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Executive Summary

Overview

In the late 90s, many forms of digital media like video games and nascent social media sites were created. In the early 2000's they became widespread and integrated into American society, particularly among the youth. Consequently, many adults critique digital media and its negative impacts on youth development. There are many courses of action to address this criticism, one of which is bringing back older modes of entertainment such as board games. Another course of action is improving existing digital media to fulfill more of the social needs of children. This paper includes a technical report of the engineering of a University of Virginia themed pinball machine, as well as a STS research paper on the development of video games to be more social. The former exemplifies a way to make older modes of entertainment more appealing to the youth, and the latter analyzes how different social groups influence the improvement of video games.

Technical Research Project

In the fall of 2023 I was in Gavin Garner's mechanical engineering capstone group. Eighteen students, Dr. Garner, and I designed and partially manufactured a UVA-themed pinball machine that features mechanical and electrical components with a budget of $200 per student. Existing pinball machines are high-cost and complex, featuring many synergistic mechanical and electrical components. Many existing pinball machines have inefficiencies that drive up

operating costs and often lead to mechanical or electrical failure. Innovating mechanical and electrical redesigns could improve the pinball industry.

To reinvent the pinball machine we used a combination of mechanical prototyping, electrical design, and software development. Mechanical prototypes were drafted in SolidWorks, a Computer-Aided-Design software, and manufactured using a variety of methods like 3D printing and laser-cutting. Electrical designs were drafted on paper and tested at smaller scales. Software development was done through one or more Parallax Propeller 2 microcontrollers.

STS Research Paper

Video Games have been subject to many technical and non-technical changes over the years, one of them being the addition of social features, or features that allow players to virtually socialize with one another without physical interaction. Many social groups and their respective desires drove the development and employment of these features. The following research will address the question: How have player bases, parents, and advocates of childrens' well-being driven the development of video games as a means for social interaction? The effectiveness of certain features in video games will be assessed. The Social Construction of Technology theory will guide the following research to analyze the demand for social features in video games, and the consequence of their development. Video games and other forms of digital media have become a primary source of entertainment and influence in American children. It is important to analyze any quickly growing technology in the lens of STS to ensure that society guides and responds to technology responsibly. Takeaways from the following research should be considered by video game companies, and companies in similar industries before developing any technology.

Self Reflection

Working on the technical project and socio-technical project alongside one another offered depth to both. While designing the pinball machine, I was constantly thinking about how our product, the pinball machine, would be received by different groups of people such as UVA students, faculty, etc. On the other hand, while researching the development of video games, and the Social Construction of Technology theory, I was thinking about how technical problems that require time and resources may get in the way of social groups' interests. Any engineered product can be broken down into a technical problem and a socio-technical problem. Addressing both of these requires a well-rounded engineer that considers all implications of their work.