**Web Application Proposal for Cyber Security Topics, IoT Vulnerabilities, and Password Strength Checker**
(Technical Paper)

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

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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## Introduction

The world is becoming more digitized by the day as worldwide smartphone usage increased by 125% from 2014 to 2017 (Shoukat, S., 2019). With this increase in smartphone usage, individuals are living more virtual lives, putting them more at risk for cyber security attacks. Cyberattacks, hacks, and security breaches over the internet have become commonplace, however, the general public are unaware on these aspects of cyber security, and how to protect themselves from such events (Bruijn, H., Janssen, M., 2017). The technical deliverable in this prospectus will bring about awareness to cyber security through a proposed web application. This application will detail various aspects of cyber security, ways for someone to protect themselves online, and a functionality that returns the estimated strength of an entered password.

The second proposed project starts on a different note. The introduction of the smartphone has led people to off-load tasks normally completed by the brain. By off-loading various tasks, people are limiting the use of their brain which may lead to cognitive failures in life (Moledina, S., & Khoja, A., 2018). Additionally, the obsessive use of a smartphone, causes people to forgo in-person social events (Vorderer, P., Krömer, N., & Schneider, F. M., 2016). With less in-person interactions, a person's ability to practice social skills decreases, which may lead to the underdevelopment of these skills. A person relies on interpersonal skills in order to effectively communicate during social interactions, such as job interviews, making new friends, and public speaking. However, without these skills, a person may fail to make new friends or elicit a job offer (Mercer, N., Farrington, D., Ttofi, M., Keijsers, L., Branje, S., Meeus, W., ... Ttofi, M. M., 2016). Therefore, the STS deliverable in this proposal aims to identify and analyze the relationship between smartphone usage and two factors: memory and social ability. Both the

technical deliverable and the STS deliverable will address various aspects of the Internet of Things (IoT), focusing on its relationship to cyber security, brain function, and social functions.

**Technical**

Many analysts suggest that over 50 billion devices will be connected to the internet by the end of 2020 (Maple, C., 2017). With these many devices present, the majority of society—including children, adults, and elderly—interact with the IoT every day, and do not understand the associated cyber security risks. IoT allows the communication between electronic devices and sensors through the internet in order to facilitate daily life, which includes cooking through smart appliances, security through smart security systems, entertainment through smart assistants, and health through fitness trackers (Manuel Silverio-Fernández, Suresh Renukappa, & Subashini Suresh, 2018). IoT is progressively becoming an important aspect of our daily lives, as it connects a variety of smart systems, frameworks, smart devices, and sensors (Kumar, S., Tiwari, P. & Zymbler, M., 2019). While the emergence of IoT has progressed society immensely—in terms of efficiency and quality—security of data and information is an important concern, but also a major challenge. Since the internet is one of the largest sources of security threats and cyber-attacks, hackers have made the data communicated through the internet insecure. The most significant concern of IoT is security and the collaboration between social networks and privacy (Kumar, S., Tiwari, P. & Zymbler, M., 2019). Some examples of IoT devices, include smart speakers like Amazon Alexa, smartphones, smartwatches, smart home systems, smart appliances, smart health sensing systems, and any device that connects to the internet which transfers data.

Despite the risk-reducing impact of good cybersecurity habits and the ever-increasing cyberattacks on business and individuals, a survey conducted by Pew Research Center reveals

that out of 1,055 participants, the average respondent answered only 38% of cyber-knowledge questions correctly (Olmstead, K., & Smith, A., 2017, March). Therefore, a basic knowledge of the threats related to IoT and smart devices will allow people to make better informed decisions about their presence online. To increase people's understanding of potential cyber security threats, this individual capstone project aims to develop an extensive layout of a web application. The web application will not be implemented, but rather, a sufficiently detailed proposal will be provided so the reader understands what is fully being proposed through the application. This hypothetical application will first describe various aspects of cyber security, followed by ways for someone to protect themselves online, and ending with a functionality that returns the estimated strength of a user entered password. The application layout will highlight the basics of cyber security by detailing how to detect malware, recognize phishing scams, protect privacy online, identify data breaches, pinpoint online scams, and understand the risks of public WiFi. There will be three sections to the website: the first will describe the previously mentioned aspects of cyber security, the second will highlight IoT vulnerabilities, and the third will calculate the estimated strength of a user entered password. The last functionality mentioned will better prepare users for creating strong and, potentially, unbreakable passwords. Whereas the first two functionalities, provide users knowledge in cyber security, and thus, the ability to proactively manage their presence in our digital world.

**STS Topic**

In 1994, IBM developed the Simon Personal Communicator and deemed as the first smartphone. This device was not as fancy as the smartphones today, however, it featured several elements like touch screen, email, calendar, address book, and native appointment scheduler, all of which are staples to current smartphones (Tocci, M., 2020). In 2001, the first smartphone is

connected to the internet in the form of a 3G network, allowing users to video-call and send large email attachments (Tocci, M., 2020). The ability for the 2001 smartphone to connect to a wireless internet connection established a precedent that all smartphones must provide wireless access to the internet. Then, in 2007, the first iPhone is produced, which provided users with fast internet access and a vast array of built-in applications (Tocci, M., 2020). Now, in 2020, smartphones place the world in the fingertips of the user, allowing them to fully access the internet and utilize a wide variety of business, utility, and lifestyle mobile applications.

Smartphone users vary based on many different aspects like age, education level, and income. In particular, 99% of people with ages 18 to 29 own a smartphone, whereas only 53% of people whose age is 65+ have a smartphone, showing that more young people use smartphones (Pew Research Center, 2019). The main difference between these demographics is that younger users are still developing their brain, whereas the older consumers have a developed or even deteriorating brain—both of which, are altered by smartphone usage (Moledina, S., & Khoja, A., 2018). With smartphones having a plethora of functionalities that increase efficiency of the consumer, the user may forgo completing tasks themselves or in-person social gatherings due to this technology-driven efficiency. Younger individuals are more focused on completing tasks with as little work as possible, and thus, complete tasks through the use of smartphones, rather than themselves (Ihm J., 2018). Similarly, an older audience—those who has trouble remembering events, telephone numbers, and appointments—utilize smartphones to aid them in keeping track of information (Hong, W., Liu, R., Ding, Y., Sheng, X., & Zhen, R., 2020). The STS research paper will utilize these previously mentioned facts—that people off-load brain tasks to smartphones and forgo social events due to ease-of-access—in order to find a relationship between memory, smartphone usage, and development of social skills. In order to

develop the relationship, the STS deliverable will analyze the effect smartphones have on a person's memory and social functions. Without knowing whether or not smartphone usage negatively effects a person's memory or social development, individuals will continue to increase their usage of smartphones which can lead to even more hardship.

The STS paper will explain the relationship between smartphone usage, memory, and social skills using the STS framework of technological determinism. The framework, technological determinism, was originated by Thorstein Veblen, who was an American Sociologist and Economist. His use of the term "conspicuous consumption" —which means items are a mark of social status—provided the beginning conceptualization of technological determinism. More specifically, technological determinism states that technology develops society; in other words, the course of history, itself, is driven by technology (Smith, 1994). Therefore, technological determinism aids in explaining how technological development becomes the principal motivation of social change. In analyzing these relationships with this framework, the paper will evaluate the effects of smartphone usage on the user's ability to remember meetings, calculate small mathematic problems, and performance in social situations. This STS theory will aid in understanding how smartphone usage affects the decline of memory with increasing age and the decrease in social skills among younger people. Many critics, including British semiotician Daniel Chandler, have argued that technological determinism simplifies society and places too much emphasis on technology alone (Chandler, D. 1995). These critics argue that reducing the issue to a cause and effect relationship, ignores the complex interactions between society and technology (Chandler, D. 1995). Therefore, while performing the analysis of how smartphones impact a person's brain function and social skills, the paper will recognize technology is not the only proof of causation.

## Methodologies

This proposal focuses on the research question: “How do smartphones effect brain function and the development of social skills among its users?” Documentary research will be the main method for obtaining information regarding this topic. The collected sources related to smartphones will be divided into two broader categories: smartphones in relation to memory and smartphones in relation to social skills. The first category will explain what triggers in a person’s brain when using smartphones and how this can eventually affect its function. Whereas, the second category, explains the importance of social skills developing through in-person interaction—instead of virtually, with the use of a smartphone. This process will progress the analysis of how smartphones elicit effects on memory, and how smartphones play a role in the development of social abilities.

To provide insight into the human interactions with smartphones, discourse analysis will be used as a secondary research method. Blog posts will be collected that highlight personal interactions with smartphones and how they alter memory or social functions. Additionally, two online video interviews will be analyzed. The first interview will be with a high school or college student who has used a smartphone most of their life. This interview will provide valuable insight into how social skills are affected by smartphone usage over a long period of time. Next, the second interview, will be with an older individual who uses smartphones for keeping track of meetings, appointments, and events. This interview will provide insight into the relationship between smartphone usage and memory.

## Conclusion

The STS paper analyzes the relationship between smartphone usage, brain function, and social skills. The STS evaluation of these relationships is expected to demonstrate that

smartphone usage negatively effects brain function and under-develops social skills of its users. On the other hand, the technical deliverable for the capstone project is a detailed proposal of a web application that presents cyber security concepts, IoT vulnerabilities, and a functionality that estimates the strength of a password. This project will be documented in a technical thesis paper. The expected outcome is a comprehensive overview of what the web application will provide to users in terms of cyber security and password strength; both of which, allow users to better manage and protect themselves online. The technical and STS portions of the portfolio are intended to provide individuals insight into how to better adapt to the digital world.

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