Video-Enhanced Homework in an Agricultural Technology Course

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Introduction and Need for Innovation

The risk of Covid-19 transmission has forced many teachers to pursue alternate methods to provide students with appropriate educational experiences. As teaching shifts to a virtual environment, it is only fair that traditional activities such as printed homework assignments do the same (Bennett et al., 2008). According to Shoulders and Myers (2012), experiential learning is an important component of agricultural education.

In response to COVID-19, instructors are becoming more adept at using digital classroom delivery methods such as video-enhanced homework to help provide these necessary experiences. To be effective, learning activities must consider three factors; cognitive load, student engagement, and active learning (Brame & Perez, 2017). Students need this format to retain information and stay focused on the assignment while taking part in video-enhanced homework laboratories. Toward this end, we developed and incorporated video-enhanced homework activities into a freshman-level agricultural systems technology course.

How It Works

This idea is based on students being given the opportunity to record data required for use in their homework assignments through a short lab video. The video focuses on the instructor making data measurements and providing the students an opportunity to visually see and to identify the processes underlying the concept. The videos are made using a tripod camera that is picked up and zoomed in so that students have a clear view of what data they are to record. The videos are then edited so that they are around two minutes in length. The videos use signaling text at data collection points to prompt students to record data at specific points in the videos (Brame & Perez, 2017).

Three video-enhanced homework assignment were incorporated into ASTM 1613 – Fundamentals of Agricultural Systems Technology at the University of [State] in fall 2020. The first covered basic engine measurements and calculations, the second covered lawn spreader calibration, and the third, covered tractor dynamometer testing and fuel efficiency. Figure 1 shows a screenshot from the third video-enhance homework.

Figure 1

Screenshot of Tractor Dynamometer Testing and Fuel Efficiency Homework Video. (Video courtesy of University of Missouri AST program.)

Results to Date

After students (n = 38) completed the tractor dynamometer video-enhanced homework, they were asked to complete a voluntary (IRB-approved) survey concerning their perceptions of the homework assignment (Table 1).

Table 1

Student Perceptions of the Video-Enhanced Tractor Dynamometer Testing Homework

Statement	M^a	*SD*
I found the video homework to be easier to understand compared to the usual printed homework assignments.	3.51	1.08
Completing the video homework helped me understand tractor dynamometer testing better than I would have with the usual printed homework.	3.84	1.13
I like the usual printed homework better than the video homework.	3.16	1.00
I would like to have more video homework assignments.	3.59	1.10
The video homework was too much trouble compared to the usual printed homework.	2.06	1.13
I like the video homework better than the usual printed homework.	3.34	1.19
I learned more by doing the video homework than I would have by doing the usual printed homework.	3.49	1.20

[a]*Based on responses to a Likert-type scale where 1 = Strongly Disagree and 5 = Strongly Agree.*

These results indicate students have a slight to moderately positive perception of the video-enhanced homework assignments as compared to the usual printed homework assignments. Given the reduction in experiential learning experiences due to COVID-19, the most salient result is the finding that students agreed (M = 3.84) the video-enhanced homework helped them to better understand tractor dynamometer testing.

Future Plans

This research suggests that students are receptive to and have a slight preference for video-enhanced homework assignments as compared to traditional homework assignments. Therefore, we plan to develop and incorporate additional video-enhanced homework assignments into ASTM 1613 and other ASTM courses as appropriate. In addition, we plan to conduct an experimental study to determine if video-enhanced homework assignments make a significant difference in student learning compared to traditional alternatives.

Costs

The cost of this study is relatively small consisting of the materials used in the video demonstration such as the engine, spreader, fertilizer. The dynamometer video was used with permission from the University of Missouri Department of Agricultural Technology. Additional videos were made in the department with a cell phone and available supplies and equipment. Many of these supplies are already on hand at the university laboratory and can be used cost free.

References

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