KloFOOD

User study, conceptual design, and interface design

Group assignment report

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1. INTRODUCTION

1.1 Project Description

Food, even with its abundance, most of it safe and healthy for human consumption is disposed consciously. Wasted food has huge negative impacts nationally and globally. The United Nation's Food and Agriculture Organisation (FAO) estimates that about one-third of all food produced in the world each year goes to waste (Gustavsson et al, 2011). While food waste occurs at all points in the food supply chain, 83% occurs at restaurants and grocery stores (ReFED). Reducing food waste requires the proposition of sustainable solutions and initiatives that everyone can key into, from governments, businesses, farmers to consumers.

The goal of the project is to develop a web service that supports and/or motivates students in higher education to act on reducing food waste in their communities. This would be achieved by connecting students with food services such as restaurants and grocery stores that have excess meals, ingredients or expired groceries offering them at discounted prices or free food that can be picked up at designated locations within their localities.

In the proceeding chapter of the report, we describe the user study process using semi-structured interviews. Next, the results from the interviews with target user groups are analyzed and reported using thematic coding to derive the main user needs and motivations. The context of use, user tasks, personas, user experience and usability goals are presented in chapter 4. In chapter 5, the web service's conceptual model is illustrated using visual (concept map) and textual descriptions (use scenarios).

The design ideation of the web service presented in the form of a sitemap, wireframes, and high-fidelity prototypes designed with Figma software are shown in chapter 6, along with a link to the design file. Accessibility has also been considered in the design. Chapter 7 provides a summary of the web service idea and reflections on the team's work.

1.2 Schedule and division of work

The team meets at least once a week on Thursday evenings and on other days as the need arises. For the user research, each member will individually produce the interview questions thereafter review together. Also, the team will collectively conduct at least two (2) interviews with participants that meet the target group of the project being worked on. The analysis of the user interviews phase is agreed to be done by each member, allocating different parts of the questions and responses. This ensures faster work on the gathered data and that there exists no bias in content analysis.

To encourage learning and collaboration, every member of the team is expected to take part in all phases of the project. Where a member's concept provides adequate and concrete information, that would be utilized.

The schedule of work and tasks are shown in tables 1,2 and 3.

Table 1. Table of main group assignment tasks

Course week	Tasks	Responsibilities	Notes
1	Forming groups, ideating interview questions	Oluwatosin for group formation, ideation – done by every member of the team	3 days
2	User Interviews, interview data analysis	User Interview & Thematic Content Analysis- All members Interview Data Analysis Interpretation- Oluwatosin Work distribution by Mina	2 weeks
3	Use context, user groups, personas, UX goals, user tasks, conceptual model	Every member discusses this. The user context, user groups, UX goals, personas to be included it in the report by Mina	1 week
4	Information architecture, use scenarios	Deliberated by every member. User Scenarios by Fareed Information Architecture (Concept map) & Sitemap by Oluwatosin	1 day
5	**Peer-reviews,** sitemap, wireframes (one individual + combined designs), accessibility	To be deliberated by every member (excluding peer-reviews). Wireframe guidance by Oluwatosin and Mina	1 week
6	Visual design (one individual + combined designs), interactive prototype	To be done by each member with guidance from Oluwatosin	1 week
7	Interactive prototype	To be done by each member with guidance from Oluwatosin	1 week

8	Finalizing the interactive prototype and report	To be done by the team	3 days

Table 2: Work Plan schedule

	WK1	WK2	WK3	WK4	WK5	WK6	WK7-9
Group Formation, Interview Questions							
User Interviews							
Data Analysis/Thematic coding							
Personas, user scenarios							
Conceptual design							
Wireframes, prototype							
Final report							

Table 3: Group meeting Schedules

Meeting	Date/Time	Purpose
Meeting 1	01/11/2022 | 5:00pm- 7.57pm	Group formation and interview questions
Meeting 2	10/11/2022 | 4:57pm - 6:12pm	User interview experiences and reflection
Meeting 3	15/11/2022 | 5:55pm - 6:25pm	Work on interview data analysis
Meeting 4	16/11/2022 | 4:00pm - 8:30pm	Work on interview data analysis
Meeting 5	17/11/2022 | 5:00pm - 9:00pm	Work on interview data analysis, thematic coding
Meeting 6	18/11/2022 | 2:01pm - 2:31pm	Discuss on report writing and delegate different chapters
Meeting 7	19/11/2022 | 2:01pm - 4:37pm	Discuss user groups, use context, personas, use scenarios, concept map
Meeting 8	20/11/2022 | 5:00pm - 11:25pm	Work on chapters 1-6 of reports for peer-review
Meeting 9	04/12/2022 | 4:00pm - 7:30pm	Planning for group presentation- Prototypes, main views/user requirements (weekly exercise)
Meeting 10	10/12/2022 | 7:00pm - 10:30pm	Reflection on peer-review work and adjustment proposals
Meeting 11	12/12/2022 | 5:00pm - 11:30pm	Work on high fidelity prototype and interaction adjustment

Meeting 12	19/12/2022 | 5:00pm - 9:00pm	High-fidelity prototype design and interaction
Meeting 13	27/12/2022 | 4:35pm - 7:30pm	High-fidelity prototype and report finalization

2. USER STUDY

This project aims for a user-centered design website, and to achieve this goal; the team needs to acquire sufficient information about user needs as a part of the user study. By conducting user interviews, useful information can be gathered from representative users from the target group to be analyzed. Nine interviews were conducted, with interviewees selected from university students. Interviewees had different backgrounds, cultures, and lifestyles. The details of the interviews and study methods are discussed.

2.1 Study method and interview questions

For this research, Semi-structured interviews have been conducted. In this method, semi-structured interview, interviewers know in detail what they want to investigate and the option to ask additional questions during the interview is open. In such a way that if follow-up questions are needed for further understanding or further exploration, interviewers are allowed to ask these additional questions. In this type of interview, interview questions are written beforehand, and the order of the questions is fixed, the interviewer both writes down the answers and notes about body language and what has been understood from participants' moods while they were answering the questions. During the interview, new topics may come up and the interviewer must cover these new related topics with new questions during the interview. In addition, if any further questions arise during the analysis phase, the interviewer will contact the participant again and ask for more information.

In the research, interview questions follow the same concept but mostly in three different parts. Depending on participants' answers to the question ''How do you usually have your meals? Do you cook? Using university restaurants? Or another restaurant?' interview questions have been divided into three sections, cooking, university restaurants, and other restaurants for an easier focused interview flow for the interviewer. If a participant mentions two or more ways of having meals, for example, both cooking and using university restaurants, first the questions about the most usual way of having a meal are being asked and then not a common question from the other section is being asked. The main goal of interview questions is to acknowledge what problems users have when it comes to food waste and what users need to reduce food waste. Interview questions are presented below.

Interview Questions:

- Where are you from? Which group do you belong to: Teenagers, early twenties (20-25), late twenties (26-29)? Do you currently work?
- How do you usually have your meals? Do you cook? Using university restaurants? Or another restaurant?
- Do you have a special diet? Like vegan, gluten-free, lacteous-free, or other diets?

Cook:

1. How often do you cook?

2. What makes you cook more often than using restaurants?

3. How often do you buy groceries? (Daily, Weekly (how often?), monthly (how often?), as needed) Why?

4. Do you make a grocery shopping list

5. Do you have a budget for your grocery shopping?

Yes, why do you budget? (Motivation)

No, why don't you budget? (reason)

6. How do you preserve your (perishable or non-perishable) groceries after purchasing?

7. What comes to mind when you hear the word food waste.

8. Have you ever had to throw away food in the last two months?

-Yes. (Can you describe the situation you have been through.) (How often did that happen?) (What is the most challenging part of reducing food waste?) (What actions can you think of to help reduce food waste?)(Can you share some benefits people derive when food waste is reduced.)

-No. (Why do you think that is?)(What actions have you applied to avoid food waste?)(What is the most challenging part of reducing food waste?) (Can you share some benefits people derive when food waste is reduced.)

9. What do you do with your food waste

10. Do you know of any platform that offers a way to reduce food waste? If Yes, can you mention them

11. Are you interested in helping to reduce food waste? (Yes/No)

If yes, how do you think you can help reduce food waste?

University's Restaurants:

1. How often do you use the university's restaurant?

2. What makes you use restaurants more often rather than cooking?

3. Have you ever had to throw away food in the last two months? /Do you usually have leftover food?

Yes. (Can you describe the situation you have been through.) (How often did that happen?) (What actions can you think of to help reduce food waste?)

No. (Why do you think that is?) (What actions have you applied to avoid food waste?)

4. What comes to mind when you hear the word food waste?

5. What do you do with your food waste

6. Do you know of any platform that offers a way to reduce food waste? If yes, can you mention them

7. Are you interested in helping to reduce food waste? (Yes/No)

If yes, how do you think you can help reduce food waste?

Other restaurants:

1.How often do you use Fast Food restaurants per week?

2.What makes you use restaurants more often rather than cooking?

3. Have you ever had to throw away food in the last two months?

Yes. (Can you describe the situation you have been through.) (How often did that happen?) (What actions can you think of to help reduce food waste?)

No. (Why do you think that is? What do you do with your food waste)

4.What comes to mind when you hear the word food waste.

5.What do you do with your food waste

6.Do you know of any platform that offers a way to reduce food waste? If yes, can you mention them

7.Are you interested in helping to reduce food waste? (Yes/No)

If yes, how do you think you can help reduce food waste?

2.2 User groups and participants

As stated above, the target group for this project is university students. All the interviewees are students but with different backgrounds and lifestyles. Nine interviewees were involved in this research. In the table below, participants' information and background can be found. For the sake of privacy, no name has been given and participants have been distinguished with given IDs.

Participant ID	Age	nationality	Job status	Familiar with similar platform (for reduce food waste)
P1	32	Bangladeshi	Full-time	No
P2	25	Pakistani	Part-time	No
P3	Late 20s	Nigerian	Not available	No
P4	Early 30s	Nigerian	Part time	Yes

P5	Late 20s	Nigerian	Part time	No
P6	Early 20s	Vietnam	Not available	No
P7	27	Persian	Full time	No
P8	Early 20s	Sri Lanka	Part time	Yes
P9	27	Persian	Full time	No

2.3 Study Process

Both online and face-to-face interviews have been used. The team prefers face-to-face interviews because this way, the participant's body language will be being paid attention to, and the facial expression along with the words can reveal the user's feelings about the topic better. There are usually three phases for each interview. In the first stage, the participant was contacted and information such as the topic of the interview, the approximate duration of the interview, the structure of the interview such as the model of the questions, the audio recording of the interview and the final purpose of the interview, i.e. where this information is to be used, were provided. Then, according to the participant's desire, an agreement was reached for the date and time, place, and online or face-to-face interview.

Interviews have been conducted by each team member only. however, all team members involved in the Analysis process of interviews. With the permission of the participants, the audio file of the interviews was shared among the team members so that if they were not present in an interview, they could, if necessary, listen to the file and review the interviewer's notes, and give their opinions during the data analysis. Each team member first conducts a pilot interview so that we can find and fix the strengths and weaknesses of the members as interviewers by reviewing those three initial interviews. After the pilot interview, the order of the interview questions was slightly changed, and the team realized that some questions needed to be paraphrased or needed to be explained better. In addition, after this experience, the interviewers made changes in their tone when asking questions, their body language, and their facial expressions to create a better experience for the interviewer during the interview. Then two more interviews were conducted by each team member. And finally, the data of nine interviews were reviewed and analyzed by the members. For in person interviews, mobile phone recording has been used and for online interviews which have been conducted in Teams, meetings have been recorded using the software’s recording option.

2.4 Data Analysis

The detailed interview transcripts were written word by word according to the recorded audio file from interviews independently by interviewers then each member of the group shared the information about their participants and participants’ answers to the interview questions in a shared Excel file.in addition to the interview scripts, interviewers' notes have been presented

and reviewed. The group analyzed the answers of the participants in cooperation and the main points of each question were obtained, which were noted in the form of codes in the Excel file in front of the relevant question. Codes have been driven by reading all participants' answers to each question considering interviewer notes about participants mood as well. In the next step, these codes were categorized based on the concept in different themes. In Chapter 3, results from data analysis are discussed.

3. INTERVIEW RESULTS

In this chapter, we provide answers to the following questions to interpret our results:

- What was the aim behind the interview?
- How did we investigate it?
- Why did we choose our analysis method?
- How did we interpret our result?
- What were the standout user pain points we discovered?

3.1 Interview results description

Interview Goals

Beyond the general description given to us to work on, we aimed to derive the following points below:

- Understand the step-by-step process a user undergo before he/she embark to the supermarket to purchase groceries
- Identify reasons why users will prefer cooking, eat at the university restaurant, order online from other restaurants or use at any of their preferred restaurants
- Learn more about challenges/pain points faced by users in managing food waste and some ways they have been able to manage them
- Identity platforms that offer similar services

How we investigated our findings

Just as pointed out in Chapter Two we combined both face to face interview and online interviews which were recorded via Microsoft teams. We interviewed **9 people in total** and they can be categorized into two classifications: **Students who prefer to cook their meals and Students who prefer to prepare their own meals, use the university restaurant, or make orders online.**

We further went on to transcribe each of our interviews into scripts thereby removing unnecessary text and editing incomplete sentences.

Choice of Analysis Method for the Interview

We made use of Thematic Coding to analyze the qualitative data. This includes codes that let us identify and summarize important concepts in our transcribed data.

Interview Results Interpretation

As an effortless way of analyzing our qualitative data, we used Microsoft Excel to categorize each response we got according to their question. This helped us create various codes to relate vital information needed to help our research.

The figure below is vital information we got from our research:

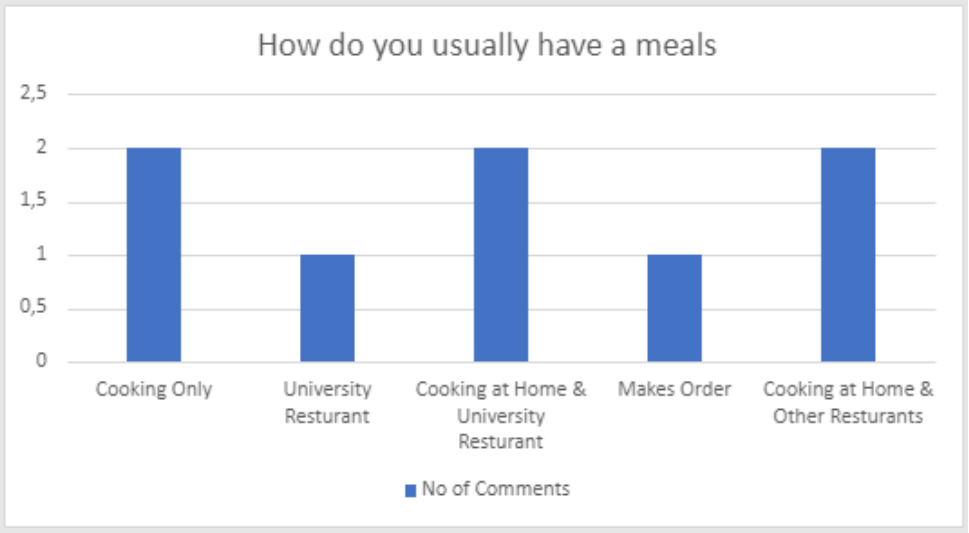


Figure 1: Various ways people usually have their meals

From Figure 1, we were able to identify key focus groups. People who like to cook by themselves, people who like to cook and eat at the university restaurant or other restaurants.

One other important question that really broadened our scope was: ***Do you have a special diet?*** *The response from this question will help to shape the type of foods we will be displaying on our web service.*

Table 1: Do you have a special diet? Like vegan, gluten-free, lactose-free or other diets?

Categorization of code	No of comments	Percentage Response
Unsure reaction to food	1	17 %
Special Diet	2	33%
Non-Applicable	3	50%

However, participant P4=TP1 called our attention to something vital which will help our project and he quoted thus *" Well, have you eaten some of their cuisine. They are good, but some of these snacks, most have high sugar content, so I try to stay away from them. But generally, their meals are nice."*

Another valuable information we needed for our research was to understand how often our participants usually cook and from our findings over 28.57 % of our participants (equivalent to 2 participants each) cook daily and also cook every other day. Also, in the same category, over 14.29 % of our participants either cooked at least 3 times or relied on their current food duration or their mode of preservation. This information can be found in Figure 2 below

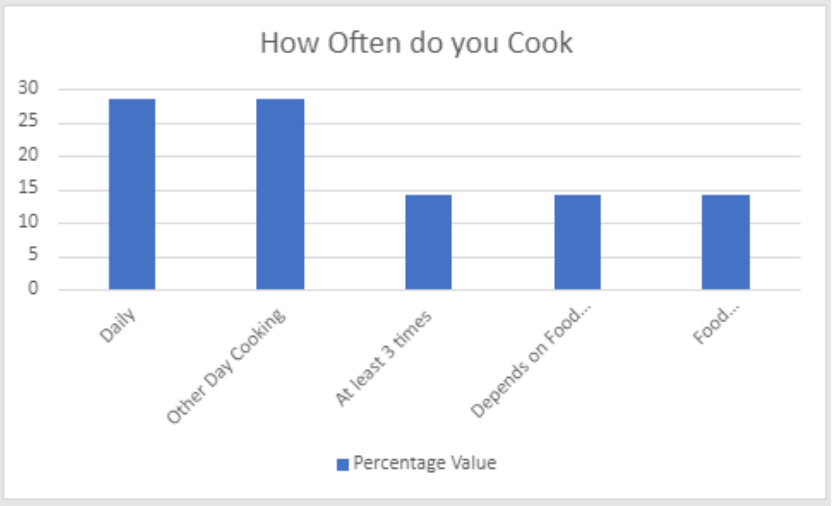


Figure 2: Result of how often people cook

From the collected data, we also realized reasons why people often shop. Below is a table that shows the various relationships of the data.

Table 2: Reasons why people often shop for groceries

Categorization of code	No of comments
Collective Purchase(Buying in bulk)	2
Non-closeness to Store of choice	1
Long Storage	1
Get Fresh Products	1
Healthy Living	1

Based on the response received, we found some peculiar patterns among people from a certain background (Nigerian) who tend to buy in bulk and due to some specific type of food one of our participants will not mind going as far as getting from an extremely far store. Participant P5=TP2 who is also a Nigerian was against the idea of bulk food stock as he has this to say *"So buying, not buying in bulk for me is more advantageous for me, but most people tend to buy in bulk depending on the kind of. Food they eat or the groceries or what they cook. But for me, I do not buy in bulk, no."*

One other thing we discovered were distinct reasons while users prefer to cook, and the following were vital points we got:

- Food preference and control: This stood out as at least 4 participants referred to this
- Time-saving
- Healthy Living
- Cost and

- Experimentation

To further establish a feature, we were proposing we decided to find out the importance of a shopping list, the table below summarizes our finding

Table 3: Reasons for making Shopping List

Categorization of code	No of comments
Planning	3
Money and Time Saving	1

However, participant P9 =MP3 raised a point that called out our attention: *"when i go shopping without a list, so it's in my mind, what I need. Or when I look at them, when I go shopping and I do see this for example this apple. Ohh, I remember that I need Apple at home. And you know, I just memorize. Yeah."***.** The need to make recommendations and take history of user shopping lists places us at an advantage to ensure the user never misses out on essential groceries they need.

Over **75%** of our participants are victims of food waste as they have had to throw away food in the **last 2 months** while the remaining **25%** tend to prepare food according to their consumption level

Some of the reasons why people throw away food is listed below:

- Expiration of goods
- Lack of information: Participant P6=TP3 has this to say: *"I think I would have spent some time to cook them or could have found some delicious recipe that make use of them"*
- Preservation Method
- Short Product Duration
- Participant Mode (Sickness, Food taste)

We also discovered some practical ways some participants have been able to manage food waste, and they are included below:

- Do not buy product you will not use almost immediately especially if the expiring date is close
- Proper packaging of Leftovers for others
- Right Preservation
- Making it a priority

3.2 Conclusions based on results

Based on the results generated, it will help to guide us on some distinct features peculiar to our users and state out their pain points. The result also confirms some ideas we thought of, but the result will be guiding us in channeling those ideas to solve the user's problem.

Thanks to the interview we got additional information and requirements our service website will be needing. We found some cultural similarities between certain participants, and we were glad they shared similar ideas.

Features Needed by the User from our Analysis:

- Calories Calculator that helps to determine the number of foods needed to be consumed per day
- Contribution of Earning to Less Privileged Individuals
- Different Locations of Restaurants and Stores
- Simplified method of helping our Target Audience save more
- Notifications of food expiry date
- Preservation Tips
- Clear indication of allegories

4. Context of use, users, personas and user experience

4.1 Context of use

For the website in question, different contexts of use have been considered. The user can access the system on the move through a smartphone or tablet, or a laptop or personal computer while seated at a place. They can use the website from home, work, restaurants, and grocery stores, anywhere they have access to the internet. Services related to university restaurants can be accessed through the TUNI website as well. Students can use their TUNI account on the website for authentication.

The website has access to a geolocation service to determine the location of available offers in nearby restaurants or grocery stores and connects to the bank's online payment portals to make online payments. Tasks like tracking food waste reduction, points that have been collected by reducing food waste can be shared on social media like Instagram to motivate other people. Also, a delivery service is available due to requests which can be provided by connecting to services like Wolt.

4.2 Users

The target users of the system are university students. Other users are employees, all people who are interested in reducing food waste and sustainability, stakeholders of grocery stores, bakeries, and restaurant owners. Users have unique needs, and their needs should be considered separately. As this service is a user-centered design service, all users' needs should be considered.

The design should be safe and secure for both buyers and sellers and should be beneficial to all parties. It should cover all types of students, those who work part-time and full-time, those who do not work, students who use restaurants all the time and those who prefer cooking at home mostly. As these people have unique needs in different environments, like at restaurants and at their kitchen and various situations regarding their free time, budget and priorities like people who work and study at the same time which have less free time and energy to think of what they have in the fridge and make something with it before it gets ruined.

People need different services related to reducing food waste and distinct reasons can motivate them to act in reducing food waste. For the users who are not familiar with platforms related to reducing food waste, information and guidance have been required and for people who use these online platforms, Weak points of the platforms and things that have not been provided as features should be covered. Stakeholders can use the website to sell their products before they expire and this way, stakeholders not only do not have to deal with the cost of moving the waste but also, they will receive money for it by selling them cheaper.

4.3 Personas

Two primary Personas have been prepared for this research so far.

Persona 1: Nadia Green is a 21-year-old American girl studying Physics at Tampere University. Nadia works part-time as a Research Assistant in the Physics laboratory at the university. She has a busy schedule because she is either working on her student work like participating in classes, group assignment meetings and studying or busy with her work at the laboratory. Because of this busy schedule, she has no free time to cook and mostly goes for lunch at university restaurants late in the afternoon when she gets hungry since she had breakfast early in the morning before leaving the house. The fact that food in university's restaurants is not being properly labeled frustrates Nadia because from time to time she happens to have mistaken food and must throw it away because it is not tasty, or she cannot have it because of her special diet. Sometimes she misses the university's restaurant's open hours and tries to use the resQ app to buy meals but the fact that she needs to leave the campus holds her from ordering because of the cold weather and tight schedule because she needs to pick up the order herself. Also, the fact that there is no option to filter your food preferences in resQ frustrates her.

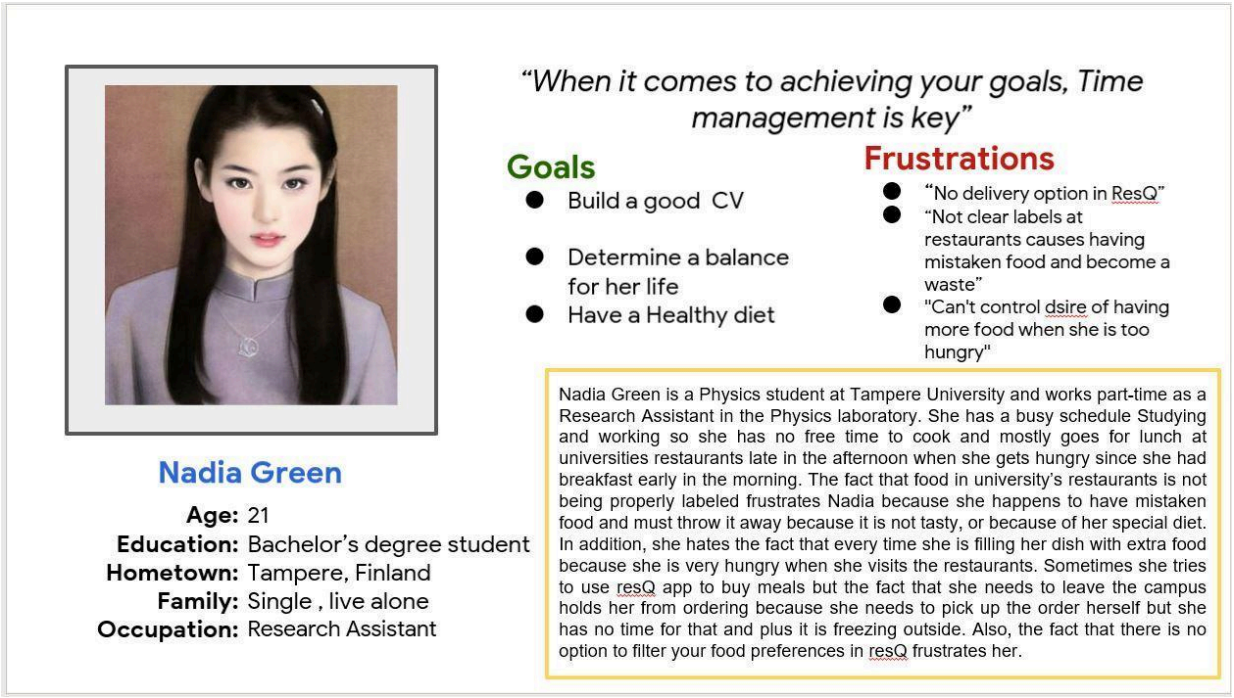


Figure 3: Persona 1- Nadia Green

Persona 2: Saeed Lidero is a Game Studies master's student at Tampere university. He is 27 and living with two flatmates in a shared apartment at Tampere. Saeed prefers to cook himself because it fits his taste and he can have everything about his meals under control, but he has problems with preserving food because it is the first time he is leaving alone, and he has not enough knowledge and experience about preserving various kinds of food. Saeed

enjoys trying new things but sometimes he has no idea what he can make with new ingredients he has bought and usually it leads to food waste and makes him feel guilty over wasting food. Also, most of the time he happens to forget what he has in the fridge because he leaves in a shared apartment, he needs to share the fridge with two more people, this way he has less space in the fridge so some products will be hidden behind others and get forgotten and only he finds out when it is ruined and smells.

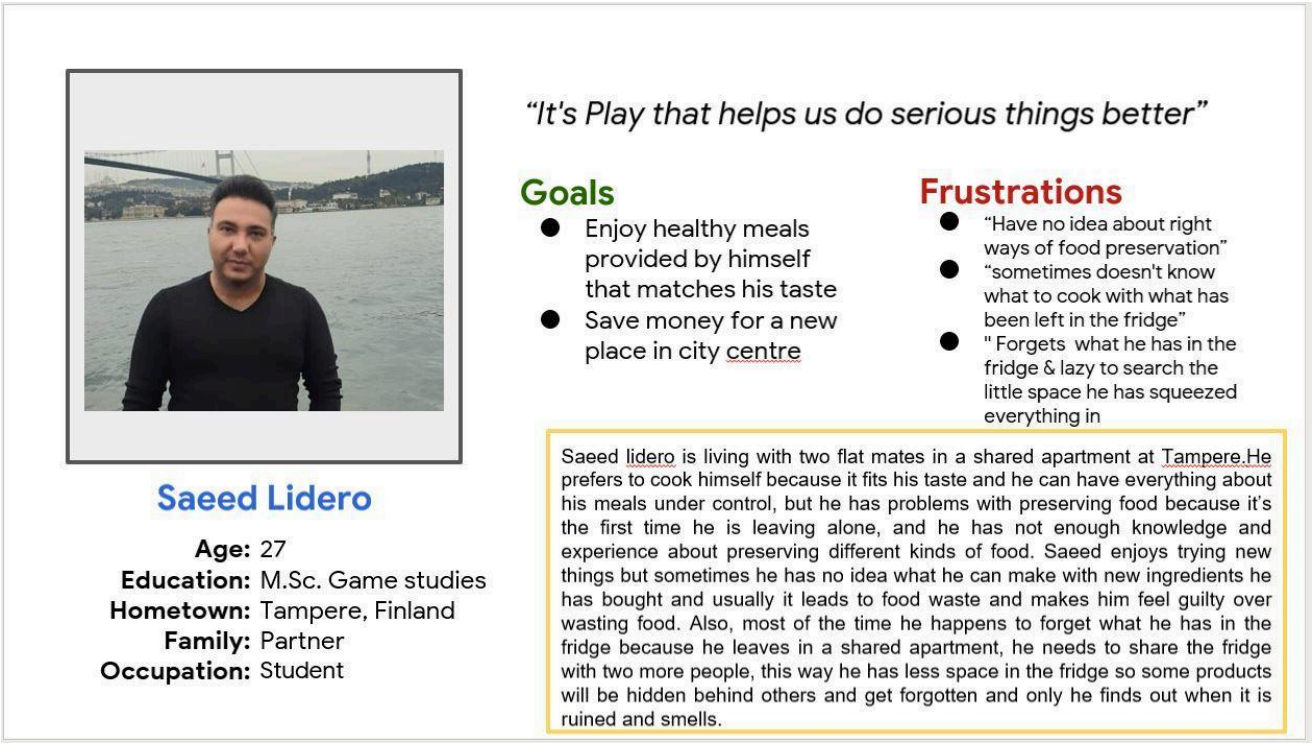


Figure 4: Persona 2 - Saeed Lidero

4.4 User tasks, user experience goals and usability goals

- View available food on offers/discounts from restaurants and grocery stores: users can browse through different food services to know what food is available for them to select from based on their individual preferences such as brand or diet.
- Filter location based on preferences: users can select their preferred location to see available foods which may or may not be their present physical location. For instance, a user who lives in Kaleva but is currently using the web service in the City Centre and wants to view food offers close to home so they can pick it up on their way.
- View information about foods and their mode of preservation: users can view detailed information about the food they intend to purchase including the expiration date, available quantity, and how they can be preserved. They can also scan the barcode on the item pack to view the information.
- Place order for food: users can place an order for their desired foods or groceries conveniently.

- Select a delivery option: users can make a choice of delivery options, from pickup to door delivery. They can order food for themselves and have it delivered to them or order for someone at another location and select their location.
- Track personal goals for reducing food waste: users can track their food waste reduction goals such as saving 10kg of food from going to waste a week. This they accomplish by purchasing food from the web service which gets added to the progress.
- View recipes for recently purchased food items/groceries: users can view information of different food recipes based on their recently purchased food items along with the duration for preparing the food.
- Setup reminders on the expiration period of purchased food items: users can set up email/SMS reminders on the web service about when their purchased items expire. The service suggests a reminder after the purchase with options to select where they decide to store the items. For example, in the refrigerator, freezer or shelves. This is so that when they get the reminders, they know where to search.

Usability goals

Ease of learning: the web service should be easy to learn for users, allowing them to quickly accomplish their tasks. One of the reasons why people return or leave a system is due to the amount of effort needed to learn how to use the system. For unaccustomed users unfamiliar with similar service platforms, it is important that the service has a minimal cognitive load for learning. This would be achieved by matching users' expectations with design goals, using familiar elements, and simplification of descriptions and steps required to accomplish user tasks.

Efficiency: an essential part of the web service is that it should support users in achieving their tasks with minimal effort. This is critical especially when users have less time to spend. Efficiency measures the speed and amount of time users take to complete their goal after familiarizing themselves with the user interface of the web service. This goal is vital because it is a determinant if users will continue using the service or not. Like learnability, the number of form fields needed to complete will be reduced, highlighting mandatory ones, and incorporating progressive disclosure in the design patterns of the interface so users can seamlessly carry out their desired actions.

Engaging: the web service design should be minimal with a clear call to action and the use of white space. The layout of the website should be well simplified with a good blend of pleasant colors, and the presentation of the images should be rich with clear indications if needed.

Finally, the use of various interactions or animation should be minimal, and content should be summarized, not bulky. This goal will help to sustain the attention of the user on key functionality the web service offers instead of being distracted.

User experience goals

Value addition: The web service will support users in promoting food sustainability through the actions they take to reduce food waste by purchasing the food excesses or those not presentable on shelves. In addition, users will be able to learn new cooking skills using different recipes shown as recommendations based on their purchase history. This contributes to the user's personal development. Tying one's little actions to a bigger cause that helps communities, and the world creates a sense of fulfillment and patriotism. It is possible that a user is only familiar with one recipe type using some ingredients, but with the recipe recommendations, they can try out new things.

Pleasurable: the web service should evoke positive emotional experiences for users, with consideration for visceral, reflective, and behavioral emotions. People are more at ease when something appeals to their emotions. To make the service worthwhile for users, the contents will be personalized, like users having a character, use of font styles and colors that conform with sustainability, characterized texts, adopting gamification methods like the collection of reward points, reminding, and encouraging users on goal progress, use of sound effects and light-hearted, humorous messages when users run into errors.

Informative Feedback: The web service would ensure users get relevant feedback whenever there is a frequent or major action carried out on our platform. Feedback like the change of button when hovered, notification of correct syntax when filling a form, animations etc.

Consistency: The web service will ensure that users are not boxed up to an unfamiliar action they are not used to. This will be done by using actions familiar to the user which will be predictable to use and navigate

5. CONCEPTUAL DESIGN

In this chapter, we present a simple workflow showing distinct features expected of the web service using a concept map. Also, we will be creating various scenarios stating what our user wants and how well we can craft a solution to tackle the problem raised by our user personas.

5.1 Conceptual model

Here we describe our proposed web-based food waste service.

The service will be made available over the Internet or the university intranet. The service will also function using Universal Description, Discovery, and Integration (UDDI) for publishing information about the service. The web service will also have a minimalistic and aesthetic design.

When a user opens the web service, they can view different food listings, and food location/collection points. Users can browse through the food listings that contain available food information which includes, price, expiry date, and category, and must have the type of food which can be groceries from grocery stores or cooked meals from restaurants. The web service must have a login option for both users(consumers) and partners (grocery store or restaurant managers) and grant them access. Users (consumers) can place orders for food, add the food item(s) to cart, select a delivery option which can be home delivery or pickup and they make payment through the service. The web service can send message notifications on food preservation tips, food expiration and recipe recommendations.

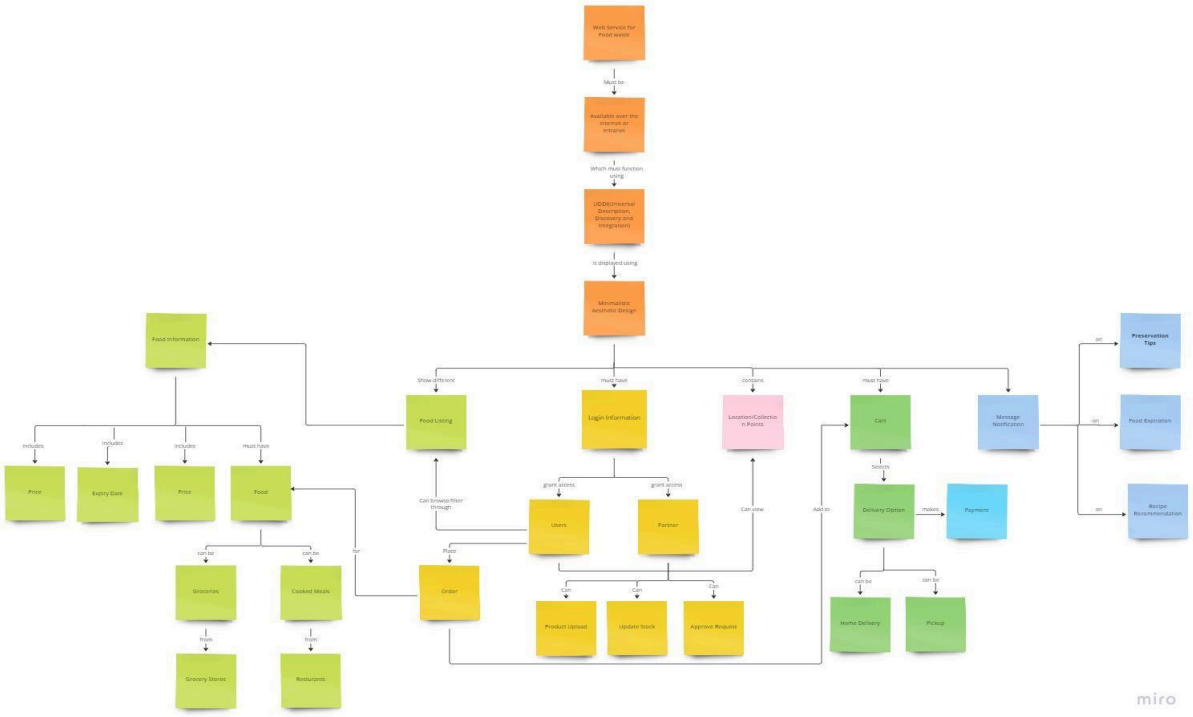


Figure 5: Concept map for KloFOOD web service

Miro Link to view concept map: [KloFood Concept map]

5.2 Use scenario

Persona 1 Use Scenario

Nadia mostly has tight work and study schedules at the university on weekdays elapsing lunchtime. She knows that by the time she gets to the university restaurant, they would be closed and prefers to have her meal before 3pm. Even if she manages to get there before closing time, her choice of food would be finished. She cannot afford to go to a restaurant outside. She opens the KloFOOD on her smartphone and browses and filters through a list of available foods that matches her preference. She selects a restaurant close to the university campus as she is very hungry, places an order and picks the university address as the delivery location and makes a payment. Nadia gets her meal within a few minutes.

Persona 2 Use Scenario

Saeed prefers his home-cooked meals because it brings him closer to home. Back in his home country, everyone eats together leaving no leftovers. He also wants to stay within his monthly budget of 150 euros by trying out new things. Saeed finishes classes late on Friday evening and wants to make dinner and plan for Saturday meal. He opens the KloFOOD to order some groceries. He is presently on campus, so he searches and selects his apartment location to see available grocery stores' collection points as he wants to get the items while close to his apartment. After the order confirmation, he is shown information about recommended recipes to try out using the ingredients he bought. After picking up his order and now at home, Saeed makes a delicious dinner with some of the purchased groceries and keeps the rest in the fridge. He receives an email message about preservation tips of the purchased items.

6. DESIGN

In this chapter, we provide insight into how each primary page of the web service links up with another logically using a sitemap. Also presented are some Mid-Fidelity and High-Fidelity Design prototypes from our UX Design Research and consideration for accessibility in the design process.

6.1 Sitemap

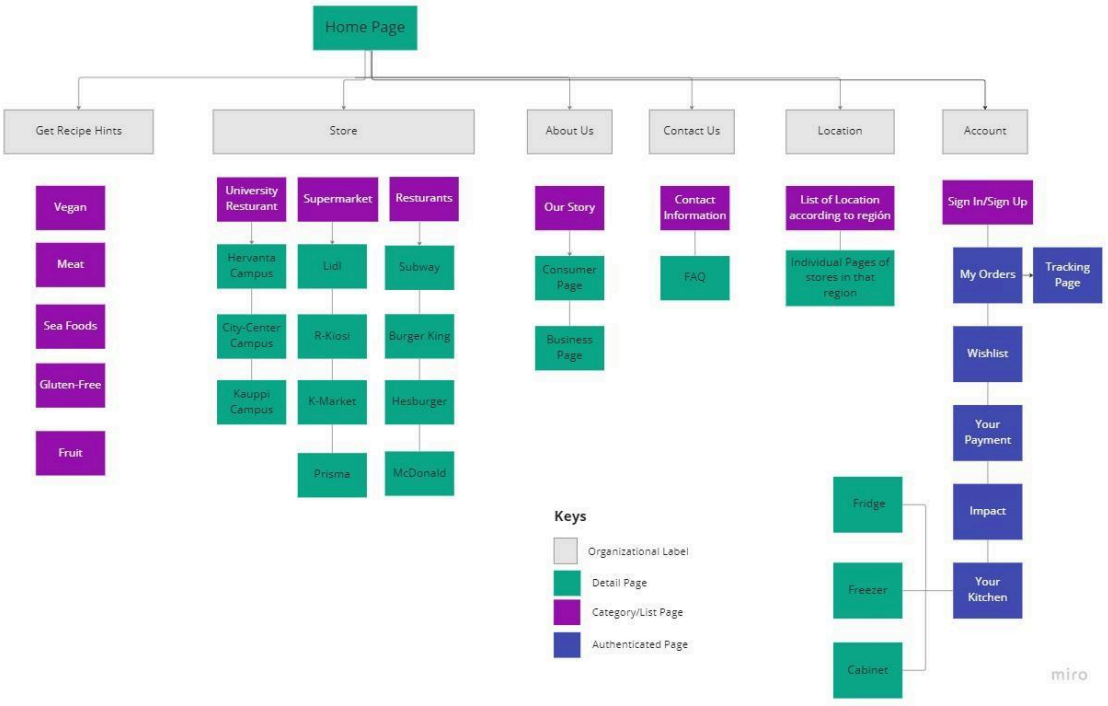


Figure 6.1: KloFood Sitemap

Figure 6 shows the pages and features of the web service represented by colored rectangles. The first top-level rectangle (organization label) captures all the major pages associated with the website while the second rectangle in green represents the detail pages which contain more information.

Also, the category/list page (purple rectangle) shows the various categories associated with each menu on the menu bar. The last rectangle in blue (authenticated page) shows pages that will be accessed by only a registered and signed-in user.

6.2 Wireframes

For the UI, the team got inspiration from various websites/apps with similar services such as ResQ, Fiksuruoka, SaveTheFood, TooGoodToGo, and Wolt, and individual creativity. Paper sketches were made and shared. A major focus was to make the web service easy to navigate

and learn, using familiar design elements users encounter almost every day in their interactions with digital services. The overall design concept is described below.

Homepage: We wanted to bring into view the benefits of using our web service for both buyers and sellers, providing the value propositions clearly on the first visit. This way users can be nudged to explore the service more.

Store page: We thought of an idea similar to regular e-commerce web stores, having a search function, filters, a listing of products, and a shopping cart icon. In addition, we wanted to give site visitors information on the expiry duration of products briefly using a catchy phrase. This way, the user requires less effort to learn about the pages we have in common with other services, which they have used so far.

Product Detail page: the design idea was similar to e-commerce, also including a section for food preservation tips, a vital part of our users' needs. Another feature was the food nutritional information and categorization, as it would be good for users to know the food composition before purchase.

Recipes Page: The idea for this page was to provide "tried and tested" recipe ideas from leftover grocery items to users, so they could follow simple recipe guides to make delicious, yet healthy meals without, thereby reducing food waste. Users can also filter recipes based on personal preferences using category and allergy.

Your orders and tracking pages: a page where users can view their recent orders (completed, in progress, or canceled). In the case of in-progress orders, they have the option to cancel. The tracking page provides a real-time order journey for in-progress orders.

Your Impact Page: the idea here was to "give" users a view of their positive contributions to reducing food waste by highlighting some important data like saved money, CO2 reduction and even to see their purchase statistics (grocery store or restaurant). In addition, collected points are mentioned as a reward for helping reduce food waste, and can be used for order payment.

Cart page: The idea here was to keep track of what the user has selected for purchase, also we were intentional to ensure that both other good combinations to spice up their order, and the products from their Wishlist were included to remind them of things they might need.

Order Confirmation page: The idea here was to generate a sequence of unique numbers for tracking of purchases and a platform to encourage users with rewards (Points and gratitude for participating in an important and positive activity for all people of this generation and future generations and the world we live in).

Your Kitchen page: The page concept was to ensure purchased food does not go to waste due to users' forgetfulness. Here, users can organize their food items into different compartments of storage (virtually) as is in the real world- fridge, freezer, and cabinet, set up and receive notifications before they expire. There are three options available for the user to add their groceries in the kitchen. They can automatically add whatever they buy from our website to their Kitchen page which this way the expiration dates will be automatically

included, and they can either scan a receipt and add the expiration dates for scanned items or add items manually.

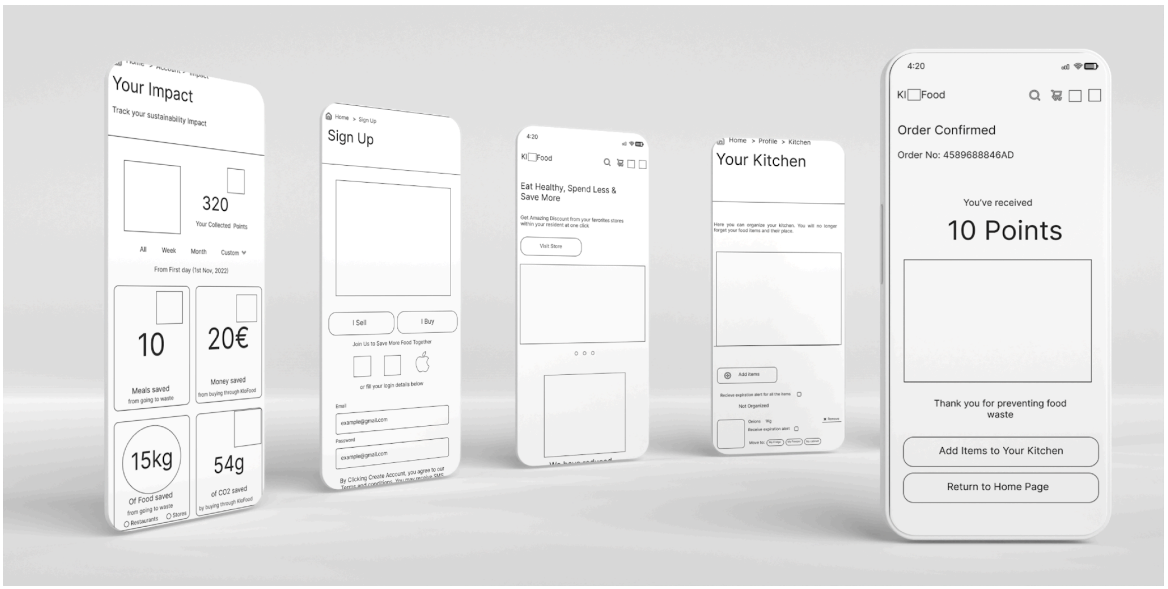


Figure 6: KloFood UI Wireframe concept Mockup

The wireframes of the web service are accessible via this l**ink:** [KloFood Low-Fidelity Wireframe]

6.3 High-fidelity screens and interactive prototype

For our High-Fidelity design, we considered colors and typography that reflect what we want our users to remember us for. We also used icons and labels to provide a more detailed explanation of the icons and symbols used on our platform. Below is a collection of typography, colors and icons used.

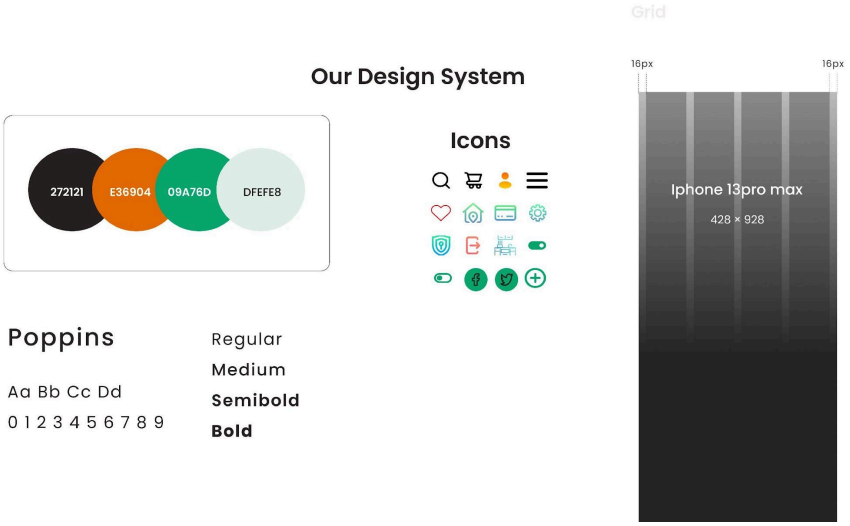


Figure 7: Design System

From our Design system, we were able to add colors and icons to the low-fidelity wireframe we created, Figure 8, is a snippet of some of our designs

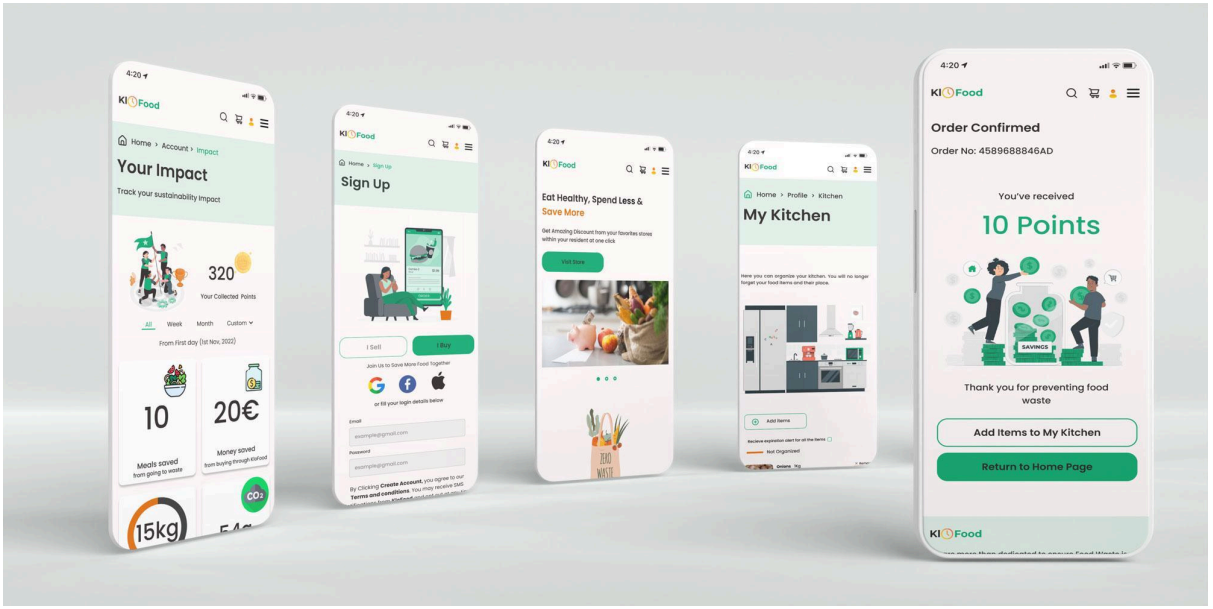


Figure 8: Hi-Fi Wireframe

Link to our High-Fidelity: KloFood High-Fidelity

The explanation of the various pages has been explained in 6.2 and below pages designed by members are mentioned.

Fareed: Yours Order Page, Tracking Page, Your Impact, Main Menu, Recipe Page

Mina: Product Detail Page,Your Kitchen, Profile Page, Cart Page, Store/Product listing page

Oluwatosin: Checkout Page, Payment Page, Good Job Page, Sign In & Login Page

The Mobile Homepage and Desktop Home Page was done by everyone. Also, on all pages, ideation, decision and editing have been done by all members.

Our full prototype interaction can be seen here: ▸ Hi-Fi - Figma Template - Design System

6.4 Overall design process and accessibility

The primary idea for “Your Kitchen” page was to have an illustration of fridge, cabinet and freezer in my kitchen page and let the user organize their groceries in these three options to simulate what they have in their real kitchen. This way, they could locate everything in the kitchen and avoid forgetting different items. However, the team decided this will be too complicated and too much effort for the user and may end up being an unused feature. We designed the kitchen page to be easy so the user would put as little effort as possible to include the items and organize them.

In the “Sign Up” page, the original idea for the action buttons was to use the title “Consumers” for people who are using the website to buy the products (students), and “Partners”, for people who are going to sell their products (grocery markets, food factories and restaurants). Later, the team decided that it is easier and more friendly for the user to understand action verbs. Hence, “I Buy” for the buyers and “I Sell” for the sellers were used. This way, people can choose their preferred user roles and respond to the sign-up questions appropriately.

All positive and moving-forward buttons have been placed at the right side/top of the page and using the green color while the negative and moving-backward buttons have been placed in the left/bottom side of the page using white background and thin green stroke. At first, the team designed a backward button in green because it was the only button to navigate the user in another page, but the color has been changed to white to be consistent with the design and user’s mindset of our website.

Furthermore, we excluded some designs such as the “Collection Location” page that would utilize maps for grocery stores only. While this was a welcomed idea, we wanted to make the navigation experience simple and not expand or make users think hard about moving between two different pages while trying to make a purchase. For example, buying groceries from a grocery store (in Collection Location) and buying cooked meals from restaurants (Products listing page).

In consideration of accessibility for the web service, we focused on two areas: choice of colors and fonts. Even though we selected colors suited for sustainability and life (green and orange), we as well ensured that the color combinations can be read and accessed by many users, hence, color green for the button background color and black for the button text. The color contrast was tested using the accessibility plugin available for Figma and Adobe’s color palette generator website, following Web Content Accessibility Guidelines (WCAG). As much as possible, we avoided overwhelming the web pages with too many colors, items, and illustrations. Instead, we intended to adopt a minimalist design. For the typography, we went with a font type (Poppins), readable to individuals with cognitive disabilities.

7. Conclusions

Here, a summary and reflection of the work for the web service is provided from members of the team and through peer-reviews.

7.1 Current situation

Based on the following feedback we received below, we came up with further iterative ideas to better engage our target user group.

Feedback 1:

“On the front page, I think having some offers visible would entice the user to explore the service further. Also since the target user group are students, maybe something more catchy tags could be added like "Cheaper food from your university restaurants!". Also, maybe notifications to the user regarding deals?”

Solution we came up with:

To solve this issue raised we decided to do the following:

- Rephrase some of our words as they were pointing our user to what we wanted them to understand (Inclusion of Catchy words to the hero section as other words were included as sliders to extend our ideas to the users)
- Categorization of Offer specially from the university on the store page for accessibility
- Wishlist was also considered by the functionality wasn’t designed

Feedback 2:

“I really didn't understand the specific product idea. I got a high-level grasp of it but I think I would've wanted to hear more about how this application would reduce food waste.”

Solution we came up with:

To solve this issue raised we decided to do the following:

- Added the expiry date to each of our products
- Inclusion of points collection for every purchase made with an accomplishment banner to encourage and motivate our users
- Paraphrase the text for food waste reduction counter

Our Web Service Strengths

- Similarity with familiar E-commerce store
- User-friendly, visually appealing and responsive (mobile and desktop context)
- Introduction of Gamification (Reward system to our web service)
- Getting relevant and essential food ingredients and ready-made food at a cheaper rate
- Tracking of Personal Sustainability Goal

- Introduction of Food reminder to send notification of items users have in their fridge, freezer, or cabinet (consciously entered by user)
- Access to multiple verified restaurant and stores
- Inclusion of allergies and specification of various food categories (Vegan, lactose-free, etc.)
- Recipe Page to get suggestions of foods you could use with ingredients left.

Weaknesses and threat for our service idea

- Low purchase of goods which might lead to wastage
- Distribution of stale food
- Process of scanning the items or adding purchase groceries manually to the "Kitchen" page may be time-consuming for some users

Further Development

- Development of the Partners Section. May involve additional rounds of interviews and questions formulations with food service stakeholders.
- Addition of a Donation feature on the web service. Users can support verified food aid programmes
- A social media share feature for goals attained or recipe recommendation users found particularly useful with motivational quotes for reducing waste.
- Share 'Your Impact' page on social media to motivate more people to join "food waste reduction" Teamwork using this web service.
- Using more gamification techniques to keep users motivated and consistent using the website.

7.2 Next steps: evaluation plan

To evaluate the service idea and interactive prototype with the target user group, a proposed test plan is described below. The first part of the plan would be to determine the purpose and goals of the study, collecting both behavioural and attitudinal data. In our case, this is to find out the usability of the service's prototype and areas for improvement. Next would be to decide on the mode of the study- in-person or online (remote), depending on time schedules and availability. Also, the moderated usability test would be adopted so the team can provide guidance and clarification to participants where necessary. Furthermore, the number of participants needs to be determined. 9 participants that adequately represent our personas and the use scenarios would be ideal (Loranger, 2016).

The test tasks are to be decided and written with a focus on the user goals that were earlier defined, considering both exploratory and specific tasks. After this, a Pilot test would be conducted with at least 3 participants to help validate task wordings, estimated task times, technical platforms for the test, and post-task interviews for clarity and cohesiveness. Informed consent form would be made available to users prior to participation and for test session recording. The pilot test would include a zero task, a practice task, and the test tasks. A System Usability Scale (SUS) questionnaire would be shared with participants after their

test sessions to get feedback on their experience with the service, and results analyzed. The team would also decide on the metrics to track during the test session with emphasis on task completion rate, task times, and error per task per participant. Lastly, every member takes on the role of moderator and observer at different sessions.

Measurement metric for User experience or usability goals for your service

Some Key Performance Indicators (KPIs) suited for our service could be used to measure the success of the user experience and usability goals. They are– Net Promoter Score where users rate how likely they are to recommend the service to others. Log data can help to understand what period (day/ time) users mostly use the service. Page views/Click rates can provide insights into the average task times, error occurrence rate, etc. Surveys can also be used to get a generalized perception of the service functionality.

7.3 Reflection of own work

Overall, the teamwork was productive and effective, as we followed the recommendations and rules for working in a group earlier shared at the beginning of the course. Every member participated in all phases of the project- from the interview questions formation, participant interviews, interview transcript thematic coding to personas, scenarios to design ideas and the interactive prototype of the web service. Along the way, everyone acquired new knowledge and skills, especially in thematic coding and learning to use the Figma design software better.

The significant part of the project and teamwork was that everyone's ideas were aired, listened to, and accepted. Even though we had argued on the justification for some ideas, we unanimously agreed on design features. A challenging aspect would be that the team mainly aimed for perfection, which ultimately affected the delivery of designs-wireframe and prototype. The report was written at different stages of the project, from project description and work schedule to user study, data analysis, conceptual design, and finally, the design work—each member taking ownership of a chapter or sub-section.

Tasks	**Responsibilities**
Forming groups, ideating interview questions	Oluwatosin for group formation, ideation – done by every member of the team
User Interviews, thematic Content analysis, interview data analysis interpretation and result	User Interview & Thematic Content Analysis- All members Interview Data Analysis Interpretation- Oluwatosin Work distribution by Mina

Use context, user groups, personas, UX goals, user tasks, conceptual model	Deliberated by every member. Personas, use context and user groups by Mina User tasks, Usability and UX Goals by Fareed and Oluwatosin.
Information architecture, use scenarios, Sitemap	Deliberated by every member. User Scenarios by Fareed Information Architecture (Concept map) & Sitemap by Oluwatosin
Visual Design: wireframe, high-fidelity prototype and interaction	Design brainstorming, wireframe and high-fidelity prototype and interaction by all members with guidance from Oluwatosin
Interactive prototype	Interactive prototype by Fareed.
Finalizing the interactive prototype and report	All members

Point distribution

Fareed: 5 points
Oluwatosin: 5 points
Mina: 5 points
(Total 15 points)

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9. APPENDICES

We provide a list of appendices to support the project work, such as participants interview transcripts, content analysis, and wireframe screens.

9.1 Interview appendices and content ana lysis

List of appendices for each member's interview guide and transcripts titled. The files are included as attachments as part of the submission

9.1.1 Interview guide - Interview Guide Document

9.1.2 Fareed Participant Interview transcript 1 - Participant I Interview Script

9.1.3 Fareed Participant Interview transcript 2 - Participant II Interview Script

9.1.4 Fareed Participant Interview transcript 3 - Participant III Interview Script

9.1.5 Mina Participant Interview transcript 1 - Participant IV Interview Script

9.1.6 Mina Participant Interview transcript 2 - Participant V Interview Script

9.1.7 Mina Participant Interview transcript 3 - Participant VI Interview Script

9.1.8 Oluwatosin Participant Interview transcript 1 - Participant VII Interview Script

9.1.9 Oluwatosin Participant Interview transcript 2 - Participant VIII Interview Script

9.1.10 Oluwatosin Participant Interview transcript 3 - Participant IX Interview Script

9.1.11 (Interview) Content analysis table- Analysis - Thermal Coding

9.2 Additional wireframes and high-fidelity screens (mobile/desktop)

Individually created wireframe screens for mobile and desktop views are provided as an attachment titled Appendix 9.2 - Individual Design