Recapping Class Content with Student Video Responses

Prof. Kaela Mae Martin, Embry-Riddle Aeronautical University, Prescott

Kaela Martin is an Assistant Professor of Aerospace Engineering at Embry-Riddle Aeronautical University, Prescott Campus. She graduated from Purdue University with a PhD in Aeronautical and Astronautical Engineering and is interested in increasing classroom engagement and student learning.

Dr. Dina M Battaglia, Embry-Riddle Aeronautical University, Arizona

Dr. Battaglia is the Director for the Center for Teaching & Learning Excellence for the Embry-Riddle Aeronautical University Prescott campus in northern Arizona. She earned both her M.S. and Ph.D. in social psychology from Texas Christian University and has over 16 years of collegiate teaching experience.

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Introduction

An old adage states that we learn by teaching, and similarly, students learn concepts by talking about them. Bransford, Brown, and Cocking[1] acknowledge that one of the significant discoveries from the science of learning is to "organize knowledge in ways that facilitate retrieval and application." By talking through a solution to a problem, students organize information and realize errors or misunderstandings that were previously present.

Humans process information and remember through language.[2] By incorporating discussions into the classroom, students are forced to confront their assumptions, implement collaborative learning, and improve their synthesis skills.[3] Furthermore, classroom talk increases student learning and understanding[4] to potentially move students from novices (blindly following rules) to experts (using intuition to find a solution).[5]

One common "learning by talking" technique historically used is the oral examination, which has been shown to increase student knowledge and cognitive learning.[6-8] With the advancements of technology, today's students learn by talking through the creation of videos for projects which have also shown to enhance learning.[9,10] In distance education courses, this technique has evolved through the use of student-made video responses. Specifically, a common technique is for students to create discussion posts through short videos,[11] but videos have also been used to respond to video critiques made by the instructor.[12]

While student-response videos are popular with online and hybrid classes, little research has been done on the use of student-response videos in face-to-face learning environments. Using video responses in tandem with a flipped classroom may provide new insights. Instead of incentivizing students to watch these "flipped" videos by requiring the completion of online multiple-choice quizzes, a richer understanding of the topic may be found when students complete assessments with video responses. This study aimed to gain a greater understanding of the benefit on learning when students use video responses for assignment assessments.

Methods

Because we know students often learn when talking through problems, this research investigated a new video response tool (Recap) to assess student favor for using this new technology.

The study began in fall 2016 with a class size of 31. Students enrolled in a required junior-level engineering class (orbital mechanics) at a small private college in the west participated in this study. A required junior-level course was chosen since students have had previous opportunities to work on open-ended questions in the curriculum. The junior year is also an important year when students receive a large chunk of their technical training before the senior capstone courses.

For half of the semester, students were in a "flipped" classroom model where they watched videos before class that covered the content, took a quiz, and spent class time clarifying concepts and working on homework. The quizzes consisted of Recap student response videos and online

quizzes through a learning management system (LMS), Canvas. The video quizzes asked conceptual and open-ended questions about the currently viewed video as well as previous topics. Each quiz consisted of two to three questions, and students had no more than 30 seconds to respond with an answer (15 seconds was deemed by the instructor and students to be too short). The questions given in Recap tended to be more open-ended than multiple-choice quizzes on the LMS and sometimes focused on student opinions (e.g., "If you had to choose between a bi-parabolic transfer and a Hohmann transfer, which would you choose? Why?").

Recap, a new application developed by Swivl, is currently in beta version. Responding to Recap assignments can be accessed through a webpage or an app for iOS and Android. Currently, the webpage version is the only method to access the teacher interface seen below in Figure 1.
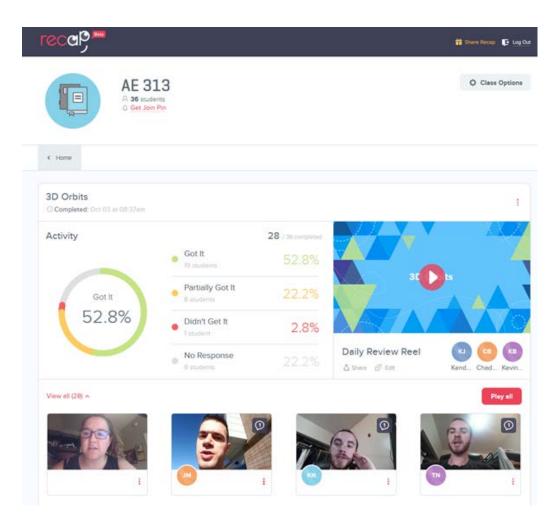

Figure 1. Teacher Interface for Recap

Students log in with an email address and join the class through a 7-digit pin number. They then see the available assignments to complete as shown in Figure 2. Students click on the assignment they want to complete, and a new page shows the questions similar to Figure 2. Students click the "Respond" button to record their response before proceeding to the next question. If students

are unhappy with the first recorded response, they can re-record their response as many times as they wish before submitting the assignment.
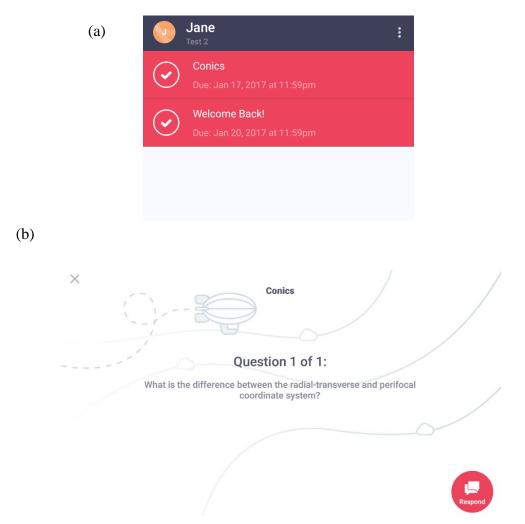
(a)

(b)

Figure 2. Recap Student View (a) and Sample Question (b).

At the end of the semester, students were asked to fill out a four-question survey. The questions included "How much did the use of Recap help increase your understanding of the course material?", "For daily quizzes, what ratio of Recap quizzes to Canvas quizzes would you prefer?", "Would you recommend other professors use Recap in their classes?", and "If you were to give advice to other faculty who wanted to use Recap in their own courses, what would you recommend?" The first two questions were scored on a Likert scale ("Not at All, Very Little, Neutral, Somewhat, Very Much" and "Always Canvas, Slightly more Canvas, Equal Canvas and Recap, Slightly more Recap, Always Recap"). The third question was a yes/no answer and the final question was open response. The anonymous survey was administrated through a LMS.

Results and Discussion

Of the 31 students enrolled in the class, 26 completed the survey. Figure 3 shows the response to "How much did the use of Recap help increase your understanding of the material?" With the

responses ranging from 1 (none) to 5 (very much), the mean was 3.42 (sd = 0.90), and the median and mode were 4.00. Since no students reported zero learning gains, all students agreed that Recap helped them gain at least some understanding of the material. With Recap currently in beta mode, there were a few technical issues with the product, which may have contributed to the lower perceived learning gains.
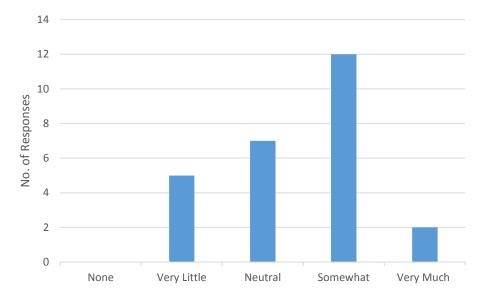

Figure 3. Response to "How much did the use of Recap help increase your understanding of the course material?"

Since the survey was anonymous, no correlations can be calculated between student self-reported perceived learning and their respective grades. Plus, because this was the first time the instructor implemented Recap within the flipped class course design, there are no other comparison groups for determining the specific and precise impact on learning of Recap as the instructor has not yet taught this course using the same design without Recap. However, future studies will be designed to better measure the relationship between video responses and student learning now that a "baseline" using Recap has been determined.

Even though our primary and ultimate goal as educators is to increase student learning when implementing any new digital learning strategy or pedagogy, we believe it is also important to be attuned to student learning preferences as their preferences may impact their motivation for learning. Thus, since this study was the first time the instructor had implemented student response videos, the instructor wanted to gauge student preferences for learning compared to a more familiar LMS quiz. Student response to ratio of Recap and LMS quizzes had a more equal spread as seen in Figure 4. With a numeric score of 1 for "Always Canvas" and 5 for "Always Recap," the mean was 2.81 (sd = 1.20), and the median was 3.00. From these results, one might conclude students slightly preferred the quizzes on LMS to Recap. The quizzes in Recap and LMS were graded on correctness, but the open-ended nature of the Recap quizzes meant that points were more readily given. From the open-ended comments, students did notice that Recap questions gave "more insight into the students [sic] knowledge than a multiple choice question" and "Recap is a good way to change things up."

The Recap quizzes cannot be automatically graded like some LMS quizzes. For this course, each quiz consisted of three questions that were no more than 30 second responses. Each question was worth three to four points (for a quiz total of 10 points). Students received full marks for a correct answer, one point off for a minor error, and two points off for a major error. For a class of 30 students, it may take up to 45 minutes to grade each quiz. Compared to an open-ended question through an LMS quiz, there was a slight increase in overall grading time. However, the benefits of using video responses evidenced in the online research[9,10] outweigh the slight increase in grading time. With the lengthier grading time than auto-graded LMS quizzes, student video responses might not work for daily quizzing but may be useful for assessing the connections and relationships between concepts at the end of a section or module.
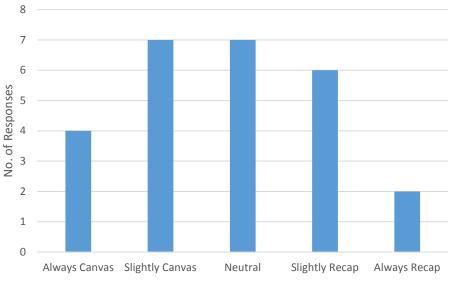

Figure 4. Preference of Ratio of Recap and LMS quizzes.

Overall, more students would not recommend other professors use Recap than those who did. Of the 26 responses, 16 would not recommend using Recap, and the other 10 would recommend it. From their open-ended comments, it was clear that the majority of the issues with Recap came from technology difficulties. For instance, three open-ended comments included complaints about the due date options. The fall 2016 version of Recap only offered due dates within 24 hours, 48 hours, or a week from the time the assignment was issued, but the current version now has the capability of specific due dates and time (i.e., 12 pm on Friday, March 1). Furthermore, the application was prone to crashing, and if students closed the application before their video was uploaded, the video would not upload. Students also had a problem resetting their password and occasionally had to create a new account to submit a new video. Beside technical dissatisfactions with Recap, introverted students did not like taking videos of themselves, and there was not an option to black out the video (some students chose to take videos of their computer screens or their desks instead). The posed questions in Recap can also be videos, which is useful when the question is based on a diagram. However, if you use a detailed diagram, students did not have the option to zoom in on the figure during the video, which may make answering the question difficult.

Conclusions and Future Work

After one semester, we saw that students who use video responses for assignments report an increase in learning yet would not recommend other instructors use Recap. With the tested Recap version in beta mode, technology problems arose that could have prevented students from seeing more of the benefit of video responses. With improvements to Recap such as due date choices and fewer uploading problems, the application may still be an option for benefiting student learning. As it currently stands, we believe Recap's technology glitches hinder true learning gains and have decided not to implement Recap during the spring 2017 semester. Plans to revisit the technology later in 2017 to see what improvements have been made will determine future use and implementation decisions.

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