Thesis Project Portfolio

Investigating Novel Proximity Monitoring Techniques Using Ubiquitous Sensor Technology

(Technical Report)

Returning to College Campuses During the COVID-19 Pandemic: Risk Communication, Assessment, and Perception Among College Students

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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Spring, 2021

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Sociotechnical Synthesis

Contemplating Collegiate Risk Awareness During the COVID-19 Pandemic.

I. Introduction

Originally, when I was assigned to a capstone project revolving around the COVID-19 pandemic I was slightly disappointed. Six months of the pandemic leading up to the project had been exhausting and I was looking forward to a break. However, it led me to very interesting discoveries through both the technical and the sociotechnical sides of the paper. My technical project, investigating ubiquitous sensor technologies for proximity detection, engaged my thinking on how colleges responded and handled the implications of the pandemic. I ultimately looked to understand the failures of risk communication that have led to low compliance among college students for my STS research topic too.

II. Technical Research Topic

My team and I were challenged to determine the optimal ubiquitous senor technology to measure proximity data between college athletes. While the pandemic accelerated in the fall, so did the college sports industry. Sports teams were looking for accurate, real time proximity data to promote social distancing and allow schools to contact trace in the event of a positive test. We narrowed the selection to three different sensors: Bluetooth, ultrasound, and ultra-wide band (UWB). After developing code, and running experiments the team determined that UWB was, by far, the most accurate sensor for an accuracy rating of over 95%. Although UWB was the most accurate sensor, the team evaluated ultrasound to be the most optimal in terms of its ease of use and integration into modern day systems already.

III. Sociotechnical Research Topic

While working on my technical topic, I was bothered by the lack of attention paid to compliance with social distancing regulations among college students. This led me directly into my STS research paper, to evaluate compliance with COVID-19 imposed social distancing / mask regulations among students. Luckily, I researched and developed a framework that evaluated risk communication among governing

bodies as well as risk attitude and perception among adolescents. Being a college student during this hectic period, I had ample evidence of compliance and non-compliance alike among college students and was able to generate a case study on UVA student's response to coronavirus. After analyzing the communication by the university and the response by the students, it was clear that there were shortcomings in the way the university presented the risk of COVID-19. If colleges were better able to portray the virus as tangible and understandable, and less controllable by students, then the risk perception would be greater and compliance would rise.

IV. Conclusion

Throughout the STS and technical writing process, my focus was continually evolving. Progress, in either the technical or the STS portion, would drive new developments in the other section where each part played off the other and allowed them to connect on deeper themes of college students, compliance, and risk awareness. The process of crafting both papers has led me to have a new appreciation for the incremental method since everything you think you know in the beginning WILL change. It's not a matter of if, but when. Learning to adjust as I went and write about what the information gave me was an important skill. Adjusting to circumstances is a crucial part of engineering, especially when you are dismayed by the potential of a project, like I was at the beginning of my capstone. Making the best of a situation can lead to surprising results and the exploration of topics you never knew existed, or wanted to study. In the end, lean into any project you are assigned to, and you will find it to be a valuable and enriching experience by the time you finish.