

**Thesis Project Portfolio**

**DAARE/Board Buddies**

(Technical Report)

**Filtering Factors on the Transition to Electric Vehicles Through the Perspective of  
Diffusion of Innovation**

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

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## **Sociotechnical Synthesis**

(Executive Summary)

### *Meeting in the Middle: Balancing Design and Implementation*

Young, naïve undergraduates are not often looking to save the world; even naïver undergraduates try to. That is where I started my STS research – to fix Climate Change. I wanted to figure out what is holding back electric vehicles (EVs) from replacing every gasoline vehicle. A necessary move that seems obvious to me, but a controversial opinion elsewhere. An impossible task for one person to answer, but at its core was an attempt to answer an ethical question. Later on, I was performing the same naïve attempt at solving a problem bigger than me. My technical report was meant to bring people closer during the isolation of COVID-19. It was a board game for two people to play remotely, that provided screen-free leisure time while connecting with a loved one. To bridge the chasms that COVID created is an impossible task for one device to answer, but the little relief that it provides would amount to something. From both the STS research and technical side, we are reminded of the importance to be centered by a problem beyond ourself.

The technical report started with the aim to do good and help people. Two people can play this tabletop game of Othello from anywhere in the world, as long as they have internet. They each have their own physical board, and when one person makes a move, it shows up on the other board. The emphasis of the game is remote playability without spending more time on our phone or computer. At the inception of this project, my team discussed a handful of other ideas before deciding on this based off its feasibility. Alternatively, we could have helped tremor patients with assistive utensils or improved electronic recycling with automatic sorting machine,

but we made a board game. What we gained in feasibility, we compromised on ethical magnitude. I wish my project was more practical and helpful, addressing a serious issue. This sacrifice could be observed in other teams' projects. There was little time to curate a project that addresses a systemic issue, so most teams ended up making a fun game and coming up with a halfhearted justification to connect it to an ethical problem afterwards. It is noteworthy that more ethical consideration should be given in the technical course.

Meanwhile, my STS research allowed a whole semester to propose an ethical problem to address. While the technical project struggled by putting too much emphasis on the end-of-pipe, implementation and feasibility, the STS research was too abstract. Starting the research from factors that affect the diffusion of EVs into society, it was helpful to speak in specific examples. For example, one category with influence over EVs was "emotional factors," however, this abstraction hurts understanding, misses nuance, and strays the reader from the central problem of the writing. The research attempts to be literal, breakdown generalized categories like emotional factors and provide a fresh look at how to design an EV centered world.

When we imagine the world's decision makers, the business innovators, the political leaders, they think about systemic problems at an abstracted level. They are often criticized by being out of touch with the implementers such as the engineers and construction workers. Designers are criticized for thinking so abstractly, that they stray from the core ethical problems that need to be solved. Abstraction fails to say anything meaningful. However, the implementers are not as ethical as the designers. Implementers are limited by time, money, and feasibility. Not all the original design elements make it to the final product because of feasibility compromises. Making a product for the sake of making something is purposeless and wasteful. As I learned by doing the technical portion, feasibility strays from the ethical problems. The STS portion taught me that

abstraction also strays from addressing ethical problems. The problem that this sociotechnical University course aims to fix is that ethics are an afterthought in engineering. Then, let this be a reminder for designers to be more grounded and implementers to remember the goals they set out to achieve.