Creating Engaging and Effective Whiteboard Videos

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CFP Education Workshop Series
Why use video in education?

• Online education
  – Primary mode of instruction

• Flipped classroom
  – Assigned videos and in-class problem solving

• Public outreach
Outline

• Engaging: How to get students to watch and pay attention to your videos

• Effective: How to get students to learn from your videos
Video can increase student engagement

Students assigned videos attended class more frequently than those assigned textbook reading
Video and Student Engagement

How Video Production Affects Student Engagement: An Empirical Study of MOOC Videos

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Assessed behavior from:
• 4 edX courses
• 862 videos
• 127,839 students
• 6,902,358 total views

Correlated behavior with:
• Production style (slides, code, whiteboard, lecture, studio, office)
• Video type (lecture, tutorial, other)
• Video length
• Speaking rate
Video and Student Engagement

The best indicator of engagement is video length

Optimal length: 6 minutes or less

Guo et al. (2014)
Video and Student Engagement

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"Khan-style" whiteboard tutorials were more engaging than slides or code

Guo et al. (2014)
Video and Student Engagement

OTHER FACTORS THAT INCREASED ENGAGEMENT

• Speaking rate and enthusiasm
• Personalization

Guo et al. (2014)
Video and Student Engagement

• Takeaway messages:
  – Keep videos short (~6 minutes or less)
  – Speak quickly, conversationally, enthusiastically
  – Personalize the video wherever possible

Guo et al. (2014)
Principles in Effective Design

How can learning science inform our decisions when planning a whiteboard video?
Cognitive Load and Video Design

Content
- Intrinsic amount difficulty

Visual input
Auditory input
- Processing / integrating

Sensory memory

Working memory

Long-term memory

Extraneous
- Cognitive load
Cognitive Load and Video Design

Cognitive load: limits what can be taken into long-term memory

Sensory memory: visual and auditory inputs

Working memory: short term memory

Long-term memory: unlimited resource

Cognitive load

1. Intrinsic: content
2. germane: processing/integration
3. Extraneous: not important for teaching
Principles in Effective Design

• How did these videos differ?
• What did you like and dislike about each video?
• What features could be used in a video to reduce cognitive load?
Principles in Effective Design

Maximize uptake
- Select appropriate amount of content
- Target level of content to your audience
- Use complementary audio and visual cues
- Speak conversationally
- Provide framing material

Reduce distractions
- Eliminate extraneous and highlight essential material
- Avoid redundancy
- Use spatial/temporal contiguity
- Consider legibility, size, color

Mayer (2008), Brame (2016)
Activity: Planning a Whiteboard Video

• Define your learning objectives

• List key terms and concepts

• Plan out your visual representation
Activity: Planning a Whiteboard Video

Learning objectives

• Describe how information from the environment reaches long term memory.

• Name and define the three types of cognitive load.

• Identify characteristics of a video that increase or reduce cognitive load.

Key terms and concepts

• Cognitive load
  – Intrinsic
  – Germaine
  – Extraneous

• Memory types
  – Sensory (visual/auditory input)
  – Working
  – Long-term
Activity: Planning a Whiteboard Video
Tips for Video Production

• Hardware and software come in all price ranges – select a setup that works for you

• Plan and practice (but not too much)

• Ask for and incorporate feedback
Beyond the Video

• Accessibility

U.S. Department of Justice
Civil Rights Division

The United States’ Findings and Conclusions Based on its Investigation
Under Title II of the Americans with Disabilities Act of the University of
California at Berkeley, DJ No. 204-11-309

INSIDE HIGHER ED
Berkeley Will Delete Online Content
Starting March 15, the university will begin removing more than 20,000 video and audio
lectures from public view as a result of a Justice Department accessibility order.

By Carl Straumsheim // March 6, 2017
123 COMMENTS
Beyond the Video

• Accessibility

• Framing material
  – Guiding text
  – Note-taking guides
  – Assessment
  – In class activities
References and Resources

  • Largest study on student engagement with video content, covering a broad range of video types. Offers guidelines for video planning and design to increase engagement.

  • Excellent review about designing videos for effective learning. Provides an overview of cognitive load and provides concrete suggestions to incorporate into video design.

  • More technical review on cognitive theory and recommendations for applying these principles to the design of multimedia teaching materials.

  • Helpful summary of Bloom’s taxonomy and designing learning objectives from the Center for Excellence in Learning and Teaching at Iowa State University.