

**Thesis Project Portfolio**

**Design and Construction of Modern  
University of Virginia Themed Pinball Machine**  
(Technical Report)

**SCOT Analysis of Corporate Social Responsibility of Gaming Corporations**  
(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science  
University of Virginia • Charlottesville, Virginia

In Partial Fulfillment of the Requirements for the Degree  
Bachelor of Science, School of Engineering

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## **Sociotechnical Synthesis**

Video games play a part in many young people's lives, and they come with various effects and consequences. My technical report covers the creation of a pinball machine themed around the University of Virginia. My research paper demonstrates the importance of accountability from gaming corporations in the creation of video games for the public. While at first glance there is only surface level value to video games, a closer look reveals that they may have a mental impact on those who play them. Therefore it is important to realize and study these implications.

My technical work covers the design and creation of a University of Virginia themed pinball machine that can be played by anyone including students. The project was attempted by another capstone group in 2016. However, that group did not finish and left much work to be done and improved upon. My capstone group both improved multiple old designs and created brand new mechanisms for the game. Each design was made into a 3D render in SolidWorks, and the whole machine was eventually modeled. The goal of our design is to create a playable pinball machine that could ultimately be donated to 1515, a stress-free study lounge and hangout for UVA students, for anyone to play. This project will test our mechanical skills while contributing to a fun and enjoyable atmosphere for UVA students.

My STS research project dives into a literature review and survey on the dangerous landscape of gaming microtransactions. The widespread use of microtransactions in video games has sparked discussion about their links to gaming addiction and adverse mental health effects. They introduce a monetary dimension in gaming that is far from the pure purpose of video games: to provide a fun positive experience for the gamer. In late 2023, a lawsuit was filed against several video game developers regarding a child who suffered from addiction to the companies'

videogames. The main claims were that the games' mechanics aim to ensure maximum playing time, and that they are the driving force behind gaming addiction and compulsive behavior. My research focuses on exploring the true effects of microtransactions and the relation between gaming corporations and gamers. The Social Construction of Technology (SCOT) framework provides an analytical lens to thoroughly investigate the impacts of microtransactions on gamers and the responsibility of gaming corporations in relation to this exploration. My claim is that Activision, Epic, and other gaming developers focus on building profits led them to employ schemes and microtransactions to encourage further game time from users, indirectly leading to gaming addiction and behavioral effects. My research emphasizes the importance of considering social corporate responsibility in the industry of gaming in order to protect the well-being of the public.

Working on these two projects simultaneously helped me realize and consider the true impact of design. My technical project provided a real-life experience of design and time constraints while providing an opportunity to apply mechanical knowledge and skills. Through my STS research, I became more aware of underlying effects of design, which translated to my work on my technical project. Overall, both projects aimed to move toward the betterment of mental health in the world of gaming, while teaching me important technical and non technical aspects of mechanical design.