular (Rideout, Roberts & Foehr, 2005), research indicates that mere exposure is not sufficient for students to acquire significant visual or media literacy (Messaris, 2001). Rather, explicit instruction is required to equip young people with the critical discrimination skills they need.

Visual Literacy

When he coined the term "visual literacy" in 1969, John Debes explained that it "refers to a group of vision-competencies a human being can develop by seeing and at the same time having and integrating other sensory experience. The development of these

competencies is fundamental to normal human learning" (cited in International Visual Literacy Association, no date). In the concise definition of the Visual Literacy Program of Pomona College, visual literacy "means the skills and learning needed to view visual and audio-visual materials skeptically, critically and knowledgably" (Stonehill, no date). Teaching students to become visually literate implies perceiving video in the classroom not merely as a conveyor of content knowledge, but also as a learning object productive of its own visual meanings.

In a study of elementary students in Australia, Callow (2006) concluded that students' intuitive understanding of such visual elements as color, salience and layout needed to be scaffolded through explicit instruction: while "many students have some understanding of visual features, …this is not developed into a richer systematic understanding, where similar concepts might be transferred to other literacy tasks." In his review of the relevant literature, Callow found a lack of substantial research and documentation of "both the metalanguage of visual texts and the pedagogy for teaching about them," indicating that this is an area where further work is required.

Teaching students to become visually-literate consumers of media also develops their abilities to produce their own multimedia objects, literate as both "readers" and "writers" in a visual language. While historically, research and resources have been more focused on the development of print literacy, the development of visual literacy is in fact a means of supporting more traditionally defined literacy: the application of visual literacy skills will assist students not only "[to] critique their own visual products, but also … to interrogate other texts to explore intended audience, purpose, emotional effect and ideological positions" (New London Group, cited in Callow, 2006). "Although visual

literacy is surely valuable for its own sake, its potential broader ramifications lend additional urgency to the argument for visual education" (Messaris, 2001).

Media Literacy

As with visual literacy, media literacy expands the concept of what constitutes a "text" to include aural and visual messages. As defined by the Center for Media Literacy,

> media literacy is a 21st century approach to education [that] provides a framework to access, analyze, evaluate and create messages in a variety of forms. [It] builds an understanding of the role of media in society, as well as essential skills of inquiry and self-expression necessary for citizens of a democracy. (Thoman & Jolls, 2005)

Television literacy, though sometimes broken out as a separate literacy (Semali, 2001), is more commonly recognized as a critical component of the broader media literacy (PB/UCLA, no date). Video technology is an essential tool for bringing a wide range of multimedia messages into the classroom where they can be analyzed and evaluated in a shared learning experience.

Media literacy instruction has been shown to have a positive correlation with demonstrable academic improvement in core subject areas. In a comparison study between two 11th-grade English classes, one of which incorporated extensive critical analysis of print, audio and visual media, researchers found that the media literacy instruction resulted in improved reading and writing skills across all forms of text (Hobbs & Frost, 2003). Additionally, preliminary results from a three-year study of a new media-literacy program funded by the U.S. Department of Education indicate that media literacy can play an important role in improving student performance in core-curriculum subjects (Gregorian, 2006).

Although media literacy is not yet a widely-implemented component of standard school curriculum, it is, in the words of David Martison (2004), "no longer a curriculum option":

> If schools are to meet the challenges presented during this revolutionary postmodern age of communication, the entire educational establishment…must be committed to responding in an anticipatory and creative manner. A commitment to aiding the development of a media-literate population must become a central priority. (p. 158)

How is video best used in the classroom?

Successful and productive school use of television and video has increased dramatically over the last decades. As the technology continues to grow both more sophisticated and more user-friendly, teachers continue to become more adept at integrating these media into their instruction. Over a period of 20 years, the Corporation for Public Broadcasting conducted surveys of classroom uses of television and video that reveal increased use of and satisfaction with video in the classroom. In the most recent survey, 92% of teachers said that using TV and video helped them teach more effectively, and 88% said that "it enable[d] them to be more creative" in the classroom (CPB, 1997).

As with all educational technologies, the value of video relies on how it is implemented in the classroom. Reviews and meta-analysis of the research indicates that positive learning and affective outcomes are greatly enhanced and extended when the video is integrated into the rest of the lesson (CPB, 2004; Mares, 1996). Effectively integrating video into classroom instruction involves preparation and activities before, during and after viewing (Reeves, 2001; Rogow, 1997; National Teacher Training Institute, undated).

Purpose and Expectations for Viewing

Teachers can prepare for using video by previewing the content, establishing clear purposes for viewing and deciding what selections will best support that purpose. The value of video "is highly correlated to its integration within the curriculum—in other words, how closely the content fits into the overall instructional sequence" (CPB, 2004, p. 11). For instance, video may be used at the beginning of a unit to pique interest, during a unit or lesson to bring demonstrations into the classroom that might not otherwise be possible, or as a means of reviewing or reinforcing content.

Supporting students to engage with video as active learners requires creating the right setting for such learning to occur. While this may seem an obvious truism, a six-year study of mass media usage in two Massachusetts school districts reveals that film and video are still often used for non-optimal purposes, including filling time, keeping students quiet, as a break from learning or as a reward for good behavior (Hobbs, 2006). Using video as "edutainment" in this way reinforces "the passive viewing and unquestioning acceptance of received material that accompanies growing up in a video environment" (Paris, 1997, p. 2).

Setting expectations for students and providing a context for the activity, beneficial with any learning tasks, may be especially crucial for viewing of video with content that is highly emotionally-charged. Denning (no date) fears that without proper instructional context and guidance, "video, like television, may condition viewers to be insensitive or to feel helpless in the context" of events being watched (p. 1).

Selecting Video Content

Selecting effective video is an essential component of integrating this medium into practice and realizing the promise of multimedia in the classroom. In reviewing the historical, political and economic contexts of each major classroom technology over the

past century, Fabos (2001) concludes that one of the most significant factors in the success or failure of an educational technology is the quality of the content, rather than the technology itself. Selecting video that has strong, visually-rich educational content is a critical element for maximizing the effectiveness of video.

Video is a visual medium, and optimal use capitalizes on the strengths of its visual material. This includes providing visual demonstrations or evidence, dramatizing events and concepts, and appealing to the emotions. Educational video with instructional strategies and cognitive modeling traits embedded in the video itself can aid in student comprehension. Examples range from zooming in on details, to providing titles and other attention-drawing graphics, to animations. Videos with closed captioning can further promote learners' reading fluency and motivation to read (Lin, 2003).

Denning (no date) offers the following suggestions of positives to look for when evaluating videos:

- Variation in the presentation
- Humor
- Age-appropriate narration and developmentally-appropriate thinking skills
- Chunking, or organization in sections
- Provision of meaningful examples
- Posing of open-ended questions
- Opportunities for students to carry out individual thinking
- Opportunities for extension
- Teacher guides outlining possibilities for previewing or extension activities.

Video becomes less effective if the selections shown depend too closely on non-visual elements of video and thus exploit the weaknesses of the medium by presenting abstract and non-visual information, relying too much on a "talking heads" style of conveying information or presenting intellectual arguments not backed up with physical evidence (Hampe, 2006). Since video conveys information that is both auditory and visual, these two modes must work in concert for video to be most effective. Overly-dramatic sound

tracks, visuals and narration that are not supportive of one another, and excessive use of still frames or slides can all detract from the educational message.

New Technologies: The Age of Video-on-Demand

In 1997, a survey by the Corporation for Public Broadcasting indicated that a growing number of teachers (93%) used TV programming on tape all or most of the time, rather than relying on live television, for the ease and benefits of videotape medium, including convenience, the ability to show the same tape to multiple sections of a class and greater control over how the material is presented. Today, video continues to have "significant staying power" in classrooms, although with new technology, "video is finding its way into schools through different paths," according to market research by Grunwald Associates (Branigan, 2005).

One of the most exciting of those new paths is Video-on-Demand (VOD) systems, tools that make unprecedented numbers of videos available to classroom teachers exactly when and as they want them. The videos are digitized, then stored on a computer server, where they can be accessed at any time by teachers or students. This may be a local server, housed at either an individual school or district, and accessed through the school network. Alternatively, the content may be stored at a non-local site and streamed over the Internet, though this may sometimes overload the available bandwidth, causing the video to be jerky.

Video-on-Demand does away with many of the inconveniences of playing video in either cassette or DVD form: locating the desired content in hard copy in a library or for purchase, reserving that title and the equipment needed to play it on, cuing it up prior

to class or between classes, switching hard copies to change to a new program, etc. Instead, teachers can search for the content they need on any networked computer, find exactly the content they need from a variety of sources and play it at their convenience, either as part of a planned multimedia lesson or by seizing the "teachable moment."

Digital delivery of video allows for far greater flexibility of searching than is possible with hard copy. Because the content is stored digitally, it can be indexed and metatagged by educators to provide searchable indexes of every program by not only showing summaries, but also key curricular concepts, making it possible to search by keyword for the exact content contained within a video or video segment. Using a VOD system, teachers can easily locate targeted content, searching by keyword, subject area or even state educational standards.

As Denning (no date) points out, one of the best ways of avoiding what he terms "television response," or passive consumption of media, is to exploit the ability of video to be shown in short, relevant segments and to use segments from multiple programs. However, editing together a precise sequence of video clips onto one video cassette, as he suggests, can be a cumbersome and time-consuming process when using only a video recorder. Digital video is designed to facilitate this process, making it an easy and quick process to locate, segment and arrange clips to suit the exact needs of a particular lesson.

In fact, the ability of VOD systems to assist teachers in locating and presenting short, targeted clips of no more than two to five minutes in length dovetails exactly with expert recommendations for video usage: "Most educational experts agree that video is best shown in short segments so as to maximize learners' concentration" (Shephard, 2003, p. 296). Video-on-Demand facilitates the process of embedding video, or threading brief segments throughout a lesson, a strategy beginning to be supported by research (for

example, see Chambers, Cheung, Madden, Slavin & Gifford, 2006). Digital delivery

frees classroom practice so that students can control their own watching of clips

supporting a lesson, repeating and reviewing as needed for comprehension. In one study

of two science classrooms, researchers found that the use of digital clips significantly

promoted learning in three critical ways:

> Firstly, the computer environment afforded student control of the pacing of the
> POE [predict-observe-explain] tasks…[and] also contributed to a high level of
> ownership of responses….Secondly, the computer-based digital clips afforded
> new opportunities for students in the crucial observation phase of the POE process
> by providing a refined tool for students to make detailed observations of events,
> enhancing the quality of observations on their predictions….Thirdly, the real-life
> physical settings depicted in the video clips were interesting and relevant for the
> students and helped them to feel comfortable and confident in voicing their
> opinions…(Kearney, 2002)

Collecting clips into playlists or integrating them into a multimedia lesson plan makes the

creation of such learning experiences easier than it has ever been before.

It is clear that this new technology opens many new opportunities for learning that

are just beginning to be explored. As the documented strengths of film, television and

video are made more and more available and accessible through Video-on-Demand

systems, the potential for learning and exploration opens up before us.

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