



Lights, Camera, Action!: Peer-to-Peer Learning through Graduate Student Videos

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Abstract

The senior level “Construction Estimating” course at Texas State University - San Marcos is co-listed for master’s students to receive graduate credit. To make this course a graduate level offering the master’s students have traditionally completed an additional assignment in addition to the assignments required of the undergraduate students. The author, upon taking over the class this year, decided that in lieu of a written project, the graduate project would be to develop instruction videos on construction estimating topics. The intent of the project was to use peer-to-peer learning to enhance content understanding of the undergraduate students and to develop a video library of brief construction estimating topics that can be assigned as class preparation homework to future classes. Further, through the creation of the video, these students demonstrated that they had a graduate level understanding of the topic.

In addition to the videos, the master’s students were required to develop a pre- and post- video quiz to assess the improvement of the undergraduate students’ understanding of the topic. The improvement was a small portion of the project grade. The paper presents the results of these quizzes and the presentation will include clips of the videos. Each master’s student was responsible for two videos and, through a first come, first served policy, the students self-selected the topics. This paper is intended to share an idea of how to generate useful homework content for future classes of millennials whilst also providing a meaningful project to graduate students.

Introduction

At Texas State University - San Marcos, the senior-level estimating course is co-listed as a graduate course. Traditionally, graduate students in co-listed courses have completed a project in addition to the work required of the undergraduate students in order to justify the graduate credit. The author’s personal experience during graduate school was that such a project was typically a term paper, however the author was neither excited about the prospect of grading term papers nor convinced that a term paper would be the best way to demonstrate graduate level understanding of a select topic.

During the 2012 ASEE annual conference, the author was intrigued by a paper that introduced the author to the concept of how some content misconceptions could be corrected depending on the stage of student learning that occurred in the classroom¹. Further, during the new faculty program at Texas State University - San Marcos, the author discovered the trend of flipping the course, and saw how this ASEE paper on student learning fit into the flip-the-course trend². Flipping a course typically involves using a series of videos that cover the topical content (either pre-recording all of the lectures that would be presented in class or otherwise covering what the students should be learning if they would do their reading assignments). The idea was intriguing, but the amount of work that would be required to develop all of the videos seemed daunting. Envisioning the creation of the videos as a term project, it struck the author as an ideal opportunity to engage the graduate students in peer-to-peer learning via videos³ to help flip the

course over time. The author's goal was for the term project to be ultimately useful for creating content for future semesters and also to be a rewarding challenge for the graduate students.

This paper is intended to share with other new engineering educators a way to develop video content for flipping a course without overburdening their very full schedules. As such, the author will describe the graduate student project that generated the videos, results from the first semester's pre- post- quizzes, and lessons learned from the process. The formal project assignment and grading rubric are included in the appendix for the reader's reference.

Procedure

Project Description

The project was defined very broadly to encourage creative submissions by the graduate students. Each video was to be two to three minutes in duration and on a topical area covered in this course. The students self-selected their topics through a first come, first served policy. Further, each graduate student would produce two videos during the course of the semester, with the first due at mid-term and the second on the last regular class day. The intention was that with feedback given after the first video that the graduate students could make any needed improvements to produce more effective videos for the second submission.

The graduate students were encouraged to use their undergraduate classmates as helpers/actors for the videos. As the undergraduate students would receive extra credit on their homework grades for participating, the graduate students were fielding volunteer offers by the second project due date. After premiering the videos in class (accompanied by the pre-post quizzes), the videos were uploaded to the university's streaming media server for use by the university community.

Pre-Post Quizzes

To accompany each video, the graduate students also wrote three multiple-choice quiz questions that could be answered from watching their videos. These quiz questions were used this semester as the in-class pre- and post-video screening quiz and was intended to be used on future classes for an outside of class pre- post-quiz. For this initial semester, the question writing was a part of the term project as the author did not know what specific aspects of the topic would be covered in the brief videos.

Results & Discussion

Pre-post quizzes

Analysis of differing quiz scores taken pre- and post- watching the videos partially showed that the graduate students wrote some questions that were too easy for the class at mid-term or at the end of the semester. Two other common issues were confusing questions or, in the case of an international student, poor English-language skills. As the nature of these videos is to replace some of the conceptual lecture that this class had already covered prior to watching the videos, it was not a surprise that many of the quizzes showed a high level of pre-existing knowledge on the topics. Because this semester's class is not the intended target of the quiz, which is instead students who have no prior experience with the topic, that the questions were too easy or basic this semester is not necessarily indicative of how later classes will fare. An example of one such

question that showed high pre-existing knowledge (95% correct on the pre-quiz and 100% correct on the post-quiz) is:

3. What is the addenda?
 - A.) The document issued to bidders before the bid to notify them of any changes.
 - B.) The document showing an outline of the entire estimate.
 - C.) The document letting the bidders know if they won the bid.
 - D.) Both B and C.

The knowledge required to answer this question correctly is not typical knowledge that any engineering or engineering technology student would be expected to know. (The answer is A, by the way.) It is the author's hope that when students without prior knowledge use the videos and quizzes, more meaningful data can be gleaned from the quiz performance.

In the part #1 quiz, over eighty percent of the questions had an increase in correct answers from the pre- to post-quizzes. Over eighty percent of the students also increased their performance between the pre- and post-quizzes. Similarly in the part #2 quiz, ninety percent of the same metrics (individual questions and individual students) saw increased performance from pre- to post-quizzes. Thus while the quiz questions were not ideal, they did show overall improvement in performance after watching the videos.

General

The videos were created using either live action or animated power-point presentations, one of which is shown in Figure 1. While the first group of videos did include some more traditionally styled lectures, the students also created videos that used interviews or scripted acting to present the material. By the second round of videos, the material was overall presented in a clearer manner.

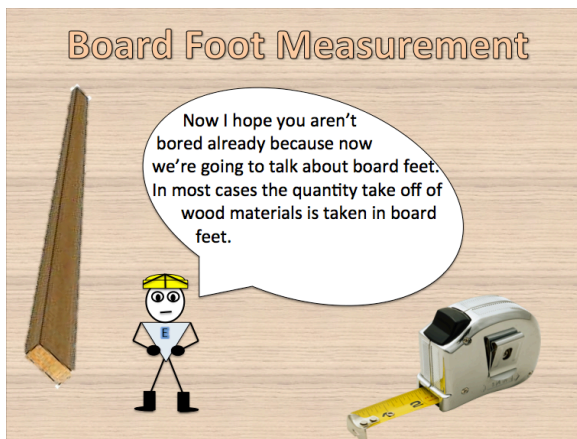


Figure 1: Still from an Animated Powerpoint Video

Between the two due dates, the author had an adjunct professor of Radio, Television, and Film at the University of _____ come and guest lecture to the graduate students about the basics of filmmaking. This hour-long seminar may have helped increase the quality of the video, although it is also possible that the student improved based upon the written feedback they received. During the next semester, the author plans to schedule the guest speaker to return prior to the first due date in order to assist the students in producing quality videos.

Lessons Learned

A few of the lessons learned that the author would like to share with other considering the use of student projects to generate video content to flip their course:

- Graduate students are not necessarily great at writing pre- post- quiz questions. The questions that they generated tended to be: too easy, confusing, or reflected the poor English skills of my international student. For next semester, I will review their questions well in advance of the final due date and provide them with three multiple-choice quiz questions if needed. This planned arrangement should help the students see what are the three key points that I would like covered in the video and, hopefully, generate some meaningful pre-post- quiz data. I will also rewrite the pre-post- quiz questions for the videos produced this semester when the questions do not seem to be clear or are poorly addressed in the video.
- Make your classes work for you. For instance, the author is using this project to develop future course content.
- Don't stress about defining lots of details in a video assignment. These students have done a good job of being factual and creative (plus, you could always have a future assignment of identifying errors).
- The second round of videos (project part two) was better than the first round. The students had improved in both filmmaking and presenting/emphasizing an appropriate amount of content. While the improvement could have been due to the filmmaking seminar, written feedback, or experience, having two parts of the project increases the chances of developing high quality content (as well as generating twice the videos compared to having only one video due per semester).
- The students reported that they enjoyed the process. The author's observations are anecdotal here, but students reported that they enjoyed working on this project. As well, the undergraduates enjoyed seeing what the graduate students had been working upon. It worked well for this mixed undergrad/graduate course to have a visible project for the graduate students. This situation allowed the undergraduates to see why the graduate students were receiving graduate credit for the work whereas they were receiving senior level undergraduate credit.
- Provide some general audio/visual guidelines, which could be covered as part of a guest lecture on filmmaking. The students needed some guidance to steer them away from having the audience read powerpoint slides or from giving all auditory information without visual reinforcement.

I would recommend using student projects to develop video content to eventually “flip” a course (or at least move some of the lecture to before the class period). The approach presented here is a work in progress, but the author hopes this information is useful and inspiring for other new engineering educators.

References

1. Swartz, Brian. (2012). “Building a Classroom Culture that Paves the Way to Learning.” *Proceedings of the 119th ASEE Annual Conference & Exposition*. San Antonio, TX: American Society for Engineering Education.
2. Bergmann, S. & Sams, A. (2012). *Flip Your Classroom: Reach Every Student in Every Class Every Day*. International Society for Technology in Education.
3. Schwartz, D. & Hartman, K. (2007). “It’s not television anymore: Designing digital video for learning and assessment.” In R. Goldman, R. Pea, B. Barron, & S. Denny (Eds.),

Appendix

TECH 5362: Construction Estimating Term Project

Description

The term project is to make two short (2-3 minute range) videos that introduce key estimating concepts. To accompany each video and to gauge the effectiveness of the presentation, the project will also require a pre- and post- video quiz to be developed and administered by each graduate student. The videos will be presented in class on the due dates indicated. This project embodies the concept of peer-to-peer learning as well as demonstrating your knowledge of the material at a graduate level. The topics of the first video shall be related to the topics scheduled in the syllabus up to and including the topic covered on due date. Similarly, the topics for the second video shall be related to the material scheduled in the second half of the course (after the due date of the first video through the end of the course). You will claim your topic via the forum on TRACS and the topics are first come, first served.

You may recruit assistance from your classmates. Any student who helps (and you report in your credits) will receive extra credit on their homework average.

Action Items

1. Claim your topics on TRACS. I have set up two Forums titled "TECH 5362 Project Part 1" and "TECH 5362 Project Part 2." Post a new thread to the discussion with your name and your topic to select your index. If someone has already posted the topic you were going to pick, you will have to choose a different one (no repeats).
2. Do a little digging. Find out some detailed information about your chosen topic. Items include, but are not limited to:
 - a. What is it? (Full name & common name or abbreviation)
 - b. Why do we use it? (Why should your classmates care about this topic?)
 - c. What makes this topic unique? (It is especially handy for...)
 - d. Who uses it?
 - e. When during the design, bidding, or construction phase would you use this topic?
 - f. Something interesting about this topic that you learned while completing this assignment.
3. Make a video about your topic to show to the class. The video should be 2-3 minutes long. If you want to make a longer video, you will need to negotiate with Dr. Talley in advance for extra time.
4. Develop a comprehension quiz (three questions, multiple choice format) to accompany your video. You must submit your questions to Dr. Talley by noon on the due date of each part of the project. The quizzes for all of the topics will be administered together as a pre- and post- quiz at the start of class and then after all of the videos are shown to gauge student learning on your topics. Improvement in student learning/understanding of your chosen topic will be a portion of your grade.
5. Play your video for the class on the due date. You are responsible for making the video play on the podium system in class.
6. Submit an electronic version of your video to Dr. Talley as either an MP4 or an AVI file format.

Due Dates

Part 1 is due Wednesday, October 10th.
Part 2 is due Wednesday, December 5th.

Available Topics

Part 1 - Pick one (see Action Item #1):

1. Introduction to Estimating
2. Types of Estimates
3. Bidding Process

4. Estimating Materials
5. Estimating Labor
6. Estimating Equipment
7. Jobsite & General Overhead
8. Contingencies, profit, bonds, insurance, and taxes
9. Estimating Site work

Part 2 - Pick one (see Action Item #1):

1. Estimating Concrete
2. Estimating Masonry
3. Estimating Metals
4. Estimating Wood
5. Estimating Thermal and Moisture Protection
6. Estimating Doors and Windows
7. Estimating Finishes
8. Estimating Mechanical Work
9. Estimating Electrical Work
10. Estimating Plumbing Work

Figure 3: Project Statement, Page 2 of 2

TECH 5362
Construction Estimating
Fall 2012

Evaluation Rubric
 Video Project No. ___

Student's Name _____ Overall Grade _____

Areas of Evaluation	Needs Improve -ment	Fair	Good	Great!	Feedback
Video Content (Technical Content) 45%					
Video (Sound/ Image) 10%					
Quiz Questions 15%					
Student Learning (Pre/Post Improvement) 15%					
Innovation/ Originality/ Creativity 15%					

Figure 4: Grading Rubric