

## **Thesis Project Portfolio**

### **Board Buddies: A Physical Board Game with Wireless Communication Capabilities**

(Technical Report)

### **Illuminating the Effects of Blue Light Emitted by Electronic Devices**

(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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## Sociotechnical Synthesis

The world has gone digital. The age of paper and pencil has passed. Many jobs are conducted almost entirely online, visual media has usurped print media, education systems rely heavily on electronic assets, and the list goes on and on. Kids nowadays are using phones and tablets before they even learn their ABCs.

Though this movement is largely positive, as electronic devices have a plethora of benefits physical devices can't match, there is one potentially devastating weakness. This weakness has the ability to significantly impact one's health long-term, yet very few people notice the problem, even if they are staring right at it. You will notice that strategic choice of words as I reveal the weakness to be the screen this is being read on, and, more accurately, the light that screen is emitting.

The specific type of light emitted by electronic devices is termed "blue light", and though there is ever-growing research regarding its effect on one's health, very few users know anything about it. Electronics companies have largely managed to sweep concerns about blue light under the rug, mostly through negligence. The information is not necessarily hidden, but companies are not forced to clearly present it. These companies obviously don't want to educate their consumers about blue light because it has the potential to decrease usage rates. Thus, by choosing to leave the potential threats off any packaging/advertising, most consumers don't have any reason to think about them.

The STS Research Paper revolves around this problem, detailing exactly what the research says about blue light and proposing ways to get the information to consumers. The paper provides various studies revealing blue light's impact on different aspects of one's health

and formulates recommendations on how to illuminate the studies' findings based on proven, successful informative strategies. By the end of the paper, one should understand that, with the way the world is trending, immediate clarity on blue light is needed before it is too late. Readers should also be able to determine whether they believe my recommendations are effective strategies to enable this clarity.

Should the STS Research Paper give you pause when it comes to electronic device usage, the Technical Report proposes a physical alternative in an increasingly digitally dominated market, entertainment. In 2020, COVID-19 forced everything online as face-to-face interaction was not possible. Though the pandemic is largely over, and we can travel freely again, my group and I noticed that remote interactions still exist in the form long distance couples, university students and their parents, friends who have moved apart for employment purposes, etc. As such, we decided to come up with a way to bring remote entertainment to the physical world, creating a system we call Board Buddies.

The system is a physical board game that can be played by people located in different parts of the world. As long as each player has a board, they can send moves back and forth wirelessly. We felt as though this would be a nice change of pace for people who experience fatigue with online gaming or perhaps like the homey feel of a board game and want to play with friends that can't be on site. The project explores concepts in computer networks, embedded computing, circuits, computer-animated design, and much more.