

Thesis Project Portfolio

Socially Distanced Dispenser

(Technical Report)

**Analyzing Food & Grocery Consumption Habits and their Impact on Technology during
the COVID-19 Pandemic**

(STS Research Paper)

An Undergraduate Thesis

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

University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

Jake Moses

Spring, 2021

Department of Computer Engineering

Table of Contents

Sociotechnical Synthesis

Socially Distanced Dispenser

Analyzing Food & Grocery Consumption Habits and their Impact on Technology during the COVID-19 Pandemic

Prospectus

Sociotechnical Synthesis

The world as we know it has been forever changed by the COVID-19 pandemic over this past year, the way people shop for groceries and order from restaurants is forever changed. When my team undertook our Socially Distanced Dispenser project we aimed to make people more comfortable with in-person grocery shopping by eliminating common high-contact. This goal of increasing safety for everyday shoppers led me to research about how exactly shopping habits had changed with respect to both grocery stores and restaurants, and specifically how new technology had been innovated to combat these new consumer needs. In both my technical project and research paper my primary focus was the consumer and how to best understand and serve their needs and comforts in both the grocery store and restaurants.

When examining the problems people were encountering in grocery stores, one of the issues that stood out to my team was that dispensers of coffee beans, cereal, and other foods had to be manually operated, resulting in a very frequently touched surface. Thus, we decided to construct a device that would allow you to dispense necessary amounts of food from your phone into your personal container.

We found that construction of this device was not only successful but cost efficient, as multiple devices could be easily manufactured that are capable of dispensing variable amounts of food that completely eliminated the need to manually touch or operate a handle.

My immediate research question regarded how technology usage and development in the grocery and restaurant industry had changed since the onset of the COVID-19 pandemic. Specifically, how changes in consumer consumption behaviors had forced companies to change their business models to incorporate more technology to better serve their consumer base. I did a lot of research on how consumer sentiment with regards to in-person consumption — with respect to both the amount of dining-in at restaurants and in-person grocery shopping — changed throughout the various stages of the COVID-19 pandemic. In addition to gathering this information, I did additional research on how these changes in consumption habits affected both the restaurant and grocery stores and how these businesses had to adapt in order to keep consumers satisfied.

What I found through my research and analysis was that in order to maintain business restaurants and grocery stores alike had to rapidly incorporate more technology into how they ran their businesses. Curbside pickup, delivery, and online order all became the baseline for ensuring that customers felt safe with consuming from these businesses. More mobile applications and online infrastructure was developed in order to stay connected with consumers, and this was wholly due to the fact that consumers were not as comfortable with their previous in-person consumption habits. Businesses that were unable to adapt to these rapid changes either suspended business during the pandemic or closed entirely for the time being.

In conclusion, much of my work in both my capstone and my research paper revolved around determining what would make consumers feel safer; whether that be a dispenser that minimized high-contact surfaces or research that determined how restaurants and grocery stores kept their customers feeling safe during the COVID-19 pandemic. Overall, I learned that

consumer sentiment truly dictates how technology is innovated and included in our everyday life, and it was clear that during the pandemic safety over spread of the virus dictated consumer sentiment, and as a result more technology was included in everyday businesses to help the average consumer feel safe while performing everyday tasks.