Pandemic Teaching: Statics Student Experiences

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Abstract

While the Covid-19 pandemic caused sudden and unexpected changes in university teaching settings in the spring 2020 term, colleges and universities have since had time to adjust their approaches to teaching in a time of pandemic, both at the administrative and the instruction level. In the statics course which is the subject of this paper, university policy dictated that classes would be taught in-person, and that live lectures would also be recorded and made available to students who were required to quarantine. This paper discusses how the course was implemented, and also presents feedback from students both as stated directly to the instructor, and as determined by student surveys. In particular, student perceptions and preferences regarding pre-recorded, live, and live-recorded lectures are presented. Live lectures are strongly preferred on average, but not necessarily for reasons related to pandemic classroom changes.

Keywords

pandemic, COVID-19, statics, survey

Introduction

In the midst of the COVID-19 pandemic, academic institutions have taken varied approaches to course offerings for the Fall 2020 semester. In order to adapt to the new rules and guidelines provided by institutions, individual faculty members have had to adjust how their courses are taught as well. This paper discusses the author's attempt to balance quality of education and adherence to pandemic rules/guidelines for an engineering statics course.

Background

At Mercer University, the administration elected to hold all in-person classes for the Fall 2020 semester. Additionally, course instructors were to record/live-stream all in-person lectures for the benefit of students under quarantine orders. Recording capabilities included a programmable camera at the back of the classroom (auto-focus, pre-programmed views), a single microphone (professional grade omnidirectional microphone/speakerphone) at the presentation computer location, and the ability to record screen captures from the presentation computer. Camera views in the classroom of interest included wide angle, as well as views of each whiteboard. Echo360 was provided through the university, and used in this course as the live lecture recording platform.

At the beginning of the semester, the author informally polled the students to discuss different ways to organize lectures and class time. Several elements were considered in this and/or

subsequent discussions; they include lecture style/content, in-class quizzes, and homework. This paper will focus only on feedback regarding lectures and delivery.

Of particular concern to the author were issues of speech intelligibility due to mask wearing and potential microphone issues, as well as a reduced ability for students to work collaboratively due to distancing guidelines.

Several weeks into the semester, a set of surveys was provided to the students to determine how well current practices were working, as well as whether the students preferred changes to the course content delivery. Results from relevant survey questions will be discussed below. All survey questions presented here were given in a Likert scale form. Responses were all anonymous, but can be correlated between some questions.

Lecture feedback

Based on initial class discussions, theory lectures and example problems were pre-recorded and posted for student use at home. Recordings used a good quality (in the author's opinion) USB condenser microphone and a digital whiteboard program (controlled by a pen tablet), such that the experience would, in some ways, try to replicate a lecture using the white boards. In-class time was split between additional example problems, in-class quizzes, and student homework/question time. It became clear rather quickly that in-class homework time was not preferred by most, so that time was quickly dropped and replaced by additional example problems. After several weeks, the student surveys were sent out.

Survey results regarding various information delivery modes are shown in Tables 1-3 below. Note that the use of ellipses and completions implies a separate question for each item; results are condensed in this way to conserve space.

The questions in Table 1 show that live lectures are clearly preferred both for theory lecture, as well as example problems, although students may be slightly less averse to example problems via methods other than live lectures (there is also considerable variation in opinions, as represented by the standard deviation). In order to determine why this preference is expressed, some additional questions can be considered. Table 2 and Table 3 present questions regarding the student experience with live, live-recorded, and pre-recorded lectures.

Table 1: Lecture survey questions part 1. Q1: "Do you prefer to get information on theory and key equations by… ?"; Q2: "Do you prefer to see example problems by… ?"

Question (right)	Q1		Q2	
Completion (below)	Mean answer	Standard deviation	Mean answer	Standard deviation
…reading your textbook? 1 = strong no 5 = strong yes	2.43	1.33	2.76	0.97
…watching pre-recorded lectures? 1 = strong no 5 = strong yes	2.57	1.18	3.14	1.08
…watching live-recorded lectures via Echo360? 1 = strong no 5 = strong yes	2.29	1.20	2.24	1.27
…attending live lectures? 1 = strong no 5 = strong yes	4.38	0.84	4.48	0.85

Looking at Table 2 and Table 3, a few deductions can be made. Keeping in mind that the live-recorded lecture results may be skewed due to the low number of responses, the survey results show that there is a clear direction in desirability for all three criteria. The pre-recorded lectures are easier to read than the live-recorded video, and also have better speech intelligibility. The live lecture is easier to read than the pre-recorded lecture, and possibly slightly easier to understand for spoken word. Looking at the question in Table 3, students felt that the instructor's use of a mask had only a slight or completely negligible effect on speech intelligibility.

There was a fair bit of variation on preferred modes of learning (Table 1), with students expressing strong preferences on both sides for most modes. However, students almost uniformly felt positively or neutral about the live lecture. Interestingly, the subset of students who responded as having had experience using the live-recorded lecture videos had a somewhat lower opinion of that method than the survey respondents as a whole. One might conclude, then, that while the live-recording of lectures sounds like as good a learning method as another to students in general, those who used it found it to perhaps not live up to expectations. While further information on this topic was not solicited, the author suggests that microphone placement in a corner of the room might be one reason for this discrepancy (the instructor's voice may be picked up unequally depending on which white board he/she is in front of); additionally, the reliance on the instructor remembering to change camera views (or not) may have an effect on the effectiveness of the video. Whatever the reason, those students who viewed the live-recorded video clearly found it more difficult to focus on (and presumably learn from) than pre-recorded videos or live lectures. It is also interesting to note that, while students watching the pre-recorded lectures were able to read the writing and understand the speech, and felt almost neutrally (on average; there was wide variation) about focusing on the video vs. live lecture, live lectures were

nonetheless considered the clearly preferable mode of information delivery when compared to pre-recorded lectures.

Table 2: Lecture survey questions part 2. Q3: "If you have watched pre-recorded lectures, … ? Leave blank if no opinion."; Q4: "If you have watched live-recorded lectures (Echo360), … ? Leave blank if no opinion."; Q5: "If you have attended live lectures, … ? Leave blank if no opinion." Note that Q4 had only about 20% the number of responses as the other questions.

Question (right)	Q3		Q4		Q5	
Completion (below)	Mean answer	Standard deviation	Mean answer	Standard deviation	Mean answer	Standard deviation
…how well are you able to read what is written [on the virtual/real board]? 1 = difficult to read 5 = easy to read	3.95	1.05	3.00	0.00	4.60	0.49
…how well are you able to understand the recorded [or live] speech? 1 = difficult to understand 5 = easy to understand	4.63	0.67	3.50	0.50	4.80	0.40
…how easy is it to focus on the video lecture versus attending a live lecture? 1 = much harder with the video 5 = much easier with the video	2.79	1.32	1.25	0.43	N/A	N/A

Table 3: Lecture survey questions part 3.

Question (below)	Mean answer	Standard deviation
Q6: If you have attended live lectures and/or watched live-recorded lectures (Echo360), how much do you think the instructor's wearing of a mask impedes your ability to understand speech? Leave blank if no opinion. 1 = very unacceptably much 3 = noticeable but acceptable 5 = not at all	4.60	0.49

Some reasons that live lectures were highly preferred might have to do with production quality of the videos. Issues relating to the live-recorded lectures have already been discussed. In the pre-recorded videos, the author also felt personally less engaged than when teaching live. In particular, the author's voice was much less dynamic when recording at home or in the office, partly to avoid disturbing neighbors in the office or exciting very vocal dogs at home, and also to reduce dynamic range so students would not need to constantly adjust their playback volume. While speech was intelligible on these videos, the lower dynamic range may have made the videos less exciting and thus harder to focus on.

Another reason that live lectures may have been preferred is that they allow for much more immediate feedback and student engagement. While feedback opportunities were not explicitly mentioned in the student surveys, engagement preferences were solicited, shown in part in Table 4.

Table 4: Lecture survey questions part 4.

Questions (below)	Mean answer	Standard deviation
Q7: Do you want to be personally engaged during class time? 1 = strong no 5 = strong yes	3.33	1.13
Q8: Is it appropriate to offer rewards for engagement? 1 = engagement is its own reward 5 = rewards are required	3.90	1.02

According to Q7, students on average feel only slightly positive about wanting to be personally engaged in class. In Q8, they indicate that engagement needs to be rewarded to occur. This might indicate that engagement is in fact not a compelling reason to desire in-person classes; however, engagement was not defined for students in this survey. Q8 might imply that engagement occurs only when students perform a measurable action (asking questions, providing answers), while students might feel engaged (less measurably) when, for instance, they are asked if they have questions, regardless of whether they respond or not, or when they observe other students having direct interactions with the instructor. Thus, Q7 may not be sufficiently specific to draw helpful conclusions.

Summary and Conclusion

It may be unsurprising that, in this particular course, students much preferred live lectures to online class, regardless of the form it took. This preference is particularly supported by the fact that one of the most obvious potential disadvantages of live classes in the pandemic, the required use of masks, did not seem to be problematic from a speech intelligibility perspective. Nevertheless, pre-recorded lectures did not, on average, rate negatively for speech or writing intelligibility, nor for ability of students to focus on the lecture. Another theory for the preference, the absence of personal engagement with video lectures, may not explain this

preference either, although this may be an error in the formation of survey questions. It is possible that improved video production quality (for instance, more dynamic and better edited pre-recorded videos; or a dedicated camera operator and wireless microphone for live-recorded lectures) might considerably increase the favorability of video learning for students, but such conclusions are beyond the scope of the data presented here. Some care should be taken when drawing broad conclusions from the presented facts, as the single class represents a relatively small sample size, and particular teaching characteristics of the instructor might have a significant effect on these results.

After obtaining survey and individual feedback, the lecture material was again given primarily in-person. Informal polling suggests that, after trying the various class recording options, the majority of students preferred their lectures this way. Although this meant that students missing class because of quarantine mandates had to use the least preferred method (live-recorded lectures), very few students ended up having to quarantine for a long period of time, such that the brief disadvantage for individual students perhaps did not outweigh the general advantage of live lectures.

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