Zero Waste Management Portfolio

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Zero Waste Application Project

Focus: Idea generation for Zero Waste Application
Industry: Compost/Waste Management
Duration: 16 weeks

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Overview:

There are people who recycle and people who don't tend to focus on recycling as much? Why is it that there are people who recycle and people who do not recycle?. To seek the solution for people's behaviour on recycling, 2 team members and I spent the course of 16 weeks observing, interviewing, gathering, researching and prototyping for the potential product to help people get into better recycling practices. The project initially started off with the competitive analysis, comparing given technologies and pain pointing from the technologies that are already being implemented. Additionally, our team members and I visited the current recycling techniques and technologies that are implemented in a local town in Bloomington, Indiana. We individually visited a local deli store and got to observe common characteristics of Green Camino, a current recycling practice and methods conducted by the residents of Bloomington Indiana.

After comparing different markets, technology and recycling methods, our team members and I conducted observational studies on how people recycle in their daily lives. After visiting and observing Green Camino recycling technology and practices, I individually visited Wright Quad University Dining hall to conduct observational studies on how people with different age groups and gender practice recycling in their daily lives. Throughout this process, I documented the patterns of how people recycle. This research method helped move onto the next phase in research for the potential prototype.

Thirdly, I decided to approach this project with the user interview with the person who recycles frequently and who has a long history of recycling practices. Initially, I spent time preparing for the user interview questions to see if the questions are viable and appropriate. Then, I spent time finding the person to conduct the user interview after multiple different calls and conversations. Finally, I spent time conducting a user interview with the questions I prepared, and was able to document the person's perspective and behaviours on how the person recycles. Then, I was individually studying the documented data and going into deeper brainstorming on coming up with the potential design idea by conducting literature review research method. During the literature review, I invested the time reading about different recycling techniques that are already being implemented today. From the reading and different articles, I had a chance to observe and understand the special features of the current technology, and narrow down the emphasis that other innovators pointed out. After helpful observation, research and documentation, I came up with the potential design of the user friendly product that could potentially help people to get into the better recycling habits and practices.

Competitive Market & Analysis:

Research Conducted: 3 March 2020
Context: The way we categorise our waste, the purposes we manage our waste for and the waste management itself is about to change.

But how much benefit does the current waste management system have? How much in terms of scale does waste management help the environment? Do people really categorise and throw away their trash in the 2020s? What kind of system does the current waste management technology offer?

Competitive Analysis by each company:

Product: OnePlus System
Features Summary: Ultrasonic waste bin sensor that notifies users how full the container is, providing detailed analytics on the load of waste and providing details on composting practices. The container keeps in track of all the contents in the bin and helps users to optimise the amount of waste in the container.
Benefits:

- Appropriate replacing of the bin
- Fuel cost of the waste management truck

Product: ECube Labs Rubbish Pickup
Features: The pickup bin uses solar power energy to compress all the waste that is stored in the bin. In addition, the pickup bin allows users to place more waste by 80% in volume.
Benefits:

- No hand users for compression
- Reduces time by solar energy compressor

Product: Tracking trash with Compology
Features: This product uses data analytics to notify users when the waste bin is full. User is notified about the bin replacement when the bin is full. Moreover, this product also offers a GPS tracking system for the waste management control.
Benefits:

- Data analytics and user notification on bin replacement
- GPS tracking system for convenient pickup
- Waste management employees benefits on shift schedule

Product: ecoATM Gazelle Kiosks
Features: This product is specifically targeted for e-waste. The main problem with the e-waste managing habit is that most people tend to throw away e-waste in a random place such as composting and recycling. Located in 2800 different locations throughout the United States, this product is designed as an ATM system where users can store their used mobile phones, computer devices and tablets in the ATM like kiosks.
Benefits:

- Safe replacement and e-waste compostment
- Mobile phone and tablet categorisation
- Users earn money for the e-waste compostment
- Other users are able to earn electronic devices

Product: Bin-E
Features: This product is able to store any waste onto the waste management machine. When the waste is placed on the machine, the machine detects the shape and the colour of the waste. It scans the waste and the waste is categorised without the user having to think about where the waste belongs.
Benefits:

- Reducing CO2 emissions
- Users save time when in a hurry

Summary & Key Takeaways: To groundbreak this project, I wanted to understand the scope of the features offered by the current recycling and waste management technology. What kind of special features do other technologies from other corporate businesses offer? Is it frequently used by other people? What are the demographics of the users? And what are the benefits of the given technology and does it solve any problem? From the competitive market analysis conducted in the earlier phase of the project (Phase 1), I have studied 6 different technologies already being practiced in our daily lives today and highlighted the important features and functionality offered by the technology.

Observational Studies:

Overview: After comparing different markets, technology and features, I learned that there are fascinating technologies that offer a unique service to users. I learned that many of the technologies are similar in terms of functionality and some of the technologies are targeted for certain waste (i.e ecoATM for e-waste management). After visiting, researching and comparing different technical features offered by different companies, I came up with the list of questions to myself. There are already numerous different technologies where users can apply and use for better waste management practices. But do people actually recycle in the first place? How often do people recycle and what are people's behaviour like? I decided to visit a busy dining hall located in Luddy Hall, Indiana University in Bloomington, Indiana. During the visit, I decided to take detailed notes and draw a pattern to where people travel to.

Location: Luddy Hall Cafeteria
Time: 3 March 2020 12:40 pm to 1:40 pm (1 hour span)

Overall Observation:
12:40 pm - Started observing the Luddy Hall cafe area, about 22 students were present in the area at the start of the observation.

12:43 pm - 2 men threw away receipts and paper wrap in the recycling bin into bin A

Observation Note:
A lot of people are bringing their food somewhere else and people are rushing

12:50 pm - A man throw aways the paper wrap in the landfill bin A

12:51 pm - A man throws away plastic snack box into landfill bin B

12:51 pm - Same man throws away a plastic bottle in the recycle bin B after binge drinking his beverage.

Observation Note:
A lot of people are throwing away the paper receipts they received from the cashier

12:55 pm - An old man (looking about age 50) throws away plastic snack box into recycle bin B

12:57 pm - More paper receipts are wasted

1:00 pm - Witnessed 7 people walking over to the water fountain refilling their water bottle

1:01 pm - A man throws away paper bag and tissue waste in landfill bin D

1:03 pm - 1:15 pm - Only about 3 people were present at this period of time with no activity (all the students walked away with their food)

1:18 pm - A man throws away paper cup in the recycling bin D

1:20 pm - A woman throws away paper cup in the recycling bin D

1:25 pm - A man throws away all his food, utensil waste (paper cup, wooden plate and plastic) in the landfill bin B (One of the bin is hard to open and one of the object is left on the top of the recycling bin)

1:30 pm - A woman throws away small garbage in the landfill bin

1:32 pm - About 5 people were present at this period of time with no activity.

List of all items thrown away:

- ➔ Paper Wrap/Paper Receipts: 75%
- ➔ Wooden Plates and Compostable Utensils: 15%
- ➔ Paper Cup: 10%

Key Takeaways:

From this observation study conducted in Luddy Hall, Indiana University in Bloomington, Indiana, I learned that people's behaviour differs based on the situation they are in. Starting with the list of items thrown away, about 75% of people (which is the majority of the items thrown away) threw away paper wraps and paper receipts received from the Luddy Hall cafe. Additionally, people threw away their wooden plates and compostable utensils into any bin (no categorising). Lastly, many people threw away paper cups from Luddy cafe, which was about 10% of the waste. I learned that many people in the school environment are in a busy situation where many students and faculties do not spend time categorising their waste. Many students ignored the fact that there are composting and recycling bins separately and many people placed their trash in any bins they saw on the way.

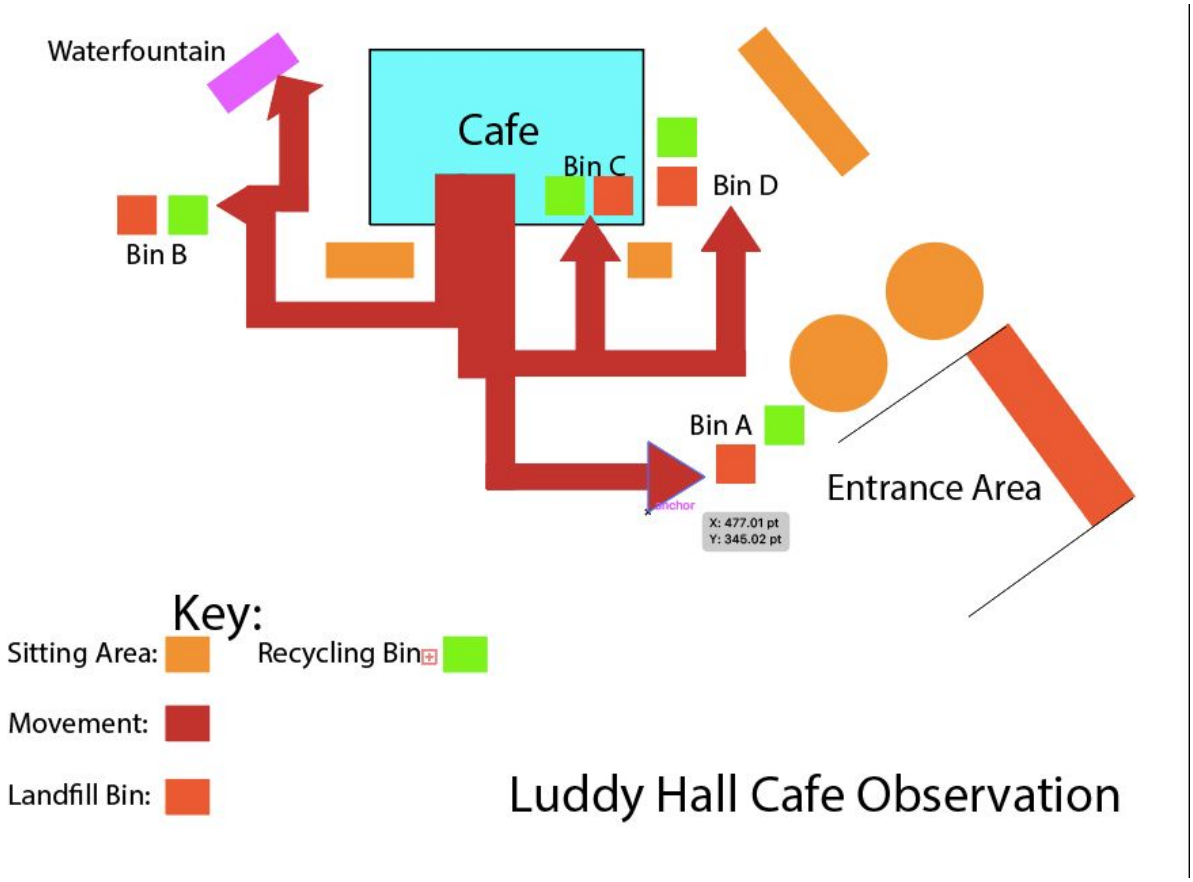


Diagram Above: The diagram above shows the pattern in student movement and the object.

Literature Review:

Date Conducted: 8 March 2020

Overview: From the project development process, I had a chance to discuss the data and results gathered from observational studies and competitive market analysis. I wanted to discover a deeper analysis on the current existing technology and how the technology is benefiting the society today. As a result, I conducted a literature review research analysis on two readings and produced a paper summary for each report. Throughout reading, I discovered many user-friendly features from the current application services. The main focus was to find out how current technology is benefiting the community around them not just for one person individually.

Reading 1: Literature Review from Reading, *Social Recipe Recommendation to Reduce Food Waste*

Key Takeaways: The technology mentioned in this reading is a software application (EUPHORIA) GPS tracked technology where leftover recipes in the refrigerator can be shared with other people around the community. This application provides both qualitative and quantitative data that allows other users to view different percentage levels for each recipe and request the ones that other users need. This reading not only focuses on the technical features that this app offers but also explores the behaviour and explores the user's emotion when using this device. Making a connection to my thought process and thinking, I previously worked on the UX project where users can create a special meal that they specialize in and share it with other users who are feeling hungry or in need of food. During this case, I was able to learn and reflect about food sharing services we already have such as DoorDash, UberEats, Postmates and GrubHub and reflect on the convenience (i.e getting the food and not having to leave the building) this can deliver to the users.

Reading 2: Literature Review from Reading, *The Grumpy Bin: Reducing Food Waste Through Playful Social Interaction*

Key Takeaways: The technology mentioned in this reading is called the Grumpy Bin, that allows young students and young adults to get into the better recycling and food waste managing habits. This particular system is designed for students who are facing difficulties and challenges in properly managing food waste or recycling. Additionally, this product is designed for people who live with other roommates and not individually. In the reading paper summary documentation, I discovered how this particular product can bring in team effort to minimise any waste people produce. During this case, I was able to learn and reflect about the recycling culture of the United States and how this product can help the University and local towns to reduce their time managing food waste that is caused by the young students and young adults.

Virtual Interview:

Overview & Note: This research period was when the COVID-19 Pandemic started spreading all over the United States and throughout the world. Since the lockdown and stay at home order, it became very difficult to schedule and meet someone physically during this difficult time. Therefore, I had a chance to contact someone who has a long history in managing food waste and was able to connect with the person for the possible interviews regarding their practices in managing their waste. Originally, I spent about 1 hour generating and coming up with the viable questions. For personal safety and privacy, I wanted to make sure all the questions are appropriate questions to ask at the time and environment they are in. After generating all the questions, another idea that I had in mind was the sensor waste bin. The reasoning for the sensor waste bin was because people would not want to touch anything that is infected by someone else. Further elaboration is stated below and below shows information regarding the user interview.

User Background:

Background on User
Name: John Kim
Age: 55
Work Status: Working at Amazon
Marital Status: Married

Q1) On a scale of 1-10, what would you rate yourself in composting materials in a proper way?

Response: I would rate myself a 7 because sometimes when I'm in rush, I tend to just throw away random materials in a wrong bin.

Q2) Where do you find yourself (In what environment) difficult to compost?

Response: I find myself having difficulty composting when I'm in a busy and rapid environment. For instance, when I was working in New York, NY 25 years ago, I was very busy with getting to work and working. Therefore, I did not focus on composting at all back in the day when proper composting wasn't a big deal. Also when nobody else around you does proper composting, then I would just get into a habit of throwing materials away anywhere. (Especially around 1995 when composting wasn't enforced as much as it is now).

Q3) In a home environment. Do you find yourself composting well?

Response: Yes very. Especially because I live in Washington state where composting laws are very strict. I make sure I cook food at a right amount and I limit the use of plastic.

Q4) Do you use any sort of technology or a website to compost?

Response: No not at all. Sometimes when I have electronic devices I don't use (e-waste), I look up online to see where I can properly recycle them without just throwing them away in the bin.

Q5) There is a company called Green Camino where they pick up your composts. Would you use that service?

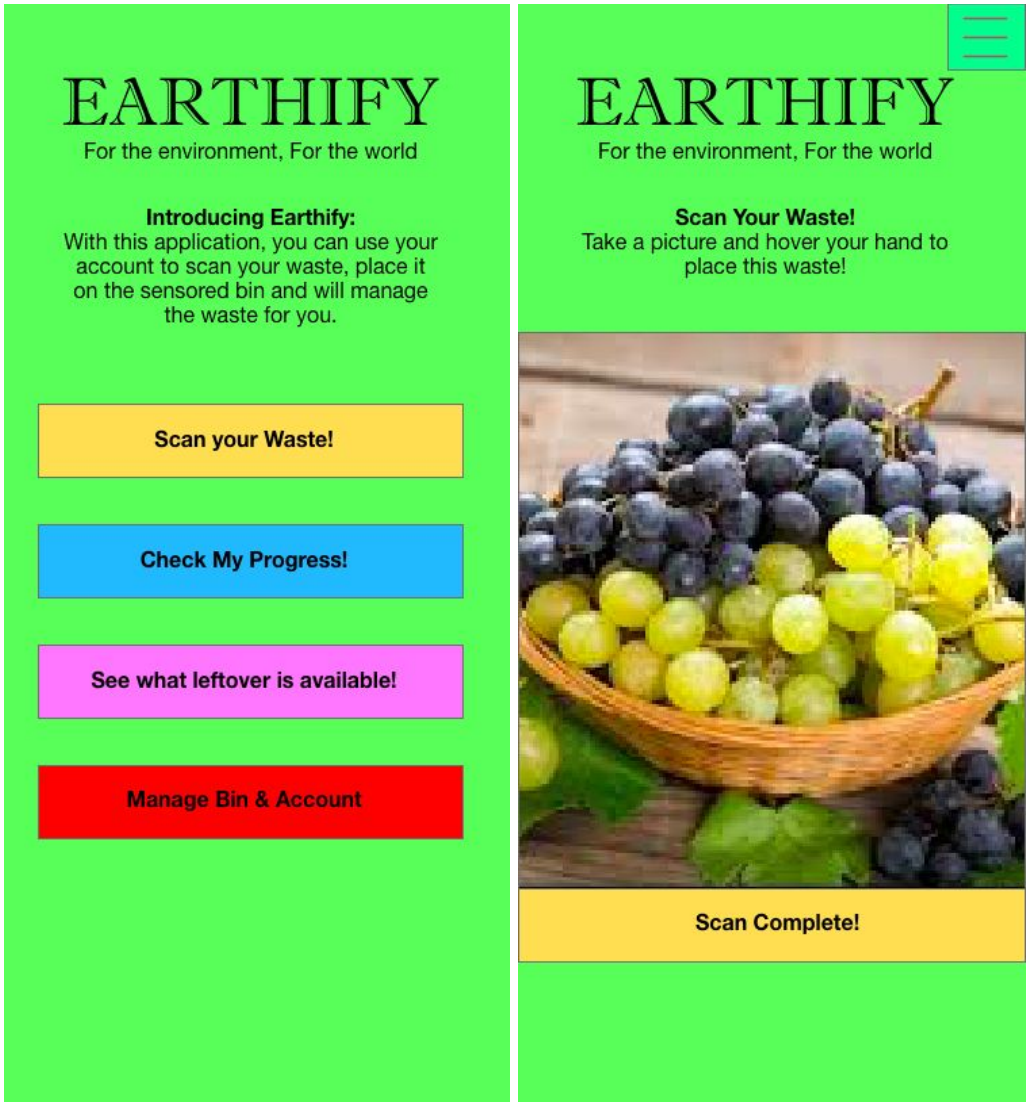
Response: Yes that seems like a very convenient company, especially when I have to leave for work. I would love to know what that company does and see if their service is available in the Seattle area.

Key Takeaways from Research:

Summary of Key Takeaways: From the observation and research I conducted for this process, I had a chance to observe different technologies from other markets, compare, reflect and brainstorm on the new potential product to help users to get into the better recycling practices. Along with the important idea generation on technical features, I have specifically learned that sensor technology would play a huge role in the technical component due to COVID-19 new pandemic outbreak. While I was conducting research through the literature reviews, virtual interview and competitive market analysis, I had a chance to observe the on-going news with the coronavirus pandemic outbreak and see major changes. As a result, I decided to take sensor technology as an initiative in design and incorporate the sensor technology to the design proposals.

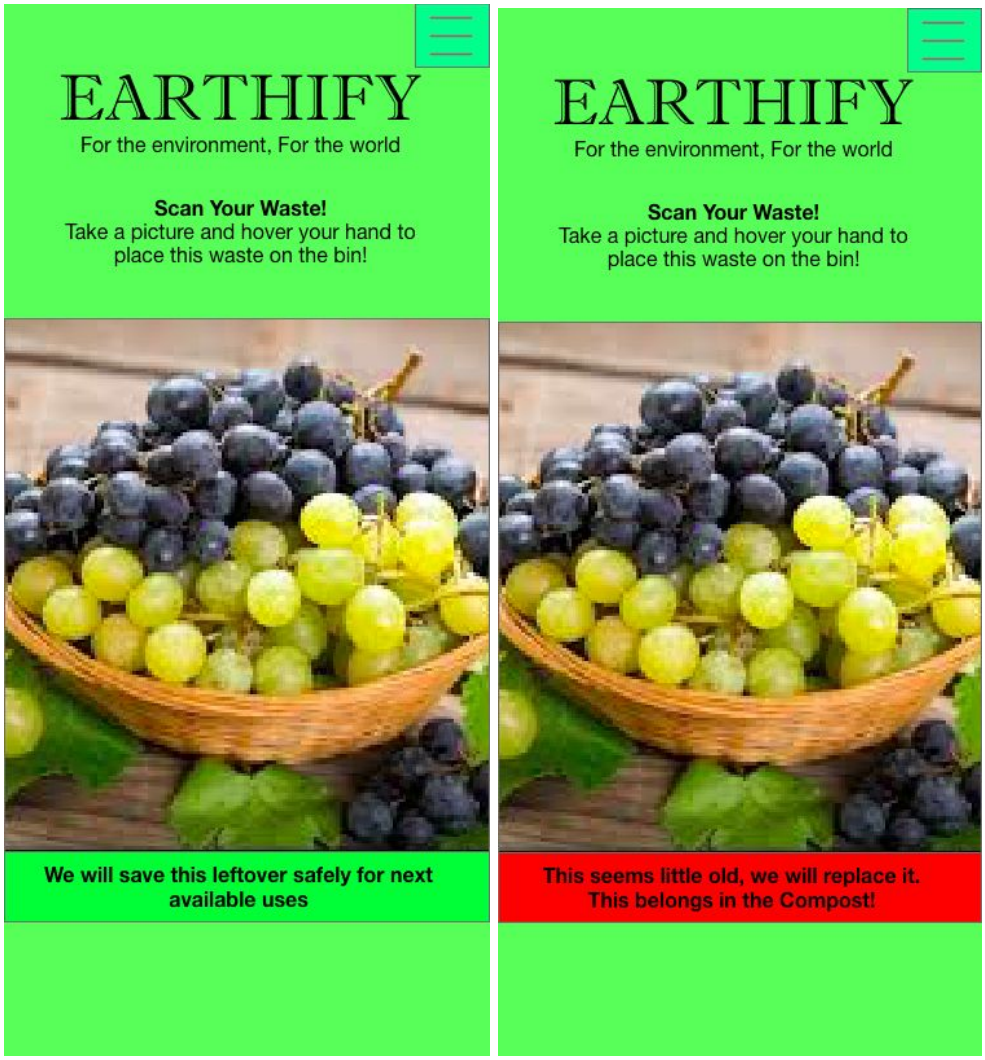
Design Proposals:

Earthify Composting App: For the design, I decided to use Adobe XD for the mockup design of the app. The key takeaways from the research is that many people are ignoring the fact that some of their leftovers are still reusable if they are kept clean and fresh. For the design below, there are 4 options to this app, which makes it simple for users to use. First is the scanning the waste option. This application would come with the ideal bin that is associated with this app, and the bin would be 100% used by the sensor when scanned with the QR code (QR Code example is provided in the “Manage bin & Account” button). This app is convenient because users would just have to take the picture, then the app would automatically detect the age of the product and determine the quality of the leftover waste).



Examples above: The picture on the left shows 4 different options on the home screen of the app. The picture on the right shows an app allowing users to take pictures of the leftovers for quality scanning (Java and C++ image processing functionality to check whether there are any dents or molds on the food). Then, this app will make the decision whether the product is good for reuse or bad for the reuse.

Examples below: The picture below on the left shows food being successfully processed and shows how it is reusable. The picture on the right shows food being ready to be composted.



Examples below: The picture below on the right is the check my progress feature homepage on this application. There are lists of score categories from compost score to recycle score to bin management score to earning details from customer's purchase. Users have an option to refresh the score and start all over again for re-evaluation. The picture on the right shows the available leftover items available by the nearby users. The available menu shows a variety of items.

Examples below: The picture below on the right shows an example when each item is clicked. Once users click on each item, then details will be displayed with the quantity of the product, last purchased from the store and the condition of the product. Users also have an option to view the price, purchase the items from other users (in this case Gianna) and contact the owner. The picture on the right shows the status of the bin with the personal account information with the logout option. QR code can be used to open up the bin with the detected sensor attached on the bin.


EARTHIFY
For the environment, For the world
Left Over!
See what types of leftover is available and get it delivered!
Apple from Gianna
4 Apples: $1.00
Quantity: 4 Apples
Purchased: 22 April 2020
Condition: Fresh
Contact Gianna
Pay & Delivery
EARTHIFY
For the environment, For the world
Manage Bin & Account!
Please check your bin level, use your hand for hover and please refresh your bin!
Current Bin:
80% Full
Compress
Dump
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