

**Thesis Portfolio**

**Web Application Proposal for Cyber Security Topics, IoT Vulnerabilities, and Password Strength Checker**

(Technical Report)

**The Psychology of Smart Devices: How the Use of Smartphones Affect Our Minds**

(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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## **Table of Contents**

Sociotechnical Synthesis

Technical Report: Web Application Proposal for Cyber Security Topics, IoT Vulnerabilities, and Password Strength Checker

STS Research Paper: The Psychology of Smart Devices: How the Use of Smartphones Affect Our Minds

Thesis Prospectus

## **Sociotechnical Synthesis**

Technology's presence within society is exponentially increasing, but have you ever thought—what little we know about technology for how much trust we place in it? In other words, how are we as a society so complacent when it comes to technology, rather than learning how technology affects us. These questions frame my technical capstone project and my STS research paper.

Many points throughout the day, people interact with technology, but does the average person know about technological security or how their data is used? As a computer science student, I see it as part of my responsibility to inform the public on these topics. Educating those who are not as technologically savvy inspired my technical capstone project, where I propose a web application that explains cyber security topics, details internet of things (IoT) vulnerabilities, and implements a password strength checker. This tool acts as a “one-stop-shop” for popular cyber security topics, which prepares users for defense against attacks and vulnerabilities.

Furthermore, people are exposed to technology—specifically smartphones—for hours each day without thinking about how this affects their life. Therefore, educating people on how smartphones affect various aspects of their lives inspired my STS research paper. The paper summarizes and highlights existing research on how smartphones affect users negatively (focusing on mental health, social-emotional skills, and cognitive ability) and how smartphones affect users positively (focusing on building and improving skills, socializing, and emotional-health benefits). Even though my research presented no direct results, it did reveal that previous studies are not comprehensive; in other words, they focus heavily on the human aspect and neglect the technological aspect.

My technical capstone project and STS research paper provide individuals with a toolkit that can aid them in making decisions on device use, navigating our technology-driven world, and protecting themselves from bad actors. I am proud to say that both projects can educate non-technical individuals to prepare themselves for our ever-evolving technological world. In addition, both projects have possible continuations. First, since I was a team of one, the web application proposed in my technical capstone project was not implemented. Using the extensively detailed deliverable, a researcher can develop the web application. Secondly, my STS research summarizes information on how smartphones affect users through published research papers and articles. These articles are limited since they place more importance on the human aspect and less on the technological aspect. Therefore, additional research must be done—such as smartphones concerning device systems, longitudinal studies, and technological ecosystems—to understand the effect of smartphones on users.

Finally, I would like to acknowledge my STS 4500 professor—Dr. Bryn Seabrook—for guiding me on my STS research topic search, my STS 4600 professor—Dr. Sean Ferguson—for helping me refine my STS research direction, and my capstone advisor—Dr. Mohammad Mahmoody—for providing valuable support to my technical project deliverable.