

Positive student response to engaging lecture videos with embedded activities implemented in hybrid online course, Biostatistics for Biology Majors

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The need for active learning in distance education is large and growing

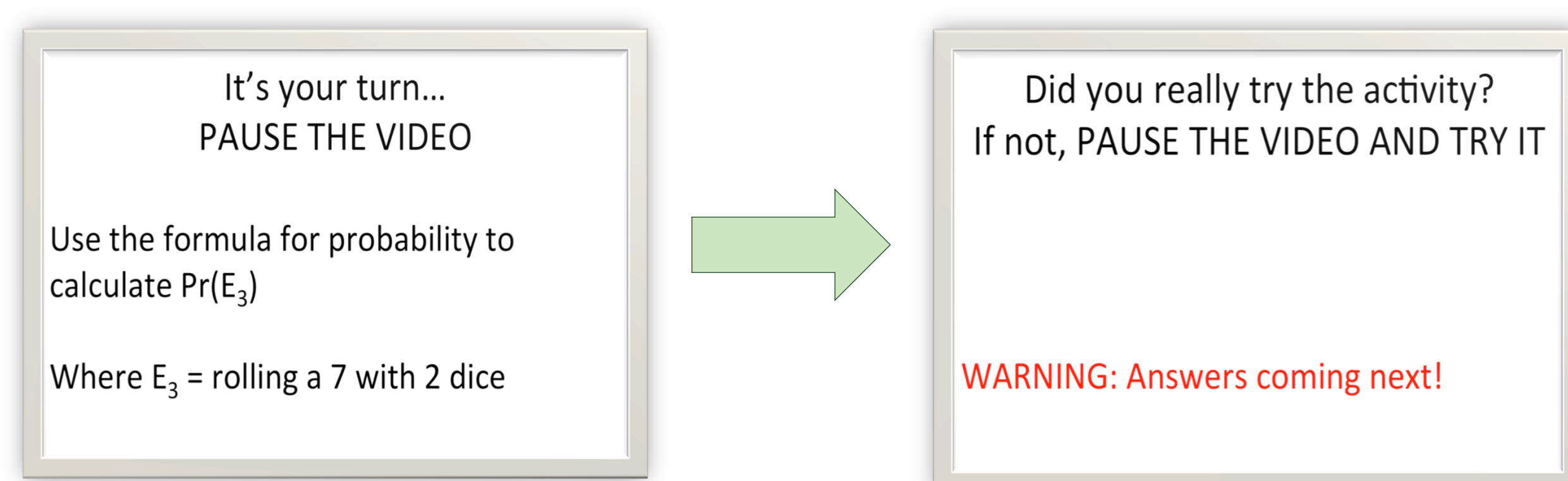
- Distance Education courses and hybrid courses are becoming MORE COMMON and MORE POPULAR to fit into millennial LIFESTYLE (full-time job, full-time parent, increasingly on-the-go, constantly connected to digital media, etc.)
- To properly SERVE ALL STUDENTS, we need to make more, and more ENGAGING, hybrid and distance education course content
 - Active learning improves student performance (Armbruster et al., 2009) and decreases achievement gap (Haak et al., 2011)
- University faculty can BORROW IDEAS from innovative, engaging digital content platforms like Coursera.org and Khan academy

Armbruster, P., Patel, M., Johnson, E., Weiss, M., 2009. Active learning and student-centered pedagogy improve student attitudes and performance in introductory biology. CBE-Life Sciences Education 8, 203–213.
 Haak, D.C., HilleRisLambers, J., Pitre, E., Freeman, S., 2011. Increased Structure and Active Learning Reduce the Achievement Gap in Introductory Biology. Science 332, 1213–1216.

About videos and activities

- 60 lecture videos filmed and edited
 - Footage mainly from face-to-face course
- Lecture videos were on average 13.5min long (± 5.6 min)
- 1 – 3 activities per video, either presented in the video or added during editing as Microsoft PowerPoint slides
- Activities draw attention to important concepts and help students review
- Students asked to solve problems independently right after learning material
- Independent attempts were directly followed by step-by-step process and answer

Example embedded activity

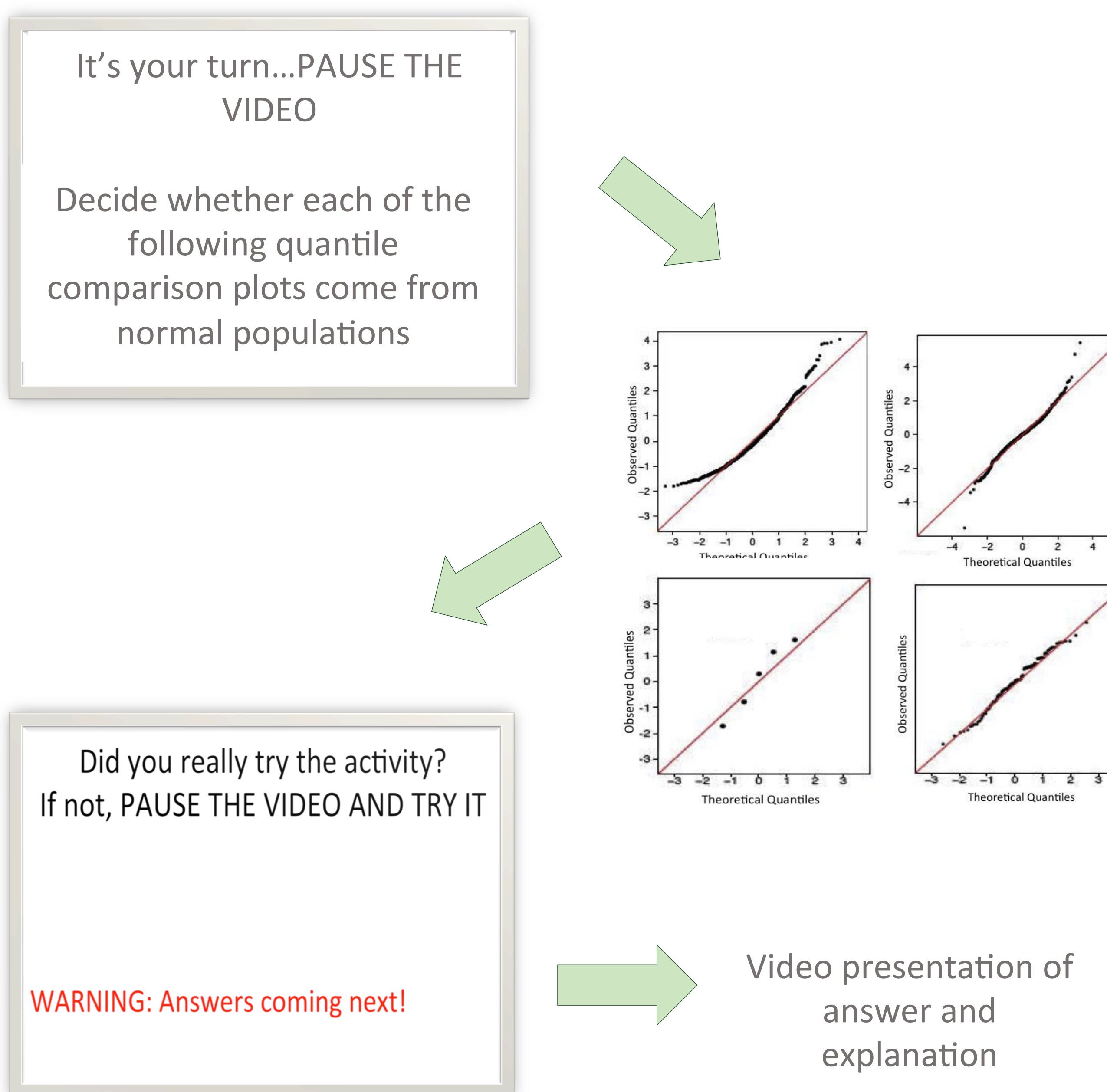


Video presentation showing, step-by-step how to solving for answer and explaining any difficulties

Methods

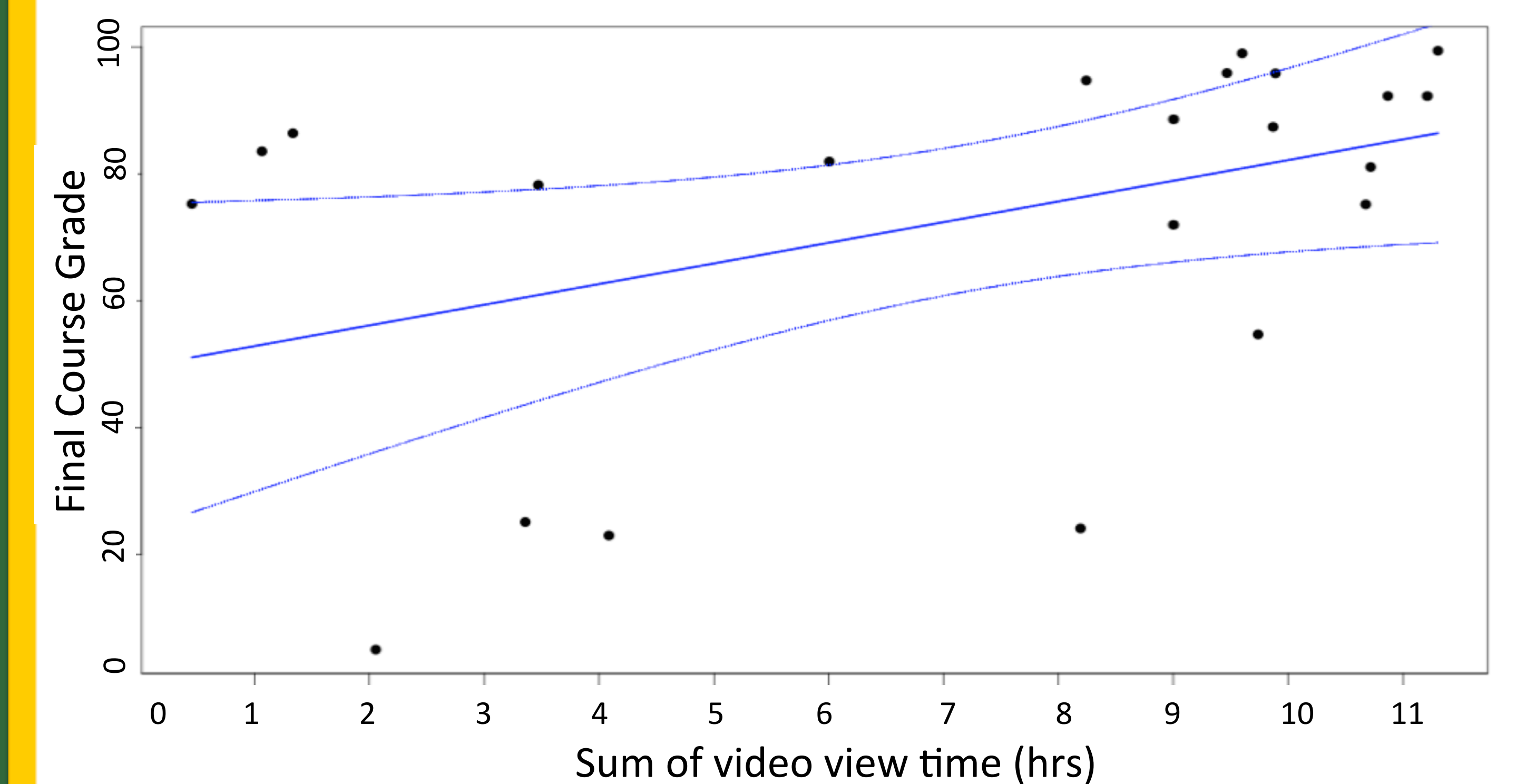
- Pilot course run Spring 2016
- 22 students enrolled
- Main course content was provided in lecture videos
- Students completed midterm formative assessment
 - Answering what content they were accessing to learn course material and how much each type of content was helping them learn course material
 - 5-point Likert scale (1 – Not at all helpful, 5 – Very helpful)
 - Rank each type of content regarding helpfulness
- Blackboard Learning Management System recorded time spent watching lecture videos for each username for each video
- Linear model created to explain course grade with time spent watching lecture videos
 - Average time spent watching each video summed across student

Example embedded activity



Results

- TIME SPENT WITH LECTURE VIDEOS PREDICTED FINAL COURSE GRADE
- 78% of students (n = 21) reported “regularly” pausing the video to complete the activities while 16% “sometimes” completed activities
- Students reported that the embedded activities:
 - “add [an] interactive component”
 - “allow [me] to practice new material right away”
 - “help me be attentive”
 - are “a low-stress way of figuring out the problems”
- The longer students spent watching lecture videos, the higher their final course grade was ($F_{1,20} = 4.612, p = 0.044, R^2 = .1467$)



Conclusions

- Only 14% of course grade can be explained by time spent watching lecture videos
 - Time that video is playing \neq time that student is actually engaged with material
- 3 students performed well in the class (final grade > 7.5) but did not watch much of the course material (< 2 hours)
 - These students frequently worked as a group and quite possibly watched videos together
 - This analysis recorded time per username: thus we could not detect when students watched videos with someone else
- no way to verify the effect of the activities alone
- Creating engaging digital lecture content is very time-consuming but leads to enhanced student engagement