CAL-STEP STUDENT INTERVIEWS
CIRCUITS, SPRING 2016
STUDENTS ENROLLED IN ONLINE LAB COMPONENT

Introduction: This summary presents highlights from interviews with four students enrolled in the online Circuits lab course. Three of the students worked together as lab partners and jointly submitted reports. Two of these students were paired from the beginning of the class. The third partner joined several weeks into the semester. The fourth interviewee worked on his own as an online student.

The following presents highlights and themes identified through interviews with the three lab partners:

Previous online experience and other preparation such as working in teams: Two of the three partners had taken liberal arts classes online in the past, but had no STEM online experience. The third student had taken several engineering courses online with mixed results, including an online Circuits class he dropped because it did not have a lab component. For him "the lab component solidified what was learned in theory."

All three lab partners said they had taken engineering and physics courses in the past that required team work. One student highlighted introduction to engineering as a course that placed a great deal of emphasis on team work.

Why did they take the course online? One student lives near Davis and took the class because he needs it to transfer and there are no community college engineering programs in his area. The other two students opted for online because of scheduling conflicts.

How did they do it? Before they started each lab session, the students read the directions which they estimated required 10-30 minutes. The partners agreed that coming prepared in this way was important and one noted that the lab session slowed down when one lab partner came unprepared on one occasion. The lab partners started out using text to communicate and then realized it was better if they could see each other. They switched to Google Hangout for their meetings and each time they met would follow the instructions to determine the steps they needed to complete after which they would make assignments. There did not seem to be a team leader – decisions were made by consensus, although the two original partners seemed more engaged than the student who joined later in the semester. One partner said that he tended to do "the theory part" while another partner was more likely to be building the model and taking measurements while the third member of the team would help the others with these tasks. One of them explained that they used their webcams to show and share what each was working on. Two of the partners said they "double-checked each other's work" to make sure they learned everything. One partner said the students "throughout the experiment worked on the same data sheet and put both their names on top" and "talk and walk through every step." (note: it seemed at times as if the two original lab partners did not fully think of the third partner who joined later as completely "equal.")

The partners estimated most of the labs required 4-5 hours and sometimes required more than one session. They said they often met "a couple of times a week."

Challenges they encountered: All agreed that finding a time that worked for all of them for the duration of each labs was one of the biggest challenges. One student felt the communication was more challenging online and the others agreed that "things probably took longer [online]. Slow connections proved problematic on many occasions.

Relationship between lab and theory: You had to know the theory to do the lab, the partners agreed. There were weekly assignments and if you had not completed these, the labs would be harder to solve. It seems that the three partners consistently came to the lab having completed these assignments. However, "we did not spend much time talking about theory," during the labs, one partner noted.

In discussing the lectures, two of the lab partners noted that the YouTube resources helped a lot, especially because they could replay the lecture was great. "You could go back and replay at 1.5 speed." The students also liked the Google Hangout office hours.

How well do they think they learned? One student said he learned from seeing how his lab partners solved problems. He also felt the need to coordinate the online lab sessions increased his organizational skills.

One student said he really liked the learning community the lab partners had formed, especially the two original members of the team. The lab partner who lived far away felt a bit left out when those living near each other and campus met without him on a couple of occasions because they felt it was easier to communicate in person. However, the lab partner who lived farther away showed great enthusiasm when talking about how much he had liked being part of a team "Group work is cool. It creates community. This is especially nice when you are from a college without an engineering department and other students studying engineering."

The students greatly appreciated the instructor's willingness to be flexible in scheduling the tests. They loved MATLAB.

Insights provided by fourth interviewee (who worked on his own as an online lab student)

- Student spent an average of 6 hours/week on the lab
- If the student had questions, he sent questions to the instructor by email.
- The student created his own YouTube videos and posted them to show he had completed an assignment and included in his video submission "unsual observations." He used his MPC email account to upload the videos and his IPhone to do the recording.
- He watched some of Rachel's videos and found them helpful when he did.
- He liked the way he was able to scroll forward and spoke of the importance of being able to quickly find information on the videos.
- In talking about the importance of the lab, the student noted that "you can read about something in the text book but the lab really brings it to life and helps you get the idea, the concept."

All interviewees were asked what it takes to be a successful online student

Most students, the interviewees agreed, will do better in a traditional environment. Online students must be organized and self-motivated. "If you keep up [in an online environment], it is no problem," one highly motivated online participant noted. It would be good if high school students were taught how to learn in an online environment, he continued. Early exposure would help a lot. "I would not have been ready for this [online instruction] at 18," he added.

There are technical requirements that have to be met in terms of quick and stable Internet connection. For the students who worked in a team, requirements also included video cameras and phone cameras as well as capacity to carry on group conversations by phone. All of these "tools" should be tested in advance so students don't have to solve technical difficulties during class/lab time.

Ideas for improvements: Make the Sunday evening sessions mandatory. Otherwise, no ideas – the students really liked the entire experience, although two of the four would most likely opt for FTF instead of online if given the choice.

Ideas for increasing the use of a forum: Require as part of the grade that students post a question each week and respond to one as well. There is a built in incentive to get this done quickly as the longer you wait, the more likely it is that questions you want to pose have been taken already and the easiest questions posed by others answered already.

Observations

The team – especially the original two members of the team – seemed highly organized and motivated. When they ran into a challenge, such as not being able to see what was on the shared screen sufficiently well for the lab project, they took photos with their phone of what they were doing and sent them to each other. All the lab partners seemed to come prepared to the labs and there was no disagreement about the division of labor. The student who was taking the course because his college does not have engineering courses, made an important remark which is that **the online team work provide him with a welcome opportunity to engage with other engineering students. (Note: We had not identified this benefit of online team work before.)** The student is committed to getting the message about online engineering courses out to other students who like himself attend community colleges with no engineering courses. He attributes his own ability to find these courses to skills and confidence he learned from being a member of student government. He is presently working on a project to help other community college engineering students navigate their way to the online courses they need to transfer and gather information that will help them decide what is a good match. (How is this going?)

The group member who had taken other engineering courses online really liked the way the instructor in this class was extremely committed and well-organized. "Online courses vary a lot depending on the instructor," the student added, pointing to one online engineering course he took in the past that was taught by a "non-responsive" instructor with a "hands off approach."

The determination and resourcefulness of especially the original team members seems to have played a key role in making them successful.

The YouTube video submissions piloted by the student who worked alone could become a requirement for the submission of lab homework. To do so, there might have to be training up front in how to create and post YouTube entries. It might be an idea to have the student himself create a how-to YouTube video of what he did step-by-step and have future students use this video as a resource.

Some students see right away the benefit of being able to do lab work at their own pace, including opportunities to repeat experiments and spend additional time on difficult concepts. "I could work on the lab whenever I wanted to. Having it at home was great. I took advantage of it all the time," one enthusiastic student noted.