

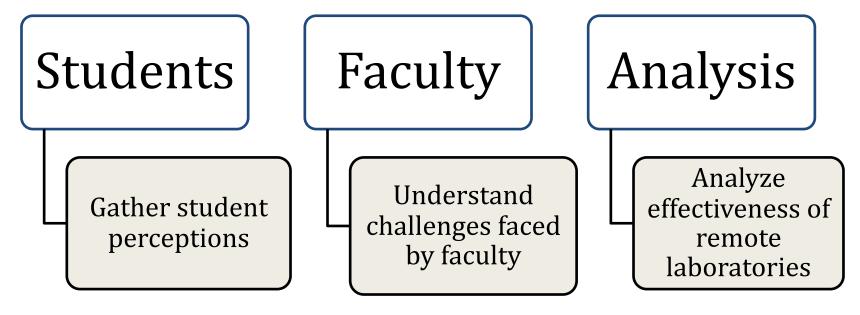
Analyzing the Effectiveness of Remote Laboratories

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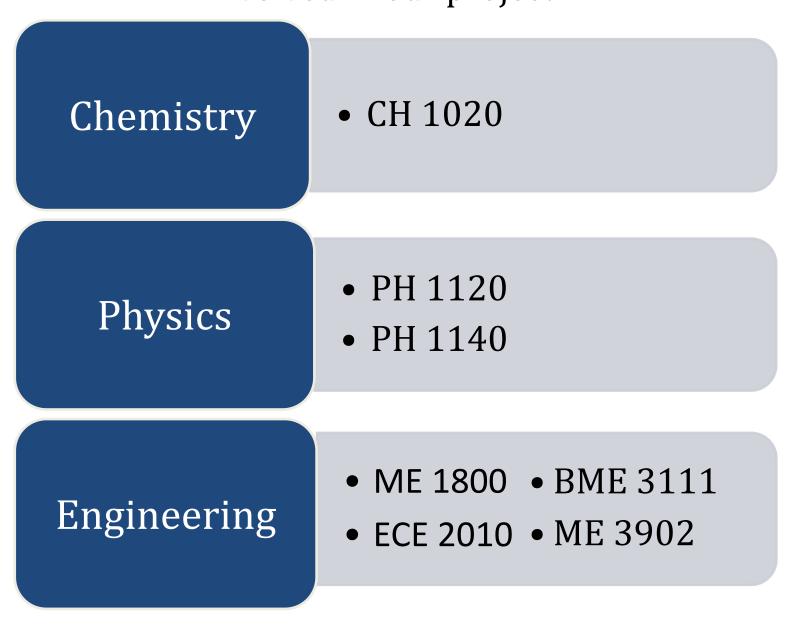
Mission and Objectives

The goal of this project was to examine how the transition to online and alternative teaching methods during the coronavirus pandemic has affected students' learning and faculty's teaching in laboratory courses.



Survey

We sent our survey out to the following classes, and grouped them as shown to protect the identity of professors who were involved in our project



Interviews

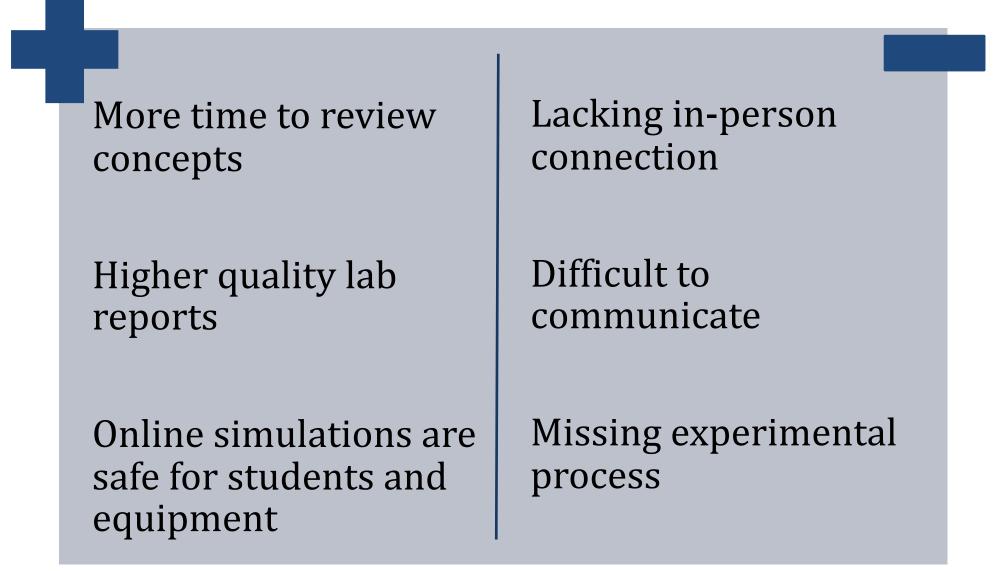
We interviewed six professors to gain a perspective of what changes they have had to make and challenges they have faced to transition their classes to the remote delivery.

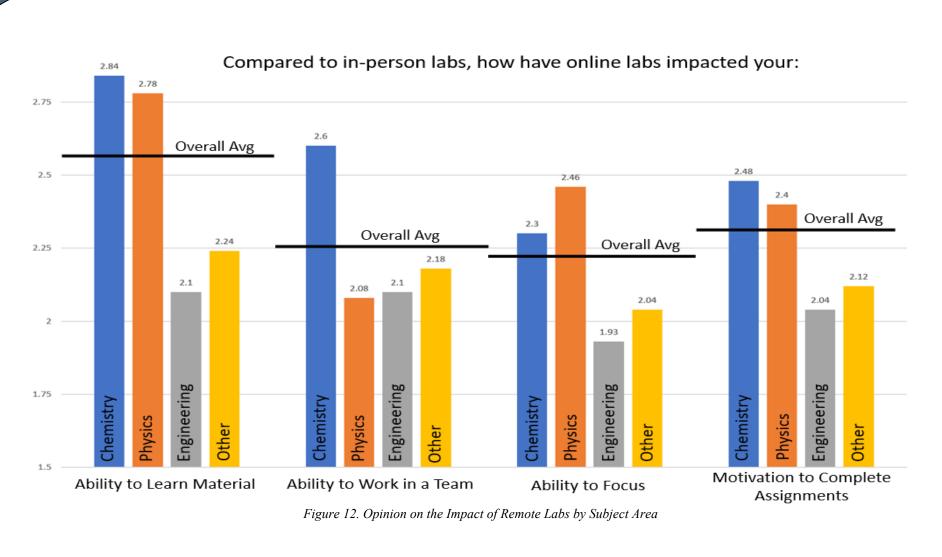
General Survey ResultsN = 195

Students hold a slightly negative opinion on the transition to online classes with 51% responding "Somewhat Negative" or "Extremely Negative". When asked more specifically about remote labs, 55% responded negatively and more than twice as many students responded, "Extremely Negative".



Interview Takeaways





Opinion on the Impact of Remote Labs by Subject Area

Comparative Analysis

Variables we investigated in our student survey included the ability to learn material, work in a team, focus, and the motivation to complete assignments. We found that the chemistry and physics classes we investigated had an average result that was more positive than that of the engineering classes for our performance variables. However, while chemistry and physics were more positive, they still had an overall negative response to the variables. This information is shown in the graphic above.

Final Conclusions and Recommendations

- Students are dissatisfied but they are doing their best
 - They are missing out on the experimental process
- Professors are missing connections with their students
 - Communication is more difficult between professors and students
- Higher level engineering classes are struggling the most
 - For a phased reopening of campus, higher level laboratory courses could benefit more from being a priority