

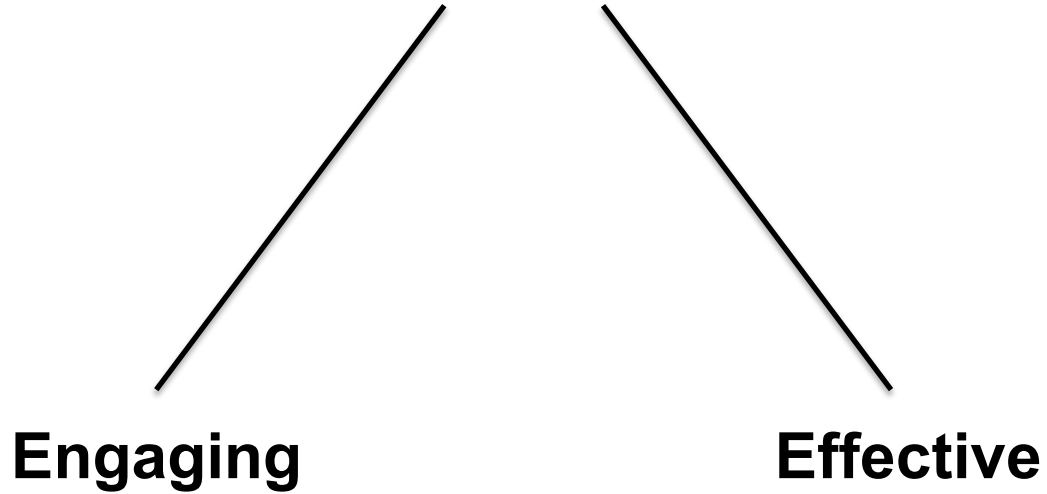
Creating Engaging and Effective Whiteboard Videos

Kate McDonnell-Dowling, PhD
CFP Education Workshop Series

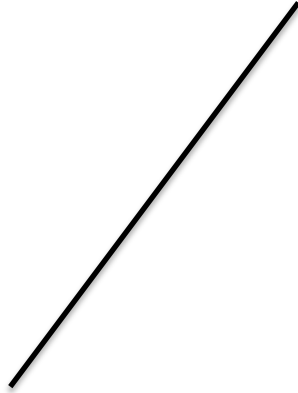
Why use video in education?

- Online education
 - Primary mode of instruction
- Flipped classroom
 - Supplement classroom teaching
 - Assigned videos and in-class problem solving

Whiteboard Videos

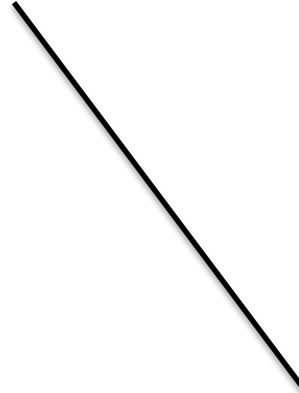


Whiteboard Videos



Engaging

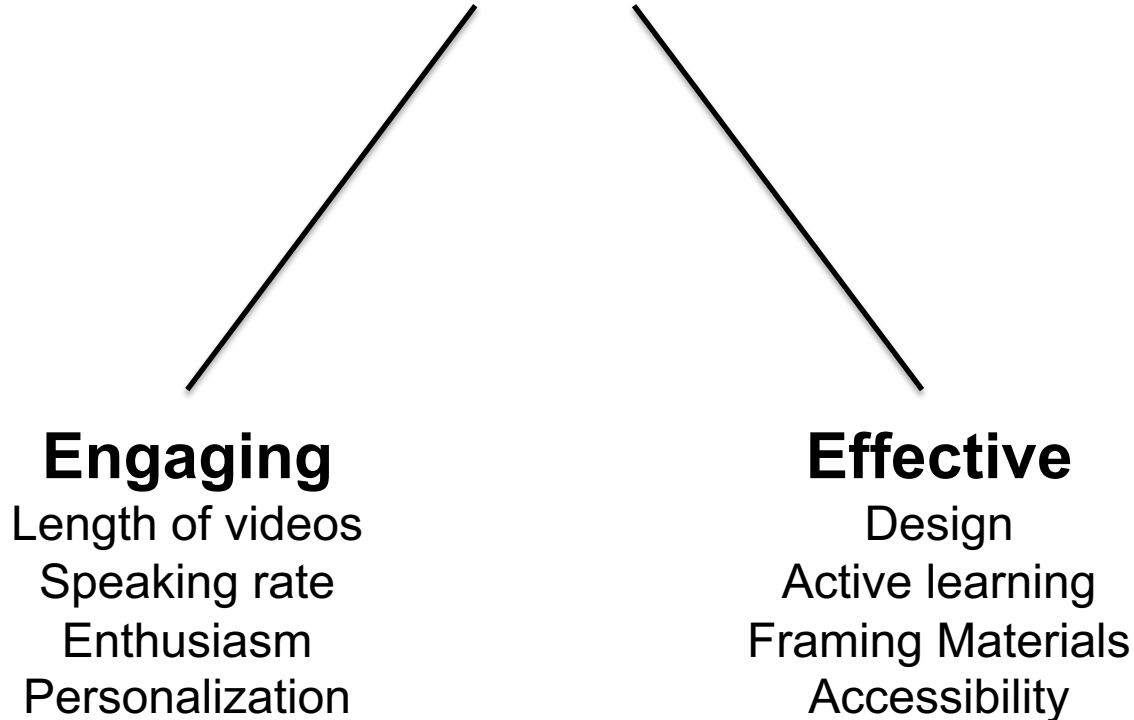
How to get students to watch and pay attention to your videos



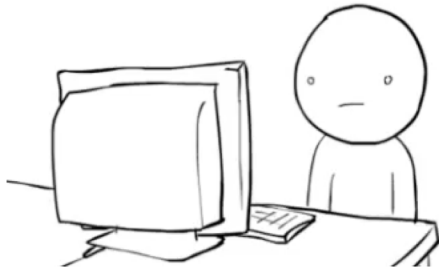
Effective

How to get students to learn from your videos

Whiteboard Videos



Engagement



Video and Student Engagement

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

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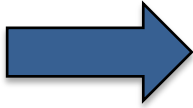
Rob Rubin
edX
rrubin@edx.org

- 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.

Video and Student Engagement

Assessed behavior from:

- edX courses (math/science MOOCs)
- 862 videos
- 127,839 students
- 6,902,358 total views



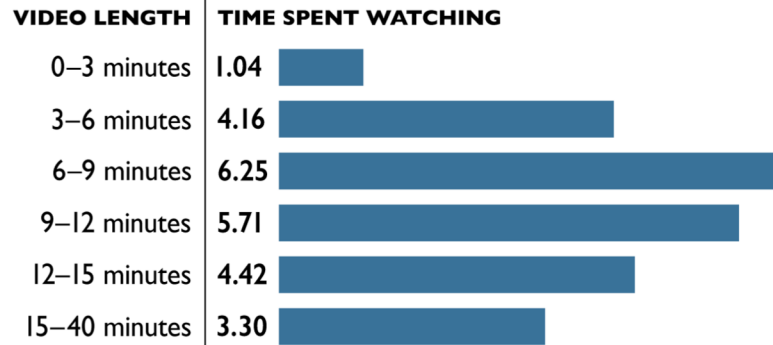
Correlated behavior with:

- Production style (slides, code, whiteboard, lecture, studio, office)
- Video type (lecture, tutorial, other)
- Video length
- Speaking rate

Video Length

Keep It Short

The median amount of time certificate-earning students spent watching a video vs. video length (in minutes) in four math/science MOOCs from edX

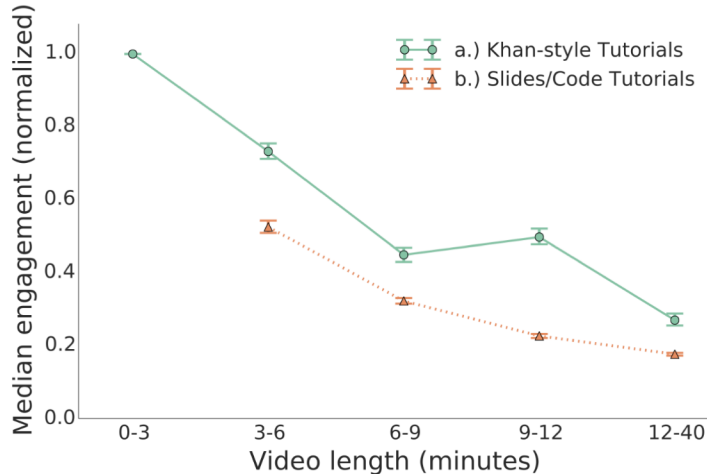


Source: Phillip Guo, University of Rochester/edX

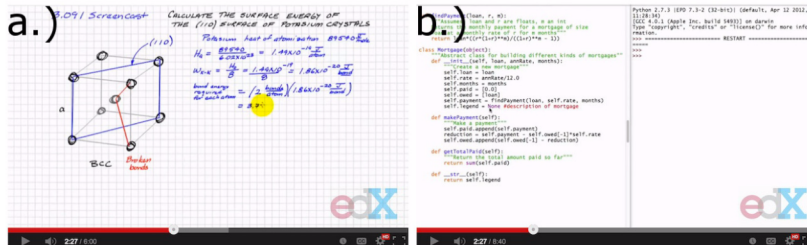
The best indicator
of engagement is
video length

Optimal length: 6 minutes or less

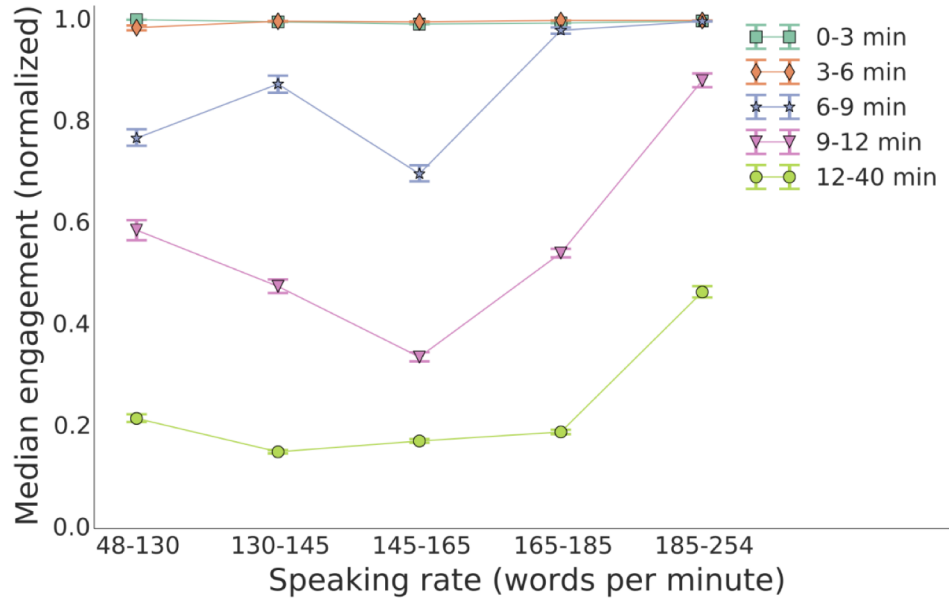
Production Style



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



Speaking rate



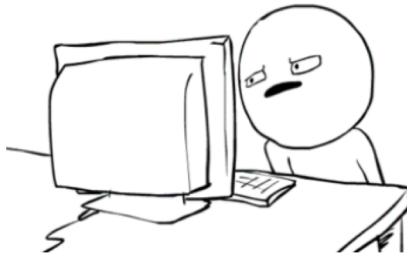
Faster speaking
rate is more
engaging

Enthusiasm

Engagement

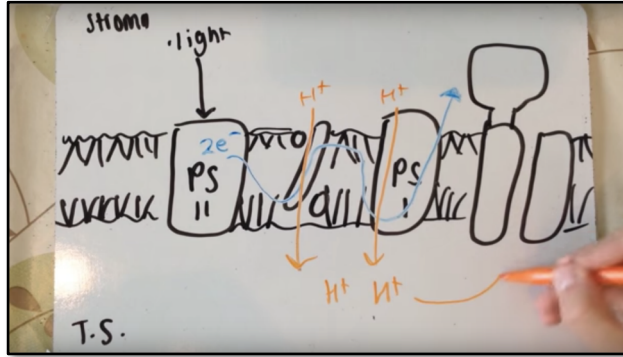
- Takeaways:
 - Keep videos short (~6 minutes or less)
 - Speak quickly, conversationally, enthusiastically
 - Personalize the video wherever possible

Effectiveness

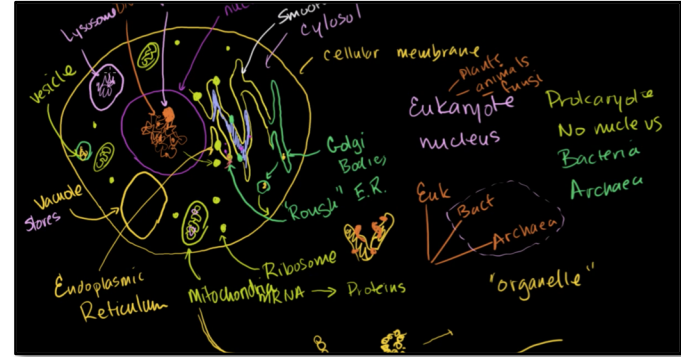


seriously?
seriously?
SERIOUSLY?

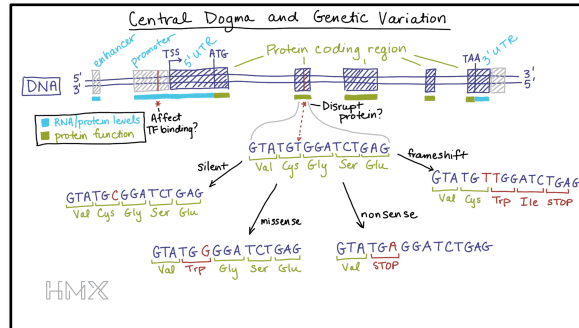
Effective Design



YouTube: Jack A-Level TTC



Khan Academy



HMX

Routes of Administration

Enteral:

Oral - by mouth
Slow onset of action
Easy to administer

Sublingual - under the tongue
Fast onset of action
Easy to administer

Rectal - into the rectal cavity
Slow onset of action
Can be used to avoid oral route if patient is vomiting

Parenteral:

I.V. - into bloodstream
Instantaneous onset of action
Cannot be used outside of the clinic

S.C. - into fat tissue
Fast onset of action
Relatively easy to administer, long-term consequences

Intramuscular - into the fat
Slow onset of action
Painful for the patient
Can have sustained release

Other:

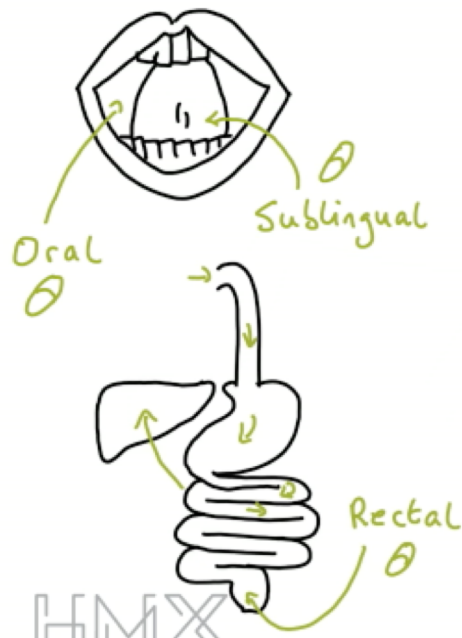
Inhalation - into lungs
Rapid onset of action
Easy to use
Not suitable for all drugs

Topical - onto an epithelial surface
Fast onset of action
Eye, nose, skin
Not suitable for all drugs

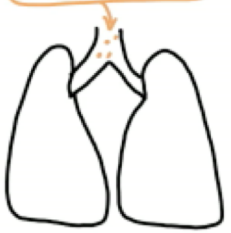
Transdermal - into bloodstream via the skin
Slow onset of action
Easy to use
Not suitable for all drugs

Routes of Administration

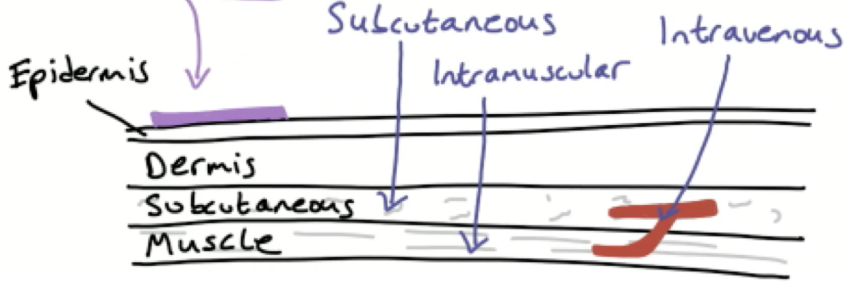
Enteral



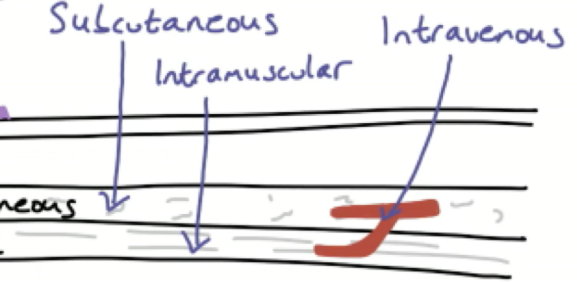
Inhalation



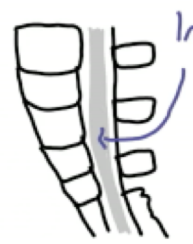
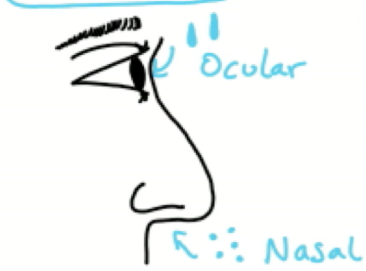
Transdermal



Parenteral

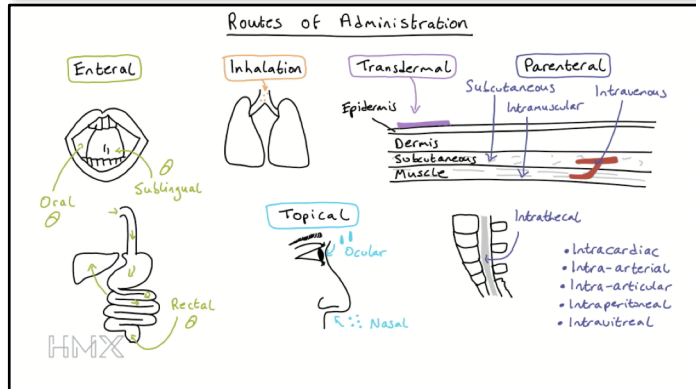
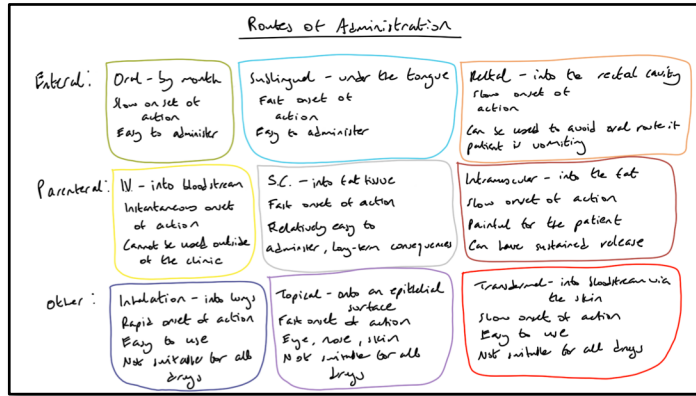


Topical



- Intracardiac
- Intra-arterial
- Intra-articular
- Intraperitoneal
- Intra vitreal

Effective Design



- How do these differ?
- What do you like and dislike about each?
- What features can be used in a video to reduce cognitive load?

Principles of Effective Design



**Maximize
uptake**

**Reduce
distractions**

Effective Design

Maximize uptake

- Select appropriate amount of content
- Target level of content to your audience
- Use complementary audio and visual cues
- Speak conversationally

Effective Design

Reduce distractions

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

Active learning

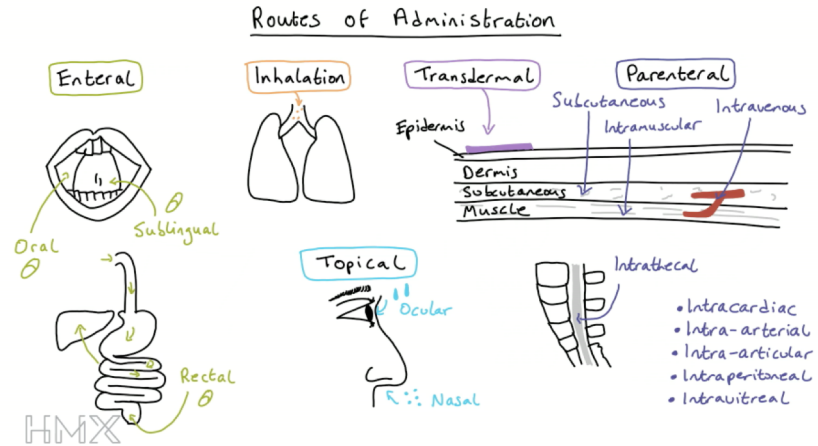
- How can you do active learning in a video?

Active learning

- Interactive questions
- Interactive features
- Guiding questions

Framing materials

- Guiding text
- Note-taking guides
- Assessment
- In class activities



Accessibility

- Closed captions or downloadable transcripts
- Use colours, symbols, and patterns to show contrast
- Be careful with contrasting colours and avoid bad colour combos

Planning

- Define your learning objectives
- List key terms and concepts
- Plan out your visual representation
- Plan and practice (but not too much)
- Ask for and incorporate feedback

Activity

- Think of a class/topic/concept you would like to teach using video
- Define your learning objectives
- List key terms and concepts

Activity

- Plan out your visual representation
 - What needs to appear on screen
 - What can be simplified
 - Are the graphics and text integrated
 - How can you use colour, art, symbols, concept maps

References

- Guo PJ, Kim J, Rubin R. 2014. How video production affects student engagement: an empirical study of MOOC videos, p. 41–50. In Proceedings of the first ACM conference on Learning @ scale conference. ACM.
- Brame CJ. 2016. Effective Educational Videos: Principles and Guidelines for Maximizing Student Learning from Video Content. CBE Life Sci Educ 15.
- Mayer RE. 2008. Applying the science of learning: evidence-based principles for the design of multimedia instruction. Am Psychol 63:760–769.

Resources

Resources for producing videos

- Visual input devices
 - SMART boards (HMS conference rooms) *Have built-in features for drawing and recording*
 - Tablet / tablet computer (Windows / Android / iPad)
 - Wacom graphics tablet (PC / Mac)
- Drawing software
 - OneNote / Paint (PC, free)
 - Autodesk Sketchbook (PC / Mac / Android / iOS, \$-\$\$)
- Screencasting / editing software
 - Screencast-o-matic (PC / Mac, free, \$ full feature) *Used by Khan Academy*
 - Quicktime (Mac, free)
 - Screenflow (Mac, \$\$\$)

Resources

- Sage learning
 - Harvard Innovation Lab
 - <https://www.sophya.ai/>

