

# **Thesis Portfolio**

**Redesigned Zoom Interface to Increase Participation in Online Classes**  
(Technical Report)

**Social Construction of Technology in Higher Education**  
(STS Research Paper)

An Undergraduate Thesis submitted to the Department of Engineering and Society  
Presented to the Faculty of the School of Engineering and Applied Science  
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In Partial Fulfillment of the Requirements for the Degree  
Bachelor of Science, School of Engineering

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#### **SOCIAL CONSTRUCTION OF TECHNOLOGY IN HIGHER EDUCATION**

STS Advisor: Travis Elliott, Department of Engineering and Society

#### **PROSPECTUS**

STS Advisor: Travis Elliott, Department of Engineering and Society

The technical report and STS research both deal with technology used in education. The technical report details a new interface design for video conferencing software used specifically for online classes. The STS research paper examines the social factors affecting the adoption and development of educational technologies.

Schools began to use video conferencing software for their classes due to Covid-19 forcing classes online. This software, such as Zoom or Microsoft Teams, was functional but was designed for business use, not to replace a classroom. While online learning existed in the past, it was a much smaller segment of education without many tools developed specifically for it. Online classes have also caused a decline in class participation. There are many features that could be added to current video conferencing software to help improve and promote more participation from students. The features are centered around helping teachers better manage and track participation from their students. The redesigned interface allows teachers to evaluate student contributions (for their own records) in real time after the student speaks or chats. It also provides more detailed attendance data and redesigned breakout rooms to make them more like a real life classroom.

The STS research applies the Social Construction of Technology (SCOT) framework to the adoption of technologies in education. It describes the relevant social groups in education and explains how their interactions and conflicts shape adoption of a new technology. Two case studies of education technologies, Piazza and online proctoring services, provide examples of how different social groups can view a technology in different ways. In the case of Piazza, the technology progresses and becomes more widely adopted when conflicts between groups are solved. However, the online proctoring services were unable to resolve some of the conflicts they created which led some institutions to reject the technology.

Examining the adoption patterns of other education technologies helped steer the direction of some of the design decisions in the technical report. Students and teachers were very concerned about privacy and data collection in both cases. The software design was very conscious of their concerns and choices were made to collect less data when possible. Recording video clips and chat comments for later reference was an initial idea. However, after learning about ProctorU collecting video clips of students and the backlash they received, that feature was abandoned. Another discarded feature used machine learning to monitor students' attention in class, but the proctoring software's high number of cheating false positives reflected the current limitations of the technology. If this new interface was released, the different social groups involved would shape the technology and its adoption, but looking at the case studies gives insight into how to design software that leads to less conflict and wider adoption.