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IMPACT OF VIDEO PRE-LAB LECTURES ON STUDENT LAB PERFORMANCE AND CONFIDENCE IN A TWO-SEMESTER ORGANIC COURSE

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Impact of Video Pre-lab Lectures on Student Lab Performance and Confidence in a Two-semester Organic Course

Synopsis:

Pre-lab lectures for organic chemistry laboratory were video recorded, processed through Camtasia, and then posted to YouTube for student access. The videos include the usual information regarding chemistry and glassware set up with a complete model. The impact of these videos on student performance and confidence will be discussed.

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Introduction

There were several motivations for recording pre-lab lectures for a 1-year organic lab sequence. First, there was a desire to offer consistency of pre-lab lectures over multiple sections. Second, some techniques have to be explained nearly every time the students have to use them, such as recrystallization. It was desirable to build an archive of videos that dealt with techniques used throughout the year of organic lab that the students could use as a resource, especially considering that most, although not all, have a smart device and can review during lab. Third, given certain economic considerations it seemed appropriate to reduce the number of contact hours during the first semester only. This could be accomplished by an archive of videos relating to the individual lab experiments.

A quick search of the internet reveals several videos that are currently available regarding organic lab techniques and reactions. However, those videos are tailored to the environment at the particular school that produced the videos. This presents a problem as no two schools have the same environment. Also, no two faculty will explain the same way nor stress the exact same points. Several of the videos initially surveyed were produced by teaching assistants and did not seem appropriate. There is certainly a report that develops between faculty and their students. For these reasons, it seemed best to produce videos unique to our environment.

Implimentation

This project was essentially a one-person effort although not without significant help from the IT department. Some equipment had recently been purchased by IT and this included Swivl robot, iPad, hand-held camcorder, and license to Camtasia. Several different methods were used to record the pre-lab lectures but in the final analysis the method that yielded the best results was using the camcorder for video and voice recording while attached to the Swivl robot atop a tripod. The Swivl robot allows for use of a specific remote microphone that also allows tracking of the speaker. The same lab space that students use was the background for recording the actual technique and glassware set up the students would be using. On occasion a second camera was used to supply a different view of the set up or reaction. The second camera was often a cell phone. Lastly, any chemistry explanation was recorded using a whiteboard as the lecture would have been given.

Recorded videos were edited using Camtasia with a mind to keep individual videos short, usually less than 8 minutes, and to the point. A complete pre-lab lecture typically consisted of 3 – 5 short videos assembled in a YouTube playlist. The link to the playlist was then made available to the students by the course management software (D2L). The links were made available 1 week before the lab sequence would begin.

As might be expected, there was a significant learning curve for use of Camtasia. Early in the project the IT department was heavily relied on. As the semester progressed the task of editing videos became easier and new editing techniques were gradually learned and applied.

Impact on student performance in lab

At the beginning of the semester the students were informed that the videos would be their only source of pre-lab lecture and they needed to watch the videos prior to the scheduled lab in order to know what to do. The students also had an in-house prepared lab textbook that contained a text regarding the technique or experiment, written procedure, pre-lab and post-lab questions. The CMS allows for tracking of students who access posted links. The links on YouTube were closed to outside searches so students had to access the videos through the posted link on D2L. The initial rate of compliance was 70 – 80 percent and by mid-semester it was about 90%. Later in the semester the percentage of students accessing the videos through D2L did drop but the report was that they were often watching in small groups so not every student watching was counted.

Almost immediately it was observed that these students were better prepared for the lab than students from previous years that only had the text and the pre-lab lecture in person prior to the lab. Students displayed a surprising amount of confidence with getting right to work and accomplishing the day's procedure. There were far fewer questions during lab about what the students were going to do next. Several times students were observed using a smart device to review the videos for that week's lab. Students requested that videos be made searchable directly through YouTube to be more readily available.

Conclusion

A single set of videos for a given lab procedure may take the better part of a day's work between preparation, recording, and post-production work. That is a significant investment of time, however once prepared the video is done and available for future course offerings. There may be improvements to be made to sets of video as mistakes are realized or better ways of stating details.

Though anecdotal at this time, the improvement to student performance and confidence in the organic lab seems to be significant. Also, this has allowed for some cost savings to the university as the organic 1 lab contact hours have been reduced. At this time organic 2 labs have not been reduced because the typical organic 2 lab is more involved than organic 1 lab.