University of Primorska
Ben Gurion University

Human-Computer Interaction for Mobile Application Design Project Report

Zero Waste

"Less Food Waste, More Energy Saved."

Supervised by:
Dr. Jessica Cauchard
Dr. Matjaž Kljun
Vivian Herdel
Cuauhtli Mijangos Campos

Submitted by:
Dana D. - UP, front/back end
Elsa M. - UP, front/back end
Karin A. - BGU, front end
Maayan K. - BGU, front end

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1. Problem and Solution Overview

One of the global sustainable development goals of the United Nations is Zero Hunger. More precisely to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture. By throwing away food, we are not only wasting the actual product but also the resources and energy within it. Food systems consume about 30% of available global energy and out of this, 38% is utilized to produce food that is either lost or wasted.

Therefore, we have created an app that minimizes food waste and enables contact with proper areas of disposal. The app is used by restaurants and cafeterias, as well as customers. By choosing the meal beforehand, and making the process of contacting easy, our app is involved in the process of food-waste reduction and contributes to a better environment.

Here is our idea expressed through a couple of simple tablet sketches.

Figure 1. Idea Sketches

2. Tasks & Final Interface Scenarios

Having in mind our goal and sketches, we created the app using three main tasks.

2.1. Simple Task

For this task, the customer will send in/choose their preferences so that the institution can approximately order the right amount of food. After the user logs into the platform he chooses if he wants to see the options that are vegan, vegetarian, or celiac. Then he proceeds with choosing a meal from the given menu. The user can see a list of the most ordered dishes as well as the restaurant's/cafeteria's pics for that period. Furthermore, if the user is planning to eat with some friends, he has the option to choose a number of portions. When this is done, the order is sent to the restaurant database and the app shows a thank you message for confirmation. This task serves the main purpose of our application. Therefore, since it is considered to be the main one, we developed it to be the simplest.
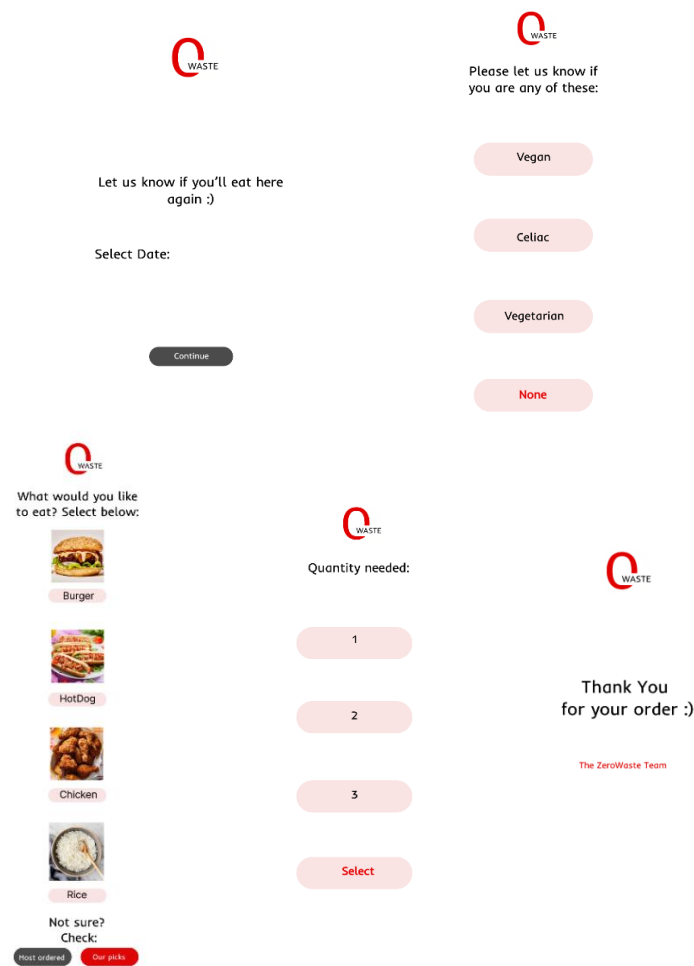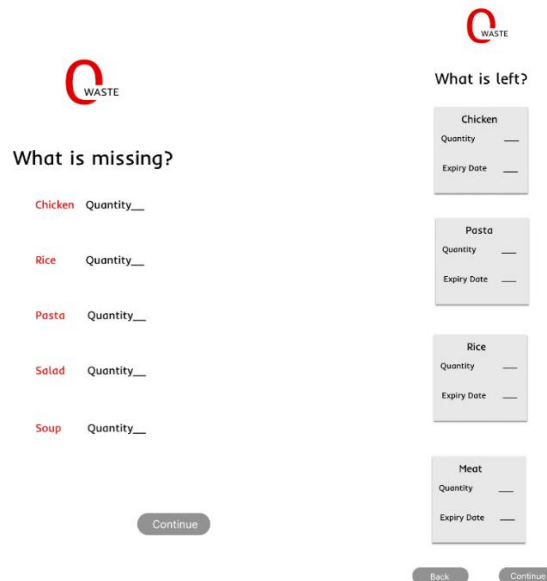

Figure 2. Simple Task Storyboard

2.2.Medium Task

This task is intended for the institution that offers food. We will refer to it as the restaurant user or employee. The restaurant user enters the amount of food that is left as well as the one that is missing. This way the database has information about how much food is unused, which is required for the needed calculations. However, these calculations are different for every restaurant, considering the different menu and budget. For that reason, we omit them.

Figure 3. Medium Task Storyboard

2.3.Complex Task

Lastly, the complex task starts with checking the expiry dates for each current inventory, the ingredients from the second task. In case there is some food that has expired, the restaurant's employee is to call and make a deal with some farmers. This food needs to be composed.

On the other hand, if the food has an expiry date in the near future, the restaurant's employee finds an organization that would be grateful to have it, and donates it. Since the list of

organizations is same on all the restaurants form the same city, the bar below each organization shows the amount of food that organization has already accepted. This is supposed to make the food donation equal or somewhere close to equal.
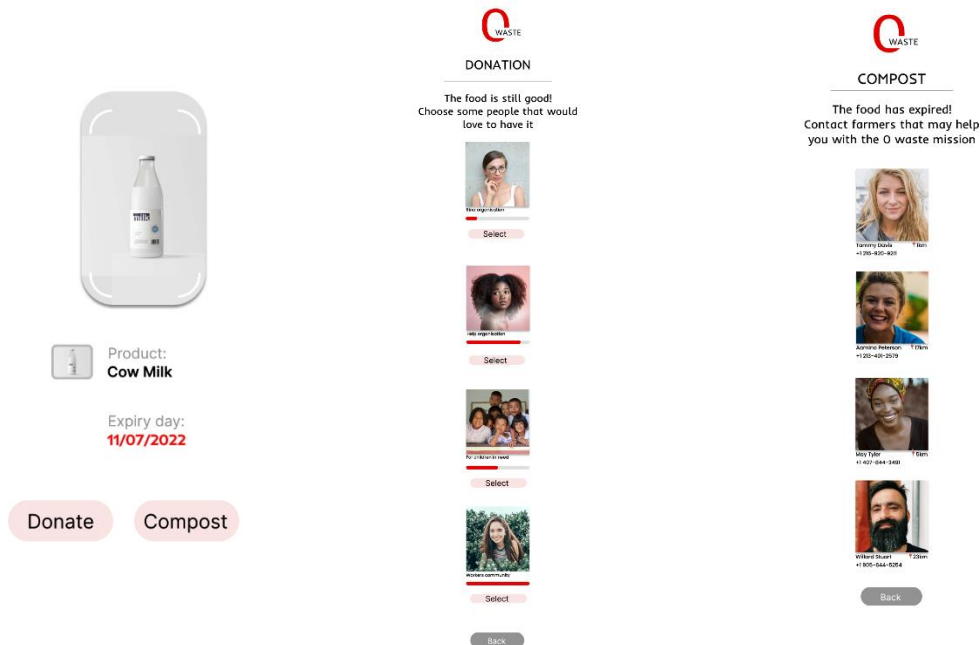

Figure 4. Complex Task Storyboard

3. Design Evolution

We had multiple sketches before designing the final app. The main idea is evident among all the sketches but the most important thing we decided to look for was the perfect interface for our app.
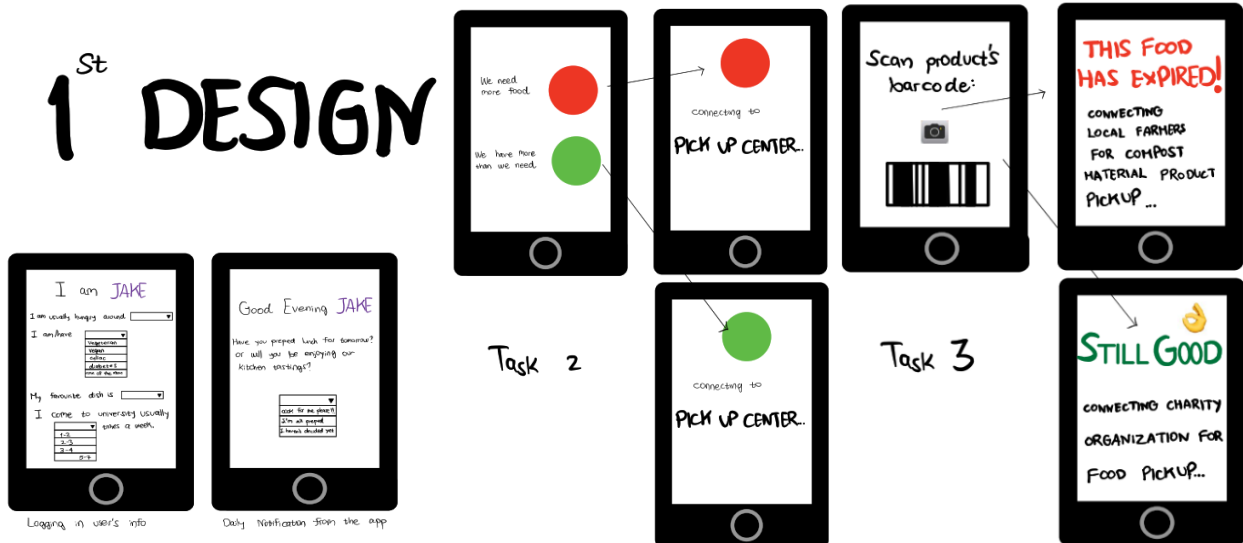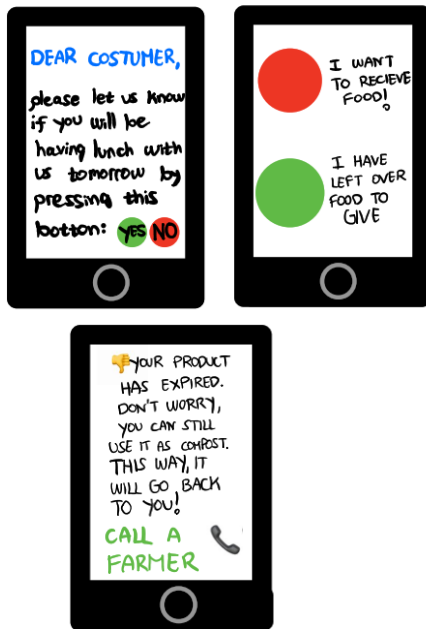
Figure 5. Initial Sketch No.1

Figure 6. Initial Sketch No.2

Figure 7. Initial Sketch No.3

When it came to choosing the final sketch for our design, we made a conscious decision to prioritize the user experience. We carefully considered the needs and preferences of the target audience. After evaluating these sketches, we had a group discussion and chose the final sketch, which fulfilled the concept that we had in mind the best.

We made modifications to some ideas that will save users time and energy. More precisely, since most of the sketches had an overwhelming amount of text, we chose to go with a more visual approach. To minimize the confusion on each step, we tried to make the frames as similar as possible and use clearly defined options. Finally, for the restaurant user instead of writing the expiry date of each product manually, we decided to use the tablet's camera to scan the labels. However, we had some difficulties implementing this feature and we were not able to include it in our application.
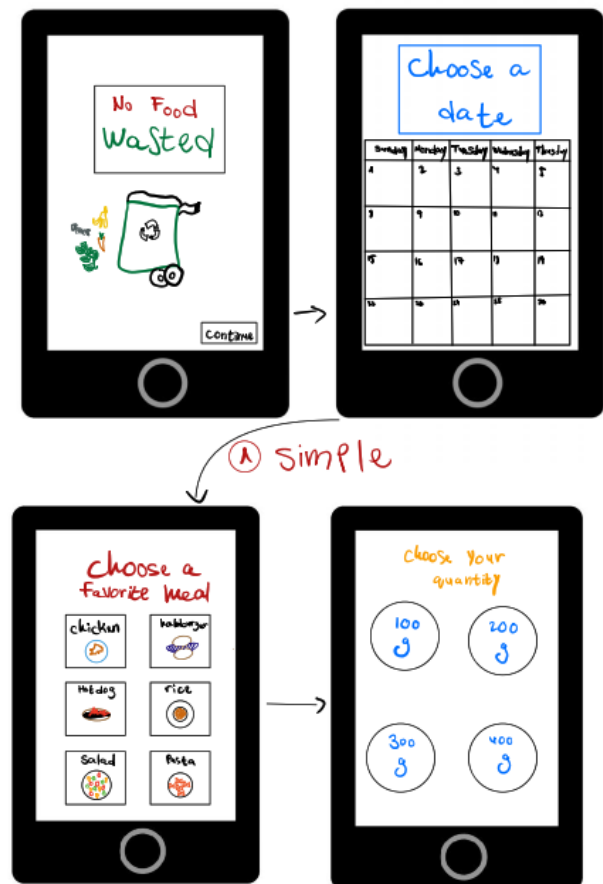

Figure 8. Final Design

4. Studies and Major Usability Problems Addressed

By using a previously prepared script and our initial prototype, we interview 4 people and modified the application in accordance with their review and their feedback on the design and functionalities. The participants were random students from the University of Primorska. We chose 2 male and 2 female students so that we would have more diversity, and they were all between the age of 20 and 30. We collected their comments and grouped them into three categories: Design (fonds, colors, pictures, frame structure), Functionality (the overall usage and app organization), and Idea. According to the statistics, we got 100% for Idea, 67% for Design, and 50% for Functionality, which sums up to an average grade of 72%.

By future reasoning and evaluation of the given feedback, we left out the option for choosing food for only the next day and instead we put a calendar. This is so that the institution can have an idea of how many people will be present in future months, and keep track of how much food they need to order. This small detail improved our application since some of the customers may be one-time customers.

Finally, we made multiple design changes to the application so the users will enjoy their experience and it will look more aesthetically pleasing.

5. Prototype Implementation

For the mid-fi prototype, we used a web application for interface design called Figma. This tool has many features that helped us and saved us a lot of time. Firstly, the real-time collaboration enabled us to edit one design file together at the same time from different locations. We watched our teammates work on one screen while we were working on another. Moreover, we used the comments for communication and sharing some ideas about specific parts of the design. Figma was a great starting point for the implementation of our app. There we visualized our ideas and created our mid-fi prototype and we expressed our creativity in designing the app.

As we progressed further into the implementation process, it was important for us to discuss what other tools to use to bring our app to life, so we decided that to achieve this, we will use a tool known as Dhiwise. This powerful tool had a plug-in to Figma and it facilitated converting our design into code. Once the design phase was complete, we moved on to coding with React. The combination of Dhiwise and React enabled us to streamline the development process and bring it to life.

5.1. Wizard of Oz technique

During the implementation of Wizard of Oz technique, our attendees were first given a comprehensive overview of the project idea and concept. This gave them an idea of the purpose and potential of our app. Next, each attendee was given a tablet with interactive sketches that presented how the app interface and design looked like. The sketches were placed in such a way that it allowed the seamless and intuitive navigation, allowing the attendees to fully immerse themselves in the" app". The purpose of this technique was to provide the attendees with a hands-

on demonstration of our app's capabilities and idea, and allow them to visualize how it will function when implemented. By allowing them to physically navigate through the sketches, we were able to gather valuable information and feedback which helped in improving the app further on.

5.2. Hard-coded data

In our project, we took the initiative to hard-code some certain data in the app. This data includes essential information such as the types of foods that the restaurants offer in general, and also the daily specials. This information is crucial for ensuring that our users have a seamless and comprehensive way of choosing an option.

5.3. Further improvements

As discussed with our teammates and our professors, it has become evident that the concept behind the app is both innovative and highly needed in our society. In order to make the app better and improve it we decided that adding a few new features would enhance it even more.

One such feature is the ability to predict the amount of food to purchase for the restaurants and cafeterias. This will help minimize the waste even more and ensure that there is always enough food available. Another important aspect to look at is implementing a notification system for the expiration dates of the food items. By implementing this notification system for the items that have an expiration date of a month or less, we aim to minimize the food spoilage and promote a more sustainable food management system.

Overall, our goal is to continue and improve the app and make it as user-friendly and society-beneficial as possible. By incorporating these additional features, we can have a more positive impact on our society.

6. Summary

The report outlines the development of our mobile app aimed at reducing food waste. This app is intended to be used by both the costumers and the restaurants/cafeterias. The customers can

choose a meal from a menu indicating their diets (vegan, vegetarian, celiac) and the number of portions they need. This information is then sent to the restaurant's database. On the other hand, the restaurant employee can log in to the app and enter the amount of food that is left and what is missing. The app also calculates the expiration dates of the food items and in the case that the food has expired, the employee is asked to contact a farmer to compost it. If the food has an expiry date in the near future, the employees can donate it to an organization. The design of the app was developed through multiple sketches and user evaluations. In improving the design and functionality of the app, four students from University of Primorska were interviewed. Based on feedback, the team made changes to the design. The implementation was done by using technologies such as Dhiwise and React.

7. Important links

- Link to paper Prototype:

https://drive.google.com/file/d/1AgUghyTfeuovez3I213Ng7fn1G_ojkg8/view?ts=638383f9

- Link to MID-FI Prototype:

https://www.figma.com/file/wASBOpZjtkEEq8vNJDTCML/Project-for-HCI?node-id=211%3A2&t=C9WDV9DVsUcnTTRe-0

Third page in the project

- Link to the video demonstration:

https://www.youtube.com/watch?v=Nd7Ji_Iw5BU

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Table of Contents