Considerations of Student Engagement and Cognitive Load:

Educational Videos Best Practices

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Author’s Note

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Abstract

This article discusses and integrates best practices found in the literature for the creation of educational videos in post-secondary online and blended courses. Situated in the context that educational videos need not be videographic masterpieces to be effective, course instructors can be moderately savvy with computer technology yet bring teaching excellence into their video creations. In reading and summarizing the literature on the topic of educational video creation, I found the information to naturally organize itself into four topics of best practices: establishing learning objectives; working with a script; brevity; and strategies for maximizing student engagement.
Considerations of Student Engagement and Cognitive Load: Educational Videos Best Practices

Educational videos are often the primary mechanism for content delivery in post-secondary online and blended courses. While the medium itself is fitting for an asynchronous, distance learning environment, it is not the determining factor of student learning and performance outcomes. However, educational videos that are created with adherence to guidelines, especially those backed by research, offer the greatest potential of being an effective pedagogical tool (Brame, 2016).

There is a large and growing body of literature on the topic of educational videos, including their alignment with learning theories and impact on student outcomes. This article aims to bring together advice from recent and credible literature on the topic, which may be useful for any low, moderate, or highly tech-savvy instructor or development team wishing to develop educational videos for the purpose of content delivery. A summary of the literature seems to naturally organize itself into four topics of best practices: establishing learning objectives; working with a script; keeping videos short; and strategies for maximizing student engagement.

**Begin with Learning Objectives**

An educational video is usually short, concise, and part of a series covering a larger volume of related content; therefore, each video needs to be organized and on-task. Well-constructed learning objectives can maximize time and effort and help ensure the video is well-suited to the intended audience (Weeks & Davis, 2017). Learning objectives can be the result of a needs assessment or focus group (Blummer & Kritskaya, 2009). They help determine video type – factual, procedural, or otherwise – and establish a roadmap for production. According to Luongo (2015), who likened the minimal-editing screencasting environment to the traditional
chalkboard, even in this more ad-lib situation, knowing your objectives before recording is essential for staying focused.

The cognitive theory of multimedia learning described by Mayer and Moreno (2003) depicts the human working memory (short term memory) such that it processes auditory and visual information separately, which they explained is at risk of cognitive overload when processing demands of a learning task exceed working memory capacity. Learning objectives facilitate the concept of weeding, which is one means for reducing cognitive load by the removal of interesting yet unnecessary information (Brame, 2016; Mayer & Moreno, 2003).

**Work with a Script**

Most scholars encourage using a script for enhancing structure, clarity, and professional quality of an educational video (Weeks & Davis, 2017). Creating an unscripted educational video is certainly possible and perhaps even preferable in recordings of a more spontaneous nature; however, using a script for a video of factual or procedural content promotes accuracy and consistency. At a minimum, a detailed point-form agenda can guard against rambling and tangents by the narrator. This is important, because educational videos are intended to be viewed more than once as students engage with the content throughout a course, for which rambling and tangents can be a deterrent.

The video script can be used for captioning (i.e. text overlays occurring synchronously with the audio narration). It can also be made available for students to read online or download as an additional resource, which supports various learning styles and situations of low bandwidth. The video script is informed by, and aligned with, the learning objectives mentioned previously, and is best created via collaboration among colleagues who can offer varying expertise and viewpoints. It may likely require several edits to reach a final version, which would
include exposing phrases that read well on paper but lack fluidity when spoken (Kern, 2013; Weeks & Davis, 2017).

**Less is More: Keep it Short**

There is a consensus within the literature that brevity of an educational video is important for mitigating excessive cognitive load. One strategy to achieve this is *segmenting*, i.e. breaking video content down into manageable chunks (Mayer & Moreno, 2003). According to Brame (2016) this can be accomplished by limiting the video length overall, but also with embedded elements, such as “‘click forward’ pauses within a video”. Each video should focus on just one small portion of content, and a videos series should be arranged in a logical sequence, such as progressing from simpler to more complex concepts (Oud, 2009).

Guo, Kim, and Rubin (2014) collected data from nearly seven million video-watching sessions on a popular MOOC platform and found that six minutes was the median length of time that viewers engaged with a video, regardless of the total length of the video. From this, Guo et al. (2014) recommended limiting the length of an educational video to six minutes or less. Rice and Farmer (2016) administered a questionnaire and conducted a focus group to find out how students at University of Northhampton (UK) use educational videos. The authors reported that students thought five to ten minutes was the optimal length for a video, and definitely no longer than ten minutes.

Because students will likely be watching a video more than once as they work through a course (a point earlier correlated to the importance of having learning objectives to drive video production), video lengthiness may be a hindrance, which ultimately will affect its usefulness as a learning resource. Another benefit of shorter videos is the inevitability that they will need to be
updated, revised, or even completely overhauled over time. It is easier to work with and re-create shorter videos, as compared to longer, more comprehensive productions.

Maximize Student Engagement

Educational videos are meant to be viewed away from a physical classroom, therefore they require incorporation of strategies to pique student interest and attention, as well as to manage cognitive load. According to Guo et al. (2014), video length is the most significant factor of viewer engagement; however, the literature reviewed for this article discussed numerous additional guidelines relating to a video’s relevancy, active learning opportunities, and overall design strategies aimed toward maximizing engagement.

Relevancy

Video content should align with the learning objectives of the online or blended course, as well as connect with real-life experiences (Blummer & Kritskaya, 2009).

Active Learning

Simply watching a video can be a passive endeavour, yet it is possible to create active learning opportunities, such as interactive quizzes, games, and screen manipulations. For example, Blummer and Kritskaya (2009) suggested a two-window screen with one being used for didactic content, and the other for problem solving.

Design

Video graphics should be simple, uncluttered, and have a consistent style (Oud, 2009). Signalling – the use of text (such as captions) and symbols (such as arrows) – can help direct a viewer’s attention to important information (Brame, 2016; Mayer & Moreno, 2003). Similar tactics include changes in color or contrast, as well as zooming and spotlighting effects (Evans,
2014; Kern, 2013). According to Guo et al. (2014), students prefer a talking head, speaking at a fairly quick pace with enthusiasm, as compared to presentation slides.

Mayer and Moreno (2013) defined multimedia instruction as the combined presentation of words (whether text or spoken) and pictures (whether still or animated). They stressed that content must be meaningful, i.e. organized, relevant, and applicable to new situations. Educational videos need not be videographic masterpieces to be effective. Instead, instructors are best served by focusing their attention and efforts on mitigating cognitive load and maximizing active learning experiences. By following research-driven recommendations, such as beginning with learning objectives, writing a script, keeping brevity in mind, and incorporation of active learning strategies, excellence in teaching and learning can be brought into the convenience of the online learning space.
References


Appendix A

Educational Videos Best Practices: A Tip Sheet for Instructors of Post-Secondary Online and Blended Courses

The following guidelines summarize the main points made in the article. Refer to the article for a lengthier discussion and complete citations and references.

Begin with learning objectives. Well-constructed learning objectives will maximize time, effort, and organization of an educational video, as well as its place within a larger video series. They can provide a road map for production and help weed out interesting yet unnecessary information.

Write and use a script. Using a script, or at least a detailed point-form agenda, improves structure, clarity, accuracy, and professional quality of an educational video. It also helps ensure consistency within a video series. Unscripted videos may result in rambling and tangents, which can be a deterrent for student viewers. A script can also be used for captioning or as a downloadable resource, which supports various learning styles and situations of low bandwidth.

Keep videos short. Research shows that students simply will avoid watching videos that are longer than 6-10 minutes. Each video should focus on just one portion of content. A video series should be arranged in a logical sequence, such as progressing from simpler to more complex concepts. Also, shorter videos are easier to revise in the future.

Maximize student engagement. In the absence of a physical classroom space, educational videos must pique student interest and attention. Research-backed methods for maximizing student engagement include:

- Keeping the video short and focused.
- Aligning with course objectives.
• Connecting with real-life experiences.

• Incorporating active learning activities, such as interactive quizzes, games, and screen manipulations.

• Having interesting yet simple and uncluttered video graphics and overall design.

• Using an appropriate amount of text, symbols, and other strategies (e.g. zooming, color contrast) to direct the viewer’s attention to important information.

• Opting for a talking head whenever possible (as compared to narrated slides), speaking at a fairly quick pace with enthusiasm.