Thesis Project Portfolio

Using Monogame for Accessible Developmental Software

(Technical Report)

The Privacy Generation: A Historical, Multileveled Analysis on the Sociotechnical Factors Responsible for American Belief in Camera Covers

(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

Jared Patrick Conway

Fall, 2024

Department of Computer Science

Table of Contents

Sociotechnical Synthesis

(Executive Summary)

Developmental Software and Contradictions of Belief

"Your scientists were so preoccupied with whether or not they could, they didn't stop to think if they should."

- *Ian Malcolm, Jurassic Park*

Developmental software has in recent years been used to help children in various ways, such as improving their concentration. Some concentration software like Focus Pocus have used advanced hardware, such as electroencephalography (EEG) headsets, to better the efficacy of the training. As advanced as this software may be, multiple frictions due to the costs of EEGs and the requirements to use outdated operating systems to support the hardware have caused this system to become obsolete. My technical project addresses these problems by using only hardware that is readily available to anyone with a computer: a screen, and a mouse. On the other hand, my STS research investigated the sociotechnical factors which contribute to camera covering behavior in America.

The technical portion of my thesis produced a video game used to practice your concentration, usable on Windows 10. My project includes a ranking system to encourage players to improve on each level, an online leaderboard which uses Firebase's realtime database, and a level select system for easy navigation. Not only that, I included a level editor to allow users to create their own custom levels, as well as to help me visualize each level as I construct them. Originally, the technical project would have used a web camera eye tracking system, but it was determined that a mouse would suffice. The decision to use a mouse instead was partially

due to the results of my STS research paper. Early on, I found some features would take a couple of weeks to implement as I had to design nearly everything myself, including the input system, animations and sprites, and user interface. As the foundation of my codebase grew, however, I found other features such as the leaderboard only took a couple of hours due to the reusability of the foundation. By this, I learned that a strong foundation for projects may be slow to implement at first, but overtime can be a valuable investment which will save me the headache later on.

In my STS research, I researched the sociotechnical factors that contribute to camera covering behavior. In STS 4500, I had found survey data from Germany which talked about several factors that people thought contributed to such behavior - one such factor being governmental corruption. However, after using Geels' historical multi-leveled analysis as well as a Google trend analysis, I found that this could not be the case. The cyclic pattern found in the search frequency for "government corruption" was not found for "camera privacy," as seen in Figure 1 below. If these terms were as correlated as was believed by the survey data, the same pattern should be observed for both trends; hence, government corruption is not a strong indicator of camera privacy in the United States. It was instead found that camera covering behavior was more strongly linked to the prevalence of cameras in daily life. In turn, this finding caused me to drop the eye tracker for my technical project as I realized there was no good way to convince my potential stakeholders to use something that went against their values. By this, I learned that survey data ought to be treated with a grain of salt as what people think they believe is not always what they truly believe.

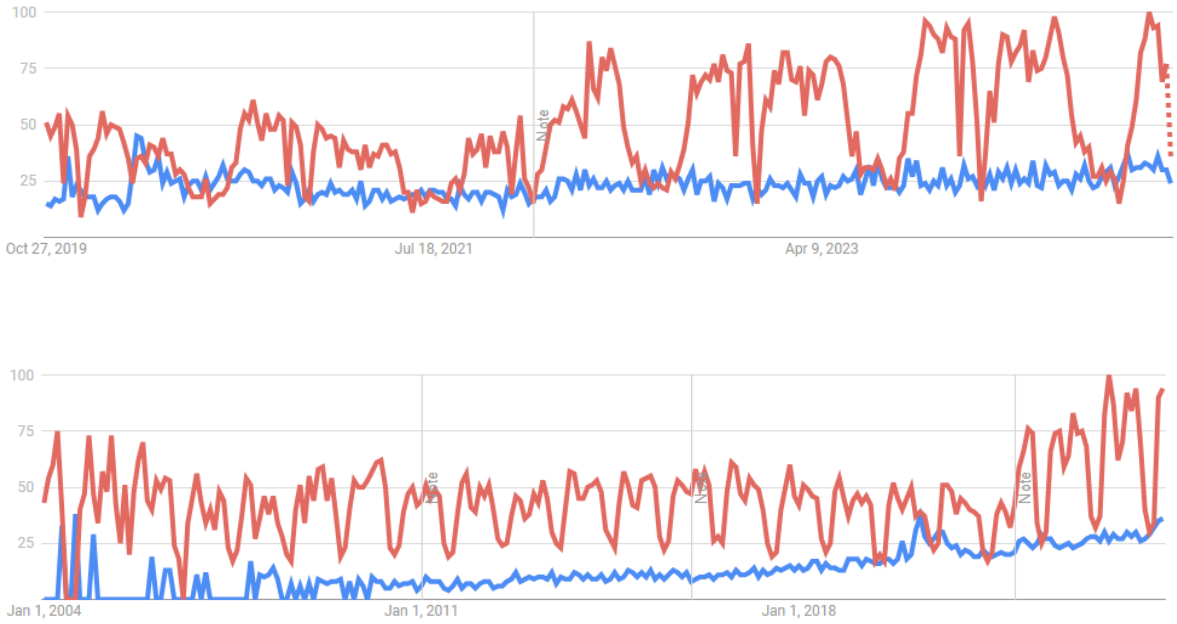

Figure 1. 5 Year and 20 Year Trend Analyses from STSRP. The cyclic red line is for the searched term "government corruption," while the straight blue line is for the searched term "camera privacy" (Author, 2024) (Google Trends, n.d.).

By considering the organizational and cultural sides of the overall topic in my STS research, I was better able to not only determine the necessary components of my technical project, but also consider the values of my stakeholders. If it was not for that research, I would have spent all of my time trying to integrate an eye tracker when a third of my consumer base would have been actively against its usage. Similar to "thin-telligence" which I had learned in STS 4500, my research helped me to identify features that I should, rather than could, implement. By this, as ethical engineers, we ought all think not only of the technical aspects of our projects, but the organizational and cultural aspects as well.