

Thesis Portfolio

Design and Construction of a Kinetic Art Weather Display
(Technical Report)

Potential Negative Effects of the Expansion of Smart Home Technology on Psychology and Human Behavior
(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science
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In Fulfillment of the Requirements for the Degree
Bachelor of Science, School of Engineering and Applied Science

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Sociotechnical Synthesis

The rapid advancement of electronics in recent years has allowed technologies to become more seamlessly integrated into everyday life, allowing convenience and comfort to further expand into our homes and workspaces. Once the positive effects of these technologies have been experienced firsthand, it can be hard to imagine living without them, especially in spaces that are otherwise quite bland. Having spent over three years learning in the Mechanical and Aerospace Engineering building at the University of Virginia, the gloomy, windowless basement to which many of my classmates and I had become accustomed presented an opportunity to use such technology to make working there more enjoyable by providing a convenient and aesthetically pleasing addition. Within the basement, students and faculty working long hours can lose track of time of day, and perhaps the weather has even changed drastically since arriving. To solve this problem, my capstone group designed and built a kinetic art weather display to improve the aesthetic of the basement in a convenient and informative manner.

After lots of brainstorming and prototyping, my capstone group decided on a wood-framed, circular design that would implement LEDs and DC motors to create a scene of the time of day and weather outside. The creation process that ensued allowed us to gain experience with 3D-printing, CNC milling, and laser cutting, all while building something that would benefit mechanical and aerospace engineers for years to come.

As the kinetic art weather display steadily came together, I began to realize that, although the goal of our capstone was to provide convenience and comfort, one may also use it as an excuse to stay in the basement longer. Rather than taking a break to walk outside and get a breath of fresh air, somebody in the basement could spend even more of their time engulfed in

their work. As a result of this realization, I became interested in how other technologies that are meant to enhance the lives of users may have unintended consequences. This directed me to look into the rapidly expanding field of smart home technologies. Although smart home technology has become more prevalent in recent years, very little research has been conducted on potential negative consequences that it may have on human behavior and psychology. For that reason, my STS thesis focused on identifying and analyzing these risks to illustrate why they should always be taken into consideration when developing and improving technologies for the home.

Overall, with a few modifications in the future, the kinetic art weather display should be able to hang in the basement of the MEC building at the University of Virginia. Additionally, my STS research was able to uncover many potential flaws in smart homes, and can hopefully be expanded to other technologies within the Internet of Things.

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