Thesis Project Portfolio

Shell Scripts: How Businesses Can Utilize Shell Scripts to Automatize Database Tasks

(Technical Report)

The Influence that Mobile Devices Have on Children K-5

(STS Research Paper)

An Undergraduate Thesis

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Sociotechnical Synthesis

The STS research focused on a concurrent issue of children from grades K-5 excessively using mobile devices and how that impacts their physical lifestyle. On the contrast, the technical capstone project was in a different field which involved databases and script automation to improve database tasks. At first glance these two research topics may seem in no way compatible with each other. However, there does exist some relationship between these two. The continuous research on children's usage of mobile devices and their physical inactivity habits contains a handful of statistical data that would ideally be stored somewhere. Databases are a viable option since they are secure and offer various functionalities to make manipulating the data much easier. These project topics in combination explored the ways in which database tasks could be improved through script automation where these results can be applied to improving the research process on children's usage of mobile devices.

The technical capstone project was based on my summer work experience at a financial firm. I was put into a team of data engineers that focused their efforts on maintaining the databases that internal stakeholders were reliant on. My team during that period of time were undergoing a migration process which involved moving databases from one platform to another. The manual process was very time consuming and demanding even with a script that was already developed. I decided to make efforts in creating a supporting script that would make this process more efficient since the already existing script had limited documentation and experience in usage by my team members. With an additional script the process of migrating the databases were much quicker and much more simple to use. I looked into how often or useful script usage truly were for database tasks similar to mine. The results from this research have shown that it is quite common and the application of scripts is not only limited to database tasks but especially

useful to teach in computer science programs. In other words, script usage is versatile and can be argued as crucial for fields involving computer science related work.

Children's mobile device usage has always been a topic that discusses whether there are more merits than flaws. However, my research in particular looked in depth on how excessive usage of mobile devices may be causing a problem with children K-5 developing sedentary lifestyles. Additionally, my research questions the design decisions that mobile device engineers are making and what the ethical implications are. Do mobile device engineers have a duty to design their mobile devices so that it is not causing children to become physically inactive? To best answer this question my research considered the Code of Ethics by the Institute of Electrical and Electronics Engineers (IEEE) and the National Society of Professional Engineers (NSPE). However, I did not limit my frameworks to documentations created by organizations that advocate for ethical engineering but also included what I believe to be foundational, Kantian duty ethics. Altogether these frameworks provided a strong base for the arguments that I made on the evidence I found through researching. Results from my STS research topic has shown that mobile device engineers do have a duty to design their device to not cause children to be physically inactive, however, another essential takeaway is that this doesn't apply for the mobile device engineers themselves but to any engineer in general. Engineers have a responsibility to design ethically for the public, the users that are relevant to their innovations.

Researching both of these topics at the same time was challenging because of the limited relevancy but very rewarding in the end. There was great value post research because these two topics appeared to be not so different after all. The final thoughts that I had were that both topics heavily emphasized the importance of designing. My technical project involved designing a good script to automate database tasks in order to help a business while my STS research focused on

mobile device engineers designing ethically for children. A key outcome from my senior thesis is that engineers truly have to be mindful of the innovations that are being created. The questions of who is impacted and how should this be designed are essential for an engineer to perform the best they can; not just for themselves but for the people around them.