

To Play or Not To Play: Leveraging Video in Medical Education

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Abstract

While video is a powerful teaching and learning tool because it can influence knowledge, skills, and attitude formation effectively and reach learners with various learning and communication styles, there are pedagogical, technical, and copyright considerations. Instructors must know sources of appropriate videos, select effective video segments, apply various strategies for incorporating video triggers into the overall

educational process, refine the message, overcome technological obstacles, and comply with copyright laws. One might ask, "Is using video triggers to improve your teaching worth it?" "Yes!" Numerous studies demonstrate that using video in many medical education settings supports and enhances learning and offers a bigger advantage in contrast with traditional methods.

*I*t's another conference, and the group begins to talk and network while filtering into the room. Out of the blue, a baby cries. Startled, people look around the room and notice on the screen at the front of the room a mother's worried look as she reads 105.7°F on the thermometer in her hand. The audience has gone quiet; sidebar conversations quickly subside as all heads turn.

After the 90-second video¹ (Texas Association of Healthcare Interpreters and Translators public service announcement [<http://youtu.be/89ny6vtP4gQ>]), the speaker walks to the front of the room to begin the presentation. Not only does the speaker have the full attention of everyone in the room, but also the audience understands implicitly that this is not "just another lecture," and they are eager to begin. Engagement is an important part of the power of using video triggers in education.

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Using video triggers or vignettes of 1 to 5 minutes in length to engage trainees effectively is not just a matter of playing video clips in class. Instructors must know sources of appropriate videos, select effective video segments, apply various strategies for incorporating video triggers into the overall educational process, refine the message, overcome technological obstacles, and comply with copyright laws. One might ask, "Is using video triggers to improve your teaching worth it?"

Why Should I Play It?

The Power of Video

A resident is obviously unhappy receiving feedback that you have just provided related to a parent complaint that she is "uncaring." The resident is defensive and outlines her frustrations with the expectations of her and forcibly states the underlying reasons for her apparently uncaring behavior. You now direct the group of faculty attending your workshop on giving feedback to discuss how they would handle such a situation and prepare them for a presentation on advanced feedback techniques (video clip of a resident responding to feedback and questions about her "uncaring" attitude [http://streaming.osu.edu/mediawww2/osumc10/FTSP/ps_case07.wmv].)

Video is a powerful teaching and learning tool because it is one of the few mediums that has been used effectively in many facets of medical education face-to-face teaching and at a distance. A search of PubMed using the phrase "use of video in medical education" resulted in articles dating back to the 1960s about topics such as knowledge transfer, diagnostic skill development, and clinical skill development.

Visual images offer several advantages over verbal communication.² Video can:

- Present more information in a given amount of space and time
- Simplify complex concepts
- Clarify pieces of abstract language-based concepts
- Demonstrate concepts/subjects that are in motion and/or relate to one another
- Be more efficient and effective at getting audience attention.

Research shows that the incorporation of images into the educational process increases learning retention.³

A study of teaching methods by Dwyer⁴ demonstrated that telling alone, showing visually alone, and combined telling and showing all resulted in at least 70% recall at 3 hours. However, 3 days later, retention was 10% for telling alone and 20% for showing alone, versus 65% for combined telling and showing.²⁻⁴

What’s Available Out There?

Many types of video clips that could be useful in medical education settings are already available, often for free. The depth and breadth of available video are truly staggering. For example, think of incorporating a video clip of a group of medical students singing and dancing *à la* MTV, only their subject is diagnosing Wenckebach (video “Diagnosis Wenckebach,” <http://youtu.be/GVxJJ2DBPiQ>).⁵

We have used this video as a break during an afternoon workshop to energize the audience and spark a rich discussion of the pros and cons of encouraging students to create and share educational videos on YouTube. Mentoring students as they create such pieces to improve accuracy and develop their professional identity may provide additional opportunities to teach.

Videos can be created for specific purposes, particularly as the cost of production and the familiarity with this process spread. For example, videos can be specifically created with real people (students, trainees, faculty, actors, and others) or with animation to deliver intended messages or demonstrate important concepts and behaviors.

Already prepared videos may also serve important purposes. There are many sources of prepared videos suitable for medical education. Universities, state organizations, and medical specialty associations have video collections. TABLE 1 lists video clips and segments that are freely available on the Internet.

How Do I Choose What to Play?

Remember It’s Fractal

Eerie music plays as a young boy sleeps. Underneath the bed, in the dark, the eyes of a monster are watching. As the monster’s shadow grows, the boy wakes, screaming, scaring the monster, who trips on a soccer ball and falls on some jacks. The lights come on. The boy is a simulator and the student monster receives feedback (video, “Monsters in Training,” <http://youtu.be/Z9C0yVgTcbs>).⁹

In 1998, at the beginning of the Internet age, Siegfried Meryn¹⁰ proposed that effective use of multimedia is quite relevant for medical communication. Stimulus videotape, when used effectively, provides five major elements of “fractal” communication and thus actively engages the learner on multiple levels. Meryn emphasized that the multimedia/Internet generation attends to “fractal communication.”¹⁰ Fractal communication is “information in a nutshell,” served up in modules with five major elements (TABLE 2).

Video triggers can be used effectively to (1) gain the learners’ attention, (2) provide a visual lesson or reinforcement of a concept, and (3) evoke an emotional

TABLE 1 VIDEO CLIPS AVAILABLE ONLINE	
Source, Reference	Description
New England Journal of Medicine (NEJM) Videos in Clinical Medicine ⁶	NEJM hosts videos in clinical medicine (showing videos of medical procedures) and a weekly Image Challenge.
TED videos ⁷	TED is a nonprofit organization devoted to Ideas Worth Spreading. TED began in 1984 as a conference, bringing together people from three worlds: technology, entertainment, and design (TED). Since then, its scope has become broader and now includes the award-winning TEDTalks video site. TED videos have high-quality content and production values. They are usually 15–20 minutes long (vs. YouTube videos, which are 2–5 minutes).
YouTube ⁸	YouTube is a video-sharing website that includes edited clips from popular TV programs and movies. Because of its popularity, educators in disciplines such as public health and medical education leverage YouTube to distribute videos. Medical students have posted many entertaining videos illustrating medical conditions.

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TABLE 2 FRACTAL COMMUNICATION

Fractal Communication Element	Description
Novelty	Learners engage in what is new. Tying a message to new or contemporary topics, characters, or personalities increases the chance of getting the message across.
Utility	Trainees attend to what they find useful, specifically what they will use right away.
Emotional impact	As Dan and Chip Heath propose in their 2004 book <i>Made to Stick</i> , people care about ideas the most when the ideas inspire an emotion. People feel for other people, not for abstractions."
Conversational	Trainees are most receptive to information when the topic is of interest.
Entertainment	Most people prefer and desire to be entertained.

response. "Messages also become stickier when they come in the form of a story that elicits emotion in readers or listeners. Patients' stories are what make the acquisition of medical knowledge compelling. They serve as the scaffolding on which facts and concepts can be organized and reinforced."¹²

Play To Teach

Examples of Video-Based Activities

Video triggers can be very useful in demonstrating patient findings and physical examination methods,¹³ procedural skills,¹⁴ and communication skills¹⁵; video clips can be particularly useful in providing examples and context related to other Accreditation Council for Graduate Medical Education (ACGME) competency domains (TABLE 3).

One of the challenges when using video triggers is determining how to encourage the learner to interact fully with the video activity. A strategy for large groups is to

direct learners to write their thoughts and then compare them in pairs or small groups. After the small group discussion of concepts generated by the learners, the instructor can share thoughts about the meaning. The use of video examples in the domains of professionalism and communication allows the discussion to move from "what did you do that was right or wrong?" to "how could the participants in the video have done better?" and "what did THEY do that was right or wrong?"

It is possible to derive multiple different instructional uses from the same video clip. For example, a video clip developed with the user-friendly online program XTra-normal (<http://www.xtranormal.com/>) has been used to facilitate discussions of professionalism values in a workshop on communication and as part of a workshop on patient safety. The potential use of such a video clip is limited only by the imagination and needs of the instructors.

TABLE 3 USE OF VIDEO CLIPS RELATED TO ACGME COMPETENCY DOMAINS

ACGME Domain	Videos Provide Examples of
Medical knowledge	Physical findings, organization of concepts (concept maps), and the possibility of "breaking down" responses in a case to find the break(s) in medical knowledge that leads to problems and poor outcomes Videos also allow consistent demonstration of findings over time and, to different learners, for comparative evaluations.
Patient care	Historical statements, procedures, physical and kinesthetic treatments, and safe portrayal of "high emotion" situations
Practice-based learning and improvement	Visual examples of data analyses, statistical methods, illustration, and discussion of improper techniques
Communications	Examples of effective communication methods and communication problems
Professionalism	Demonstration of lapses in and challenges to professionalism
Systems-based practice	Demonstration of medical systems and providers in action and interactions

Do I Have the Right to Play It?

Copyright Issues in Teaching

By making judicious use of the fair use exception to copyright law, educators can use video clips for teaching and still stay within the law. Depending on the educational setting, copyright exceptions for face-to-face teaching or distance learning may also apply, but fair use is the broadest and most useful exception for a variety of instructional scenarios.

Copyright law gives the exclusive rights of reproduction, preparation of derivative works, distribution, public display, public performance, and performance by means of digital audio transmissions during the duration of the copyright term.¹⁶ To balance these broad rights, the copyright law also contains a number of exceptions. Under US law, one of the foremost exceptions is fair use, which allows for some use of copyrighted material without permission for some socially useful purposes.

The fair use statute lists a number of purposes for which fair use may be allowed, including “criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research.”¹⁷ The list is intended to be descriptive. It gives examples of the kinds of uses that may be fair, but it is not a definitive list. In order to do a fair use analysis, the law requires that the following four factors be used to determine whether the use is fair¹⁷:

1. The purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;
2. The nature of the copyrighted work;
3. The amount and substantiality of the portion used in relation to the copyrighted work as a whole;
4. The effect of the use upon the potential market for or value of the copyrighted work.

Consideration of these factors should not be a mechanical tallying but rather a balancing of all four factors. Many educators find it helpful to use a checklist, such as the one developed by the Columbia University Copyright Advisory Office, to arrange their thoughts about the fair use factors in an organized way.¹⁸ A checklist shows the different attributes and issues based on statutory law, court cases, and practices in the community that make it more or less likely that a use is fair. It can be helpful to fill out the checklist and sign and date it in order to have a record of decisions made and to show a good faith process. Careful fair use analysis needs to be done when adding video to any online learning management or course reserve system.

The video “What is Fair Use” shows a graphical representation of the process of learning about and balancing the factors.¹⁹ Not every educational use of

copyrighted material is a fair use, but thoughtful consideration and application of the fair use factors can allow educators to take advantage of this copyright exception in a reasonable way.

Will it Play? Anything That Can Go Wrong Will Go Wrong

Delivering the Content

The movie doesn't play...there is no sound...the movie is jerky and pauses...the video is not in PowerPoint.... Where is the movie?.... All that is on the screen is a white/black rectangle.... Using video in a presentation requires some preparation and care. All the above-mentioned problems can happen to any presenter. It is important for anyone who wishes to use video in a presentation to understand that video makes high-level demands on computer systems, software, and people. It is always best to test the video on the equipment that will be used for the actual presentation, whenever possible. When that is not possible, there are several ways to maximize the possibility of success.

Unlike images, which become a part of the slide, video (and audio) inserted into a PowerPoint presentation (Microsoft, Redmond, WA) is not actually embedded in the PowerPoint file. This means that if PowerPoint files containing videos are created on one computer and moved to another computer for the presentation, all associated files must be transferred. Additionally, not all video file types will play in PowerPoint. Often, incompatible movies require additional application software.

To help ensure that the video works flawlessly, remember the Three Ps

- Preliminary actions
- Prepare (for the worst)
- Practice (preferably on the actual presentation equipment)

Preliminary Actions

Know where files are saved, how to use hyperlinks, and most importantly, make friends on technical support teams.

Sending the presentation ahead of time enables the technical support staff to load it into the presentation computer and check it. In many cases, they will be familiar with the pitfalls of showing videos in their venue and will make sure the videos are linked properly and can check the audio. A speaker ready room, which is available at many larger meetings, is invaluable for testing the presentation.

There are many ways to insert or link a video to a PowerPoint file. Each method has strengths and weaknesses; however, they all rely on having access to the video file or Internet URL for the video. One of the easiest ways to ensure success is to save the PowerPoint file and the linked video files all in the same folder. To transfer the files,

TABLE 4 COMMON PROBLEMS IN USE OF VIDEO TRIGGERS IN PRESENTATION

Problem	3 P Steps
The movie doesn't play	Hyperlink doesn't work? <ul style="list-style-type: none"> • Make sure hyperlinks work before the presentation. Make certain the hyperlink is linked to the correct address.
Video (not) in PowerPoint	Have a backup method <ul style="list-style-type: none"> • If possible, have a backup. Put an extra copy of the video on the desktop, pause the PowerPoint, play video manually, and go back to the PowerPoint.
There is no sound in the movie	Check audio settings and equipment <ul style="list-style-type: none"> • Make sure the computer is not muted. • Beware of recording software. • Check compatibility before beginning the presentation, if possible.
The movie is jerky and pauses	<ul style="list-style-type: none"> • This may be due to a computer that does not have the graphics capability to run the video. Reduce the size of the video viewing area.
Still no video	
-Where is the movie?	<ul style="list-style-type: none"> • Review hyperlink information
-White rectangle	Check the movie file name <ul style="list-style-type: none"> • It may be too long (>128 characters).
-Black rectangle	Usually the problem is the computer is not compatible with the video. <ul style="list-style-type: none"> • Test the video on the computer ahead of time to prevent this problem.

zip that folder and send it to the technical support staff at the presentation venue. As a backup, copy the folder and all the files to a portable drive.

When using an Internet video clip, ensure that Internet access will be available during the presentation. Hyperlink to the video's online location and play it from the internet during the presentation. Of course, in this scenario, if the internet connection is broken, the video will not play.

Prepare (For the Worst)—Know What To Do if It Won't Play

In essence, "preparing for the worst" at the most basic level means being prepared for the video to not play in the middle of a high-stakes presentation.

To be prepared for failure:

- Practice to ensure the video works
- Practice what to do when the video does not work
 - What to say as people try to fix the problem
 - Know what to say to make the teaching and learning points for the video, even without the video

A list of common problems in presenting video triggers is presented in TABLE 4.

Practice

Arriving at the presentation venue only a few minutes early with portable drive in hand and informing technical support that there is video in the presentation is tantamount to ensuring the worst will happen (TABLE 4). Conversely,

sending presentation files ahead of time, carrying backup files, and practicing at the presentation venue on the day of (or day before, if possible) the presentation will mitigate most of the worst things that can happen.

- Make certain that the video plays
- Make sure to check the audio levels
- Make certain all the files are on a portable drive
- Know what to do if there is a problem, before the presentation begins

While video triggers may have an impact, they may make a presentation technically more difficult. It is demanding for equipment, and despite improvements in computer graphics, there remains the possibility of having a blank screen where the video should be. Even when compressed by making the viewing size smaller or removing some of the definition, files can be large and difficult to e-mail. However, despite the pitfalls of using video, we have found it to be a great way to increase the effectiveness of presentations.

Conclusions

Is using video triggers to improve your teaching worth it? Based on our experience, the answer is a definite YES!

While the ability to combine images with sound is now more than a century old, this process still remarkably engages the audience in a way that mere description alone, sound alone, or static image alone cannot. Faculty,

administrators, and learners find that multimedia electronic learning enhances both teaching and learning. These advantages can be categorized as targeting either learning delivery or learning enhancement.²⁰ Video clips are particularly useful in eliciting emotions and ensuring engagement.¹⁰ Although questions exist about the impact of video in education, numerous studies demonstrate that video and multimedia tools support and enhance learning, offering a bigger advantage in contrast to traditional methods.

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