Thesis Portfolio

Cubetrix: An instrument-like, portable, cube-shaped device
(Technical Report)

Evolution of toys and its effect on child development
(STS Research Paper)

An Undergraduate Thesis

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Sociotechnical Synthesis

This paper investigates a sociotechnical research topic along with outlining a technical project. The technical project produced an interactive device with visual reactions to sensory input. The design utilized motions sensor inputs and LED outputs that were integrated using a microcontroller. The software on the microcontroller was designed to operate the device's algorithms, and the necessary hardware was unified on a single PCB board. The design was completely enclosed, simply requiring a replacement of rechargeable batteries when necessary. The motivation for this project was to ultimately create something visually appealing and fun to use while incorporating aspects of the Computer Engineering coursework to demonstrate our skills in both hardware and software design. This project presented many challenges and roadblocks. While our final product was not exactly the same as our original design, the original motivation and purpose was fulfilled.

Thus, this technical project motivated the sociotechnical research portion of this paper. Since the technical project produced a product that similarly resembles aspects of a child's toy, a question of how such technology might affect children came about. When designing such technology, it is important to understand how it might be affecting the user and what is the intended purpose of the technological design. Thus, this research topic is intended to provide more insight into this specific industry and how technology is affecting it. The sociotechnical research is divided into two parts with a framework for analysis. The first part is investigating child development and how technology has transformed the area of children's play. The goal of this part is to understand the history of children's play and how it is currently changing. We also intend to see where technology is playing a role and if there are positive or negative effects on children. The second part is to identify other important stakeholders, like teachers and parents,

who care about a child's development. The goal of this part is to analyze these stakeholder's perspective and why they might accept or reject this new technology in this specific area. This is important because even if the technology has objective benefits, society must accept it. The STS framework utilized throughout the paper, but mainly in the second section, is Social Construction of Technology (SCOT) which is used to identify relevant social groups and understand their differing interpretations of a technology. The idea is that society's acceptance of a technology aids its growth. In this paper, we show that parents play a large part in a child's development. This technology is being accepted into this specific industry because they accept this technology into their homes as a form of aiding their child's development or keeping them entertained.

This paper includes a sociotechnical research topic along and a technical research paper which are linked by the effects of children's toys on their development. The technical research portion involves actually designing a children's toy with available engineering technologies, meanwhile, the sociotechnical research analyzes society's perspective on such technologies and why it is accepted. Each portion motivates the other in understanding how technology and society interact with one another and how each can aid in the other's development.