



SUSTAINER: DESIGNING SUSTAINABLE SYSTEMS

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mobile application, to-go, food, eating, container, meta-products, interaction design, gamification, service system

ABSTRACT

This paper discusses the research and design of 'Sustainer' a reminder-based, behavior-change mobile application (app) paired with a re-usable container meant to help reduce waste caused by disposable to-go food containers. The project is the collaboration of communication design student Kieran Wallace and industrial design student Andreas Eiken of Emily Carr University of Art + Design. Together we developed a behavior change service that encourages users to bring their reusable food containers with them when they are eating on the go. There is a large opportunity space within the zero waste initiative in the city of Vancouver. Packaging represents approximately one third of municipal waste in the United States. In tackling the zero waste initiative it meant that the project had to go through many iterations requiring primary and secondary research, video sketching, and an introduction to the idea of 'the internet of things,' or meta products. The project's outcomes exemplify the three r's of reduce, reuse and recycle.

The City of Vancouver in British Columbia is attempting to be the greenest international city by 2020. One of the many goals is to "reduce solid waste going to the landfill or incinerator by 50%." [1] According to the U.S. Environmental Protection Agency in 2010 roughly 250 million tons of trash entered landfills in the United States alone. [3] There have been a number of local projects that serve as precedents for this problem space including the 'Tiffin Project' of Vancouver and 'Go Box' a similar system founded in Portland, Oregon. The design intention for Sustainer was to make eating on the go easier by providing the user with a container and the support to maintain usage of it. The container and app would come bundled in one package at a set fee. The user would purchase the container and activate the app by entering a unique download code into a smartphone.

BARRIERS/OPPORTUNITY

There are several barriers to eating on the go with a personal container. Forgetting the container is the first issue. The research question asked: can a food container become part of the everyday things we carry like keys, a water bottle, or our phones? A second barrier is the issue of leakage. A trust issue exists with current containers and their ability to create a perfect, hermetic seal. It is generally understood that we all carry things in our bags that are far too valuable such as a smartphone or tablet to risk a tomato soup spill. The third issue with reusable food containers is their difficulty in transportation. Many of the current container designs do not accommodate a majority of different bag forms. The opportunity lies in resolving these three major issues through developing a system in which a container has a close relationship with a phone, something we carry with us everywhere. This system will in turn encourage sustainability within the context of eating, particularly on-the-go.

INITIAL PRELIMINARY RESEARCH

The preliminary research for this project consisted of several phases. Various user-centred approaches were used in exploring the inquiry. A service safari was conducted in order to create user journey maps to develop a sense of how a member of the public might interact while taking their food to go. A number of expert interviews were conducted as well. Participants came from diverse fields such as city government, business, sustainability, and the restaurant industry. During the initial stages of design research for the project it was realized that the Student Union at Emily Carr had a great example of a to-go solution. Their 'Mug Wall' is a centralized wall where mugs are hung and made accessible to share among the students. It has been in operation for over a year. We approached the Union to see if they could use the mug wall as a testing ground for the sustainer concept. There was one key problem in the way the mug wall was set up; it was too centralized, offering only one location for drop-off and pick-up. From the 200 mugs the union purchased in the fall of 2012, only about 40 remained on the wall after over a month of use. The research around the mug wall attempted to increase the return rate of mugs to inform a shared



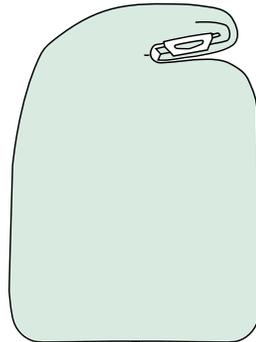
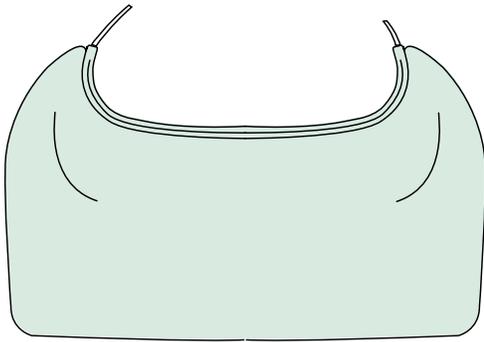
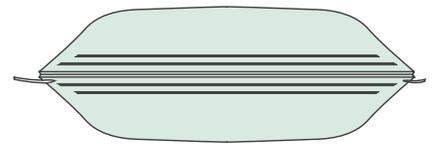
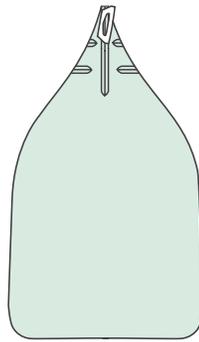
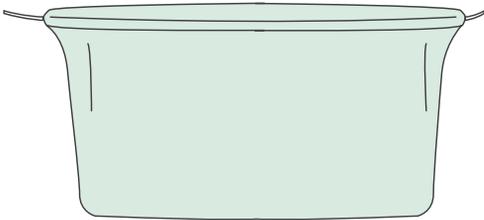
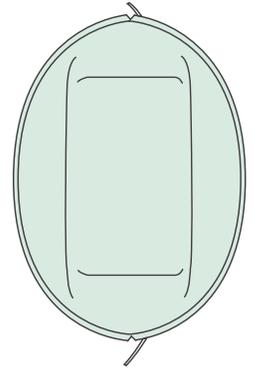
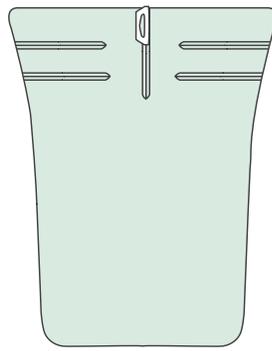
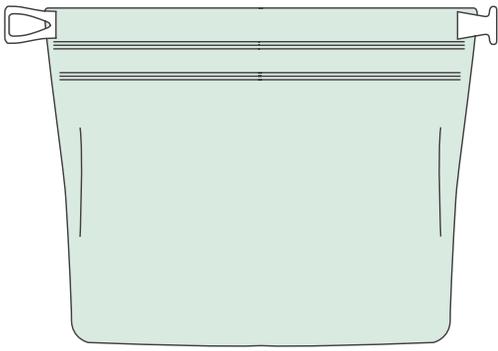
SUSTAINER is a container and digital application system, which work together to create more sustainable habits regarding food storage and transportation.

food container concept. After consulting with the student union about their system, and talking to people that use the mug wall, it was decided to install five collection points around the university. After consolidating the information gathered from interviews, statistical research, and precedent studies it was apparent that the most efficient solution for Sustainer was to put the onus on the user and develop a support system for them to maintain usage of their own container.

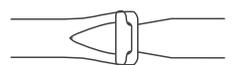
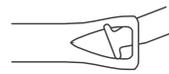
SYSTEM DESIGN WITH VIDEO SKETCHING

Video sketching is a simple and quick method of rapid prototyping displaying accurate context along with different scenarios of how a user might interact with a product and/or system. Communicating a rich interaction between a user, a product, and a smartphone proved to be

more difficult than anticipated. Maps, diagrams and other two-dimensional communication methods were deployed to try and communicate to instructors, friends and the public how the Sustainer system worked. After getting feedback it was realized that these methods were not getting the ideas across effectively. Video sketching then became the most obvious way to better understand the interactions users would have with the product. This form of rapid prototyping and visualization was fundamental to getting a handle on what elements of the system had holes and which elements seemed flushed out. Video sketching was helpful in showing the context along with how the user would ideally interact with the product and system. It was also extremely versatile as it could easily be shown on a computer, tablet or even phone for quick feedback.



38 INTERACTIVITY



HOW SUSTAINER WORKS. Inspired by the hermetic fold top found in kayak bags, the Sustainer container is designed to address key user concerns about size, portability and leakage.



THE MUG WALL at Emily Carr provided a great example of a reusable dishware system, and the need for a less centralized return location was discovered and addressed. A strong support system is required for lasting habitual changes to occur.

BEHAVIOUR CHANGE THROUGH INTERACTION (VIDEO)

While developing the main intervention point of the app, we looked at three possible options. First, when the user is at home; this is where we keep all of our belongings and where we spend the most time. Testing was done around receiving a reminder when the user leaves their home. The prompt would be a simple reminder telling them to bring their container. It was observed that when in a transition mode like leaving the house, the user was less susceptible to reminders and less likely to stop and follow through. The second intervention point was at the workplace. The issue here is that the chance of the user not having their container is much higher. This poses a problem when structuring the entire system around reminders. The third option was to intervene at the restaurant itself. The decision was made to focus on the restaurant as the primary time for Sustainer to intervene. When going to a restaurant, it was noted that users tended to be in a mindset of choice-making. When entering a restaurant the user has decided what restaurant to eat from and what food to eat. As such why can't we also choose how to make that particular meal more sustainable?

One of the exciting features that enables the Sustainer app to work in this area of intervention is a technology often referred to as 'geofencing.' Geofencing uses GPS (Global Positioning Systems) and other location based technologies to set up a digital boundary around a physical location. In the context of the Sustainer app, the user would geofence frequented restaurants so that the app would recognize when they entered the restaurant and send a prompt. Many precedent mobile applications were studied including Nike Plus, The Jawbone Up, Fitbit, and several others. These 'meta products' helped to inform the interaction the user would have with Sustainer.

THE INTERNET OF THINGS

During the early stages of iteration for the application, information was gathered from the book *Meta Products*. [2] This book was instrumental in defining the interaction the user would have with their phone and the container and ultimately find the link the two shared. The book speaks to the idea of the Internet of things, where this vast digital network is translated from our screens into the products we love and use every day. This opens a whole new world for interaction, graphic, and industrial designers. A great precedent of this is Nike Plus, a system in which the user inserts a special tracking chip into their shoe, and allows access to real-time feedback about their run via their smartphone. The app also acts as a social platform where the user can post their run times, routes, and more to Twitter or Facebook. Once the general framework for the Sustainer app was laid out as well as the general physical dimensions and attributes of the container, the most challenging iterative process came when trying to push the link between the mobile application and container; they were great stand-alone products, but they lacked a relational dynamic.

THE INTERSECTION OF DIGITAL AND PHYSICAL INTERACTION

The goal was to change the initial notion of 'app plus container' into 'app equals container'. The first effort towards this was the integration of a 'smart' element into an accessory for Sustainer. Either a fork or a strap were considered and would have become 'smart' by the implementation of RFID (radio frequency identification) technology. We decided to instead challenge this notion of literal smart technology and develop the link through a visual and tactile relationship. This direction would also avoid accessories becoming lost or damaged. The approach was to make the physical features and movements of the container be directly mirrored in the interactions of the app. This way the app and container became linked via their use and experience, not through an embedded chip. If someone interacts with the app on their phone, they should be able to pick up the container and intuitively use it as well.

CONCLUSION

Design is an ever-evolving profession; with new technologies and hardware constantly being updated and released, it is the role of the designer to use these evolving technologies to stimulate how users use and interact with their products. There is a level of responsibility by the designer in this sense. The products that are successful will introduce different behaviors throughout culture. Multidisciplinary collaboration and iterative prototyping were instrumental to the finding of an effective solution.

REFERENCES

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