

Developing An Eye-Tracker Video Game to Reduce Destructive Multitasking
(Technical Topic)

Investigating the Root Cause of Heightened Privacy Concerns Among Children
(STS Topic)

A Thesis Prospectus
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By
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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

Despite common belief that attention spans have plummeted to around 8.25 seconds in recent years, this statistic is misleading and only represents the average time a user spends on websites before clicking off - is not representative of concentration as a whole (Bradbury, 2016, TED and the Goldfish). However, platforms such as TikTok have been on the rise to address shorter “video-preference consumption habits” which has caused other major platforms, such as YouTube, to produce more short-form content (Su, 2024, 68). Unfortunately, as users continue to consume overstimulating digital media, “deep reading,” otherwise known as critical thought, has been on the decline as users are unable to concentrate in the presence of technology (Wolf, 2018, 2). To address this decline, software such as Focus Pocus, a headset-based game from 2012, was created. Although Focus Pocus saw success in treating ADHD symptoms in children over a 7 to 9 week training period, it came with several problems. For instance, enjoyment and engagement over this training period dwindled over time (Johnstone et al., 2017, Abstract), it required the use of outdated technology that has had problems on modern operating systems, and no marketing was done outside of YouTube to promote the game. As a result, the project is now defunct and can no longer be found on even the official NeuroSky platform. Unfortunately, we cannot rely on children and young adults to actively train their focus if the method for doing so is not readily available and does not provide them the instant gratification they expect to keep them engaged (Roberts, 2014, 9).

Alongside the decrease in concentration, there has been an increase in multitasking that has “sky-rocketed in the Information Age in both the workplace and personal life” (Loukopoulos et al., 2016, 12). Although some types of multitasking can be beneficial, such as preparing dinner while a washing machine is running, others can be detrimental. For instance, around “80 percent of automobile crashes and 65 percent of near crashes occurred within three seconds of drivers’ attempt to multitask,” with cell phones being the predominant factor.

To combat this multitasking crisis from devolving further, my project will take advantage of pre-established game mechanics already ingrained in society to create an “anti-game.” In essence, the

anti-game will use overstimulating visual effects as an obstacle to the user, rather than as a reward. This project will be downloadable from major platforms such as Steam to train users to focus using a web-camera based eye tracker readily available in most users homes instead of using complicated machinery. Further research will be conducted to investigate the sociotechnical factors surrounding privacy concerns in my STS report. Additionally, my report will compare different theories which explain why this expectation for privacy exists to begin with.

Technical Topic: Developing an Eye-Tracker Video Game to Reduce Destructive Multitasking

With the advent of live streaming and the “third wave” of gaming, video games have become a “central part of our media, networked, and sociotechnical landscape” (Taylor et al., 2018, 11). Specifically, many users have turned to video games as a source of not only entertainment, but also for discussing cultural issues within society such as “the interrelation between technology and social practice” (Taylor et al., 2018, 12). Therefore, video games have become a new medium to drive movements within society, such as pushing back on multitasking. For example, Focus Pocus implemented this approach to improving concentration deficits in children by creating an electrode-based video game and found short term success (Johnstone et al., 2017, 1), but failed to reach the public eye as the game can no longer be found online.

There are three main reasons why Focus Pocus likely shut down. First, the brainwave scanning headset was specially designed for NeuroSky games and had to be purchased before using the software. Depicted below in Figure 1 is a diagram of this headset. Since most users expect to “find a desired game, pay for it, download and install it, and play with a few clicks of a button” as evident in the growing trend of online gaming (Hoile, 2017, 5), many users were likely deterred by this barrier to try the game. Second, beside the project’s YouTube channel, little was done to market the game to gain an online presence. As most modern “art” games rely on game stores and sites to host games “to be broadcast to a large potential user base” (Hoile, 2017, 8), the company had missed out on a significant portion of users who may have been willing to try their software. Third, there was a lack of engagement towards the software near the end of the training period among the participants (Johnstone et al., 2017, Abstract). Users tend to spread

games and other forms of media through word of mouth - failing to provide enjoyment, however, prevents this from occurring. As Focus Pocus demonstrated, failing to meet user expectations “can lead to the crushing failure of even well supported titles” (Hoile, 2017, 16).

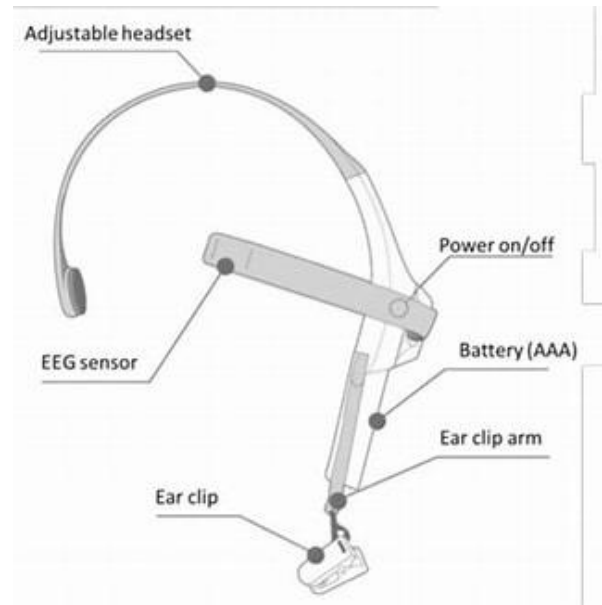


Figure 1. Neurosky Mindwave EEG headset. Users wear this headset with the front EEG sensor resting on the forehead and the clip pinches on the left ear (Zaharija et al., 2018, 200).

In order for the technical project to be successful, each of the three faults of Focus Pocus must be accounted for. For example, the technical project will focus on developing software more accessible than Focus Pocus by implementing a web camera-based eye tracker instead of the NeuroSky design. As more users have access to web cameras than a piece of hardware from the early 2010s, the technical project would likely deter less users from giving the game a try. Additionally, the project will be targeted towards major game platforms, such as Steam, as well as towards streaming platforms, such as Twitch or Youtube, in order to gain an online presence. The main challenge would be to make the game subversive enough in order to find success on major platforms as the user base would expect the game to do something new (Hoile, 2017, 14). This project will at the very least work at the individual level as Focus Pocus was successful with their video game approach (Johnstone et al., 2017, 1).

STS Topic: Investigating the Root Cause of Heightened Privacy Concerns Among Children

From as recent as 2015, children of the new generation are growing up in a new technological age which has caused worries among parents (Hayman, 2016, 11). Parents have over time been losing influence over their children as the internet has caused children to disconnect from their families. Slowly but surely, children are becoming a more prominent actor in the sociotechnical system, meaning their needs, in addition to the parents' needs, must also be accounted for.

One particular need among the younger generations is privacy. For example, according to a study conducted in Germany, about 33.3% of digital notebook users younger than 18 were not comfortable with the notebook camera, opting to cover their cameras even when there was no real risk shown (Machuletz et al., 2016, 4). In reality, most users behave this way due to perceived risk rather than actual security concerns, such as cross site tracking (Machuletz et al., 2016, 3). Unfortunately, the technical project requires users to use a camera in order to accurately track where they look. If the technical side of the project fails to address this expectation, a third of the potential user base may refuse to give the project a try. Therefore, the STS Research must identify why this cultural factor exists in order to direct the technical project towards a compromise which appeases both the children playing the game, and the parents paying for the game.

There are two prominent theories which may explain why this factor exists - the Theory of Reasoned Action (TRA), and the Theory of Planned Behavior (TPB) (Machuletz et al., 2016, 2). Both theories are similar in that a person's actions are dictated by their attitudes about the subject, as well as their established norms, while TPB also includes the person's feeling of control over the situation. Depicted below in Figure 2 is an illustration of the two hypothesized main causes of this perceived risk, according to TRA. Further research will need to be conducted to determine which of the two primary theories is applicable to the technical project, as well as uncovering the sociotechnical factors responsible for this expectation of privacy.

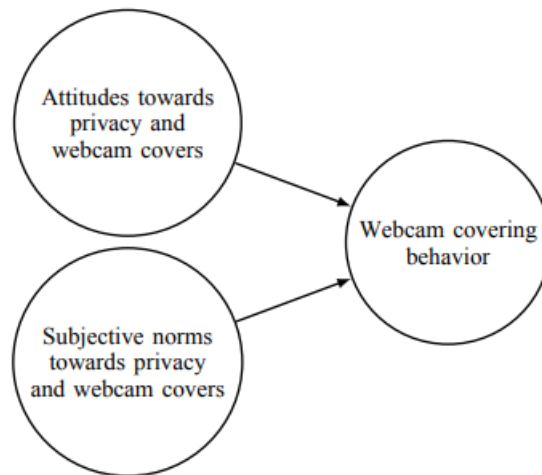


Figure 2. Research Model Based on the TRA. People that cover webcams tend to do so based on subjective, perceived risks about cameras and covers, as well as the value for personal privacy (Machuletz et al., 2016, 3).

Conclusion

For the technical project, I will be iterating upon Focus Pocus by providing a more accessible game through using an eye tracking system instead of using a headset. My STS research will investigate the reasons why privacy is such an important factor to the user base. If my project is successful, it would allow users to more easily concentrate on a single task at hand rather than many at once, meaning nonconstructive multitasking would decrease. Additionally, it may cause a cultural shift in the gaming industry where more developers would create games that also address the focusing problem. If the STS research can successfully identify the reason why privacy is a concern among younger audiences, an alternative to the eye tracker could be developed for the technical project; therefore, less of the potential user base would be deterred from using the project, helping more users reduce nonconstructive multitasking.

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