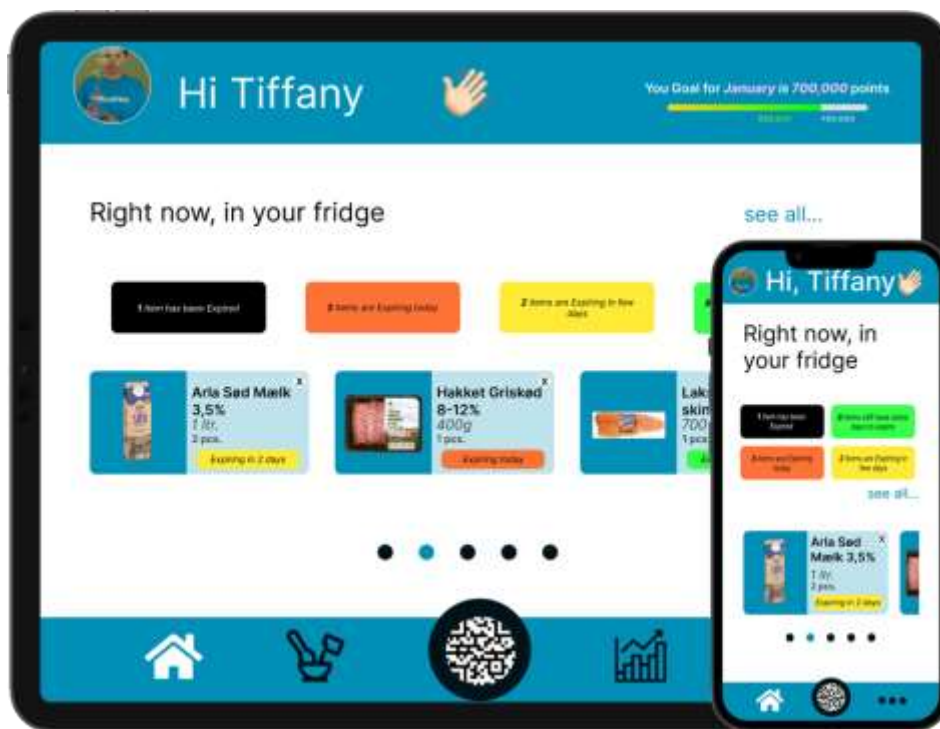


# FOOD WASTE SOLUTION FOR TEENAGERS



## ROLES AND RESPONSIBILITIES:

Researcher      Product Designer      UX Designer      UI Designer

## 1.1 OVERVIEW

The problem of food waste is huge and directly related to climate change as it increases the greenhouse gases in atmosphere. There are two main reason of food waste in Danish household, and they are, **due to date expiration** and **surplus of prepared food**.

So, the question was:

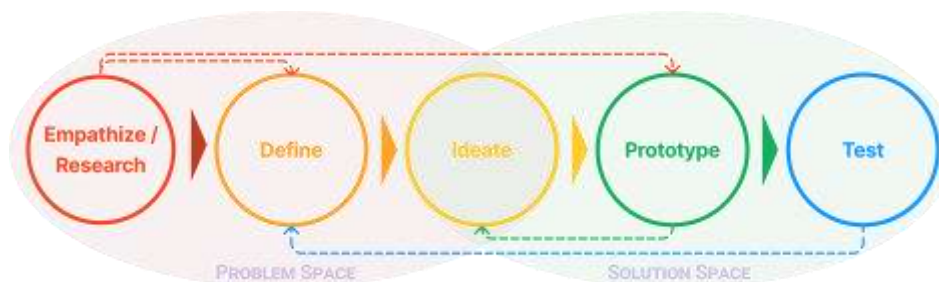
*"How to use Human-Computer Interaction and Gamification methods within User Experience Design framework in Designing digital system to reduce food waste focused for children of late Gen Z (13 to 15 years) group?"*

The final solution was designed especially for tablets and was able to keep track of food which would be soon cross the dateline of expiry and suggest a recipe from the database which has it as ingredients. Which will reduce the food waste and as well as encourage them in preparing and consuming healthy meal.

## 2 CONTEXT

Food Waste Solution (now onwards, FWS) is a solution to reduce household food waste that I designed as project for my master's thesis. The requirement of the project was to find a problem, which we can see in our daily life and find and design a digital solution to solve it. So, I had chosen this problem and did research, design based on the result and test it.

## 3 THE CHOSEN DESIGN PROCESS - DESIGN THINKING



### 3.1 RESEARCH

Before moving forward and listing the requirements, first and foremost step was to understand the problem and its causes, and do the research on different relevant topics, like as, **Food waste, Gamification and Engagement and Human-Computer Interaction**. Among these topics, **Child Psychology** was focus on research, as they were the primary users as well as targeted group.

#### 3.1.1 Interview

I interviewed couple of children who were between 13 to 15 years and go to public school. The interview was semi-structured interview and was focused to get insights about **their use of mobile/PC games and social media, what they think about food waste and how often do they waste food and, whether they would use a tool to reduce food waste, if there was any.**

From the interview, I could conclude, as assumed, that the children between 13 and 15 are more aware of food waste and climate change. Swedish-teen activist is influencing the teens to be aware of climate change and global warming. Beside this, the participant said that **the social recognition and belonging to community is vital, sharing the achievements is important, staying in instant connection is important**, are some of the important points for these group of users.

#### 3.1.2 Competitive Advantage

Moreover, 6 different apps or systems, which were working/related to reducing food waste, were analysed and they are as below:

**Food Sharing Copenhagen**

- + Volunteer-led Organization
- + People can come and pick-out items as they like
- Collects food from business, Events twice a week
- No app for it.

**To Good To Go**

- + App connects with local stores etc. in near vicinity
- + Marketplace for surplus food
- Focus on food producers and retailers

**Wefood**

- + Volunteer-led Organization
- + Mislabeled, broken package but fine to consume
- Collects food from business
- No app for it.

**Stop Spild af Mad**

- + Is a movement and encourage large chain stores to change methods
- No app for it
- Relates to food producers and policy making

**Plant Jammer**

- + User can search recipes and use it for preparing meal
- + Focus on Individuals also
- Collects data for food producers
- Not much other things can be done as individual users

**No Waste**

- + The app helps to keep track of the food which is soon being date expire
- + Focus on Individuals
- Not much other things can be done as individual users

**Literatures review, Interview and Observation** were the main techniques used in research and some of the main findings were:

- Main reasons behind the food waste from private householdings are, due to date expiration and surplus of prepared food.
- Achievements from actions motivates and want to share to others.
- Social recognition and belonging are important.
- Staying in instant connected is important.
- As the user's skill improves, increase the level of challenge.
- Give the user sense of control and freedom

## 3.2 DEFINING THE REQUIREMENTS

The next step after research is to define the users' requirements from the system and to do that, I used Personas and User Journey.

### 3.2.1 Persona

Based on the interviews and research, I identified 2 personas.



**Adam**  
15, Student  
Copenhagen, DK

"It would be great to achieve something from my action, which I can show to my peers"

**Bio**  
Adam is a student and goes to public school. He likes to play online games in game console, pc or mobile with his friends. He likes games where he can build and achieve points, share those achievements with his friends. He likes to cooking class in school.

**Goals and Interests**

- Get achievements from the actions which are shareable with his group
- Wants to belong to the group of friends who are concern with food waste
- Reduce food waste at his home

**Motivation**

- His main motivation is to be included in his friends circle and impress others
- Want to follow the trend of being environment friendly against climate change
- Gets to know new recipes where he can exclude peanut as he is allergic to it.

**Pain Points & Concerns**

- Not knowing any specific smartphone app for individual users
- Can't track food in the refrigerator which are expiring
- Doesn't have much knowledge about what to make from expiring food

**Social Media Usage**

Instagram	●●●●●
Facebook	●●●●●
Snapchat	●●●●●
TikTok	●●●●●



**Tiffany**  
14, Student  
Copenhagen, DK

"I am great fan of Greta, and I am concern about our food waste from households"

**Bio**  
Tiffany is a student and goes to public school. She is an environment activist in her school and takes part in different related programmes and arrangements. She idolize Greta and tries to contribute in fighting against climate change. She has many followers in TikTok and Instagram. She often makes TikTok and Instagram contents to influence her followers to contribute on this fight.

**Goals and Interests**

- Reduce food waste to fight climate change and global warming
- Need to influence teenages to reduce food waste from their home
- Make it easier to keep track of food regarding their expiry date

**Motivation**

- Her main motivation is fighting with climate change as it is huge problem to solve urgently
- Really wants to influence as many teenager to act on the problem
- Create a big group of similar users where they share their achievements with each other

**Pain Points & Concerns**

- Couldn't find any good and specific system to help with food waste in private homes
- Hard to keep track of expiry dates of food in the refrigerator
- Can't influence many of her friends as there is not easy and flexible solution for them

**Social Media Usage**

Instagram	●●●●●
Facebook	●●●●●
Snapchat	●●●●●
TikTok	●●●●●

### 3.3 IDEATION

For Ideation, I used the Brainstorming technique. From conclusion of research and review, I had reached to a conclusion that there are mainly two reason, that should be addressed to reduce the food waste from individual households, and they are:

- Due to date expiration
- Due to surplus of prepared meal

The first problem can be solved using the approach as in 'No Waste' which can track the expiring dates of the products and sends the notification if something is expiring.

The second problem can be solved using the approach as 'Plant Jammer', which can be used in searching recipes.

So, we can combine both approaches and help users to reduce and learn about food waste.

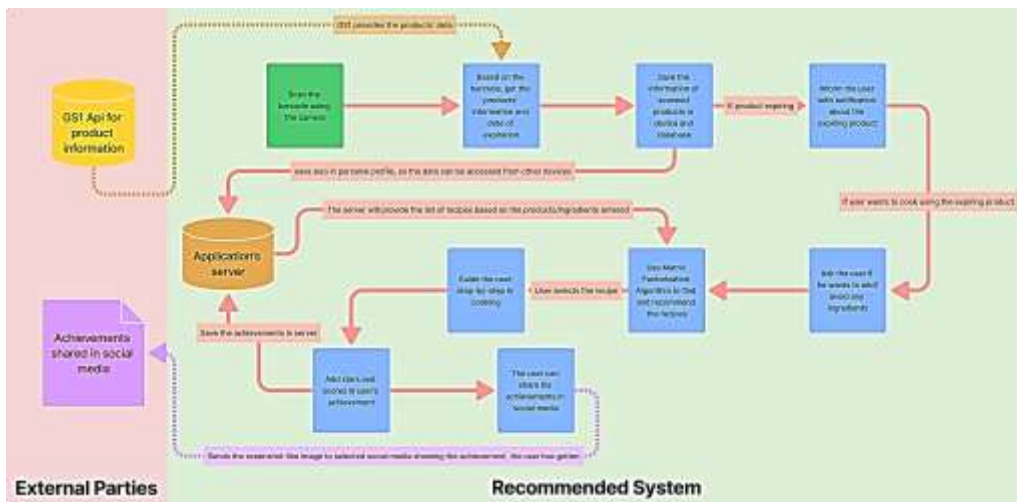
Beside this, for user engagement, I have used findings from Flow Theory and Gamification methods, like as, sense of control and freedom, opportunity to share the progress and thoughts, increase the level of challenge as skill increases and so on.

So, the summary of the system as recommendation has:

- The application use device camera to scan the barcode of products and keep track of the products' expiration date.
- The application will inform the user with notification about the product which is soon going to expire according to the track it made.
- The application allows user to add any other ingredients with the expiring product. Moreover, it also allows the user to avoid any ingredients that the user doesn't consumes based on health and cultural reasons. . If the user wants to cook using those products, the application uses the Matrix Factorization algorithms to find the recipe based on those products. These ingredients will be considered when the Matrix Factorization algorithms will recommend the recipes
- The application will show the list of ingredients for number of person and informs users to increase as needed. This could be set in the settings also and the portion of ingredients will be changed as the settings.
- The application will add stars and scores (points and badges) in user's achievement if the user uses the product before expiration. The user can set his/her own goal to be achieved in months.
- The user's achievements can be shared in social medias connected with the application.

Moreover, from research I have found that GS1 provides the barcode/QR data for the products in Denmark so we can use its API service for product information.

The recommended system will, fundamentally, work like this:



### 3.4 PROTOTYPE

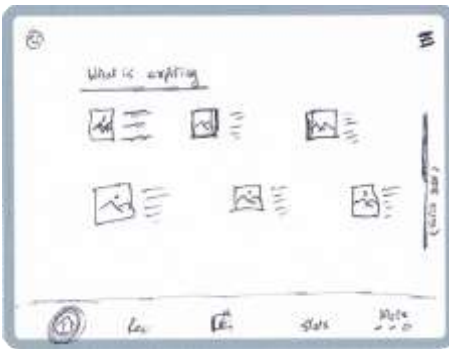
After Ideation, I started to sketch the design as wireframes and later finalized the design in Figma.

#### 3.4.1 Wireframe

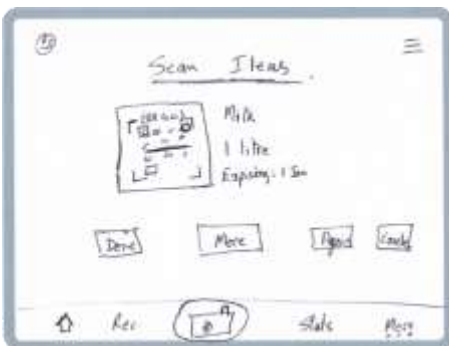
The design started with wireframing. Some of the wireframes and their final design are as below:



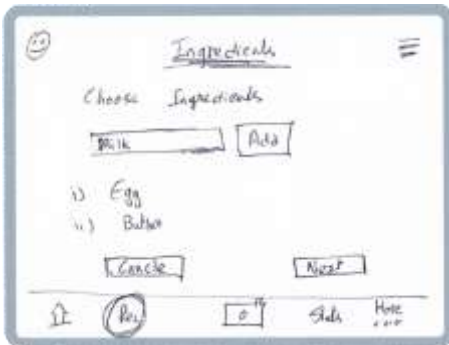
- **Dashboard >**



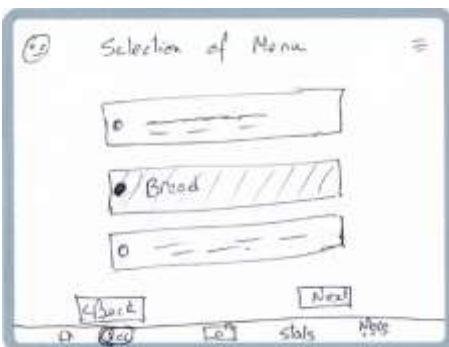
- **Scanning items**



- **Choose Ingredients**



- **List of recipes**



• Side Menu



• Achievement Page



The final design was changed compared to wireframe on based of testing. Some of the suggestion I received from potential users were:

- Image of Food
• Able to watch as video also.
• can see how long time the menu takes to prepare.
• Menu ratings from other users

3.4.2 Interaction Design

The interface design was based on Heuristic Principle for Interaction Design.

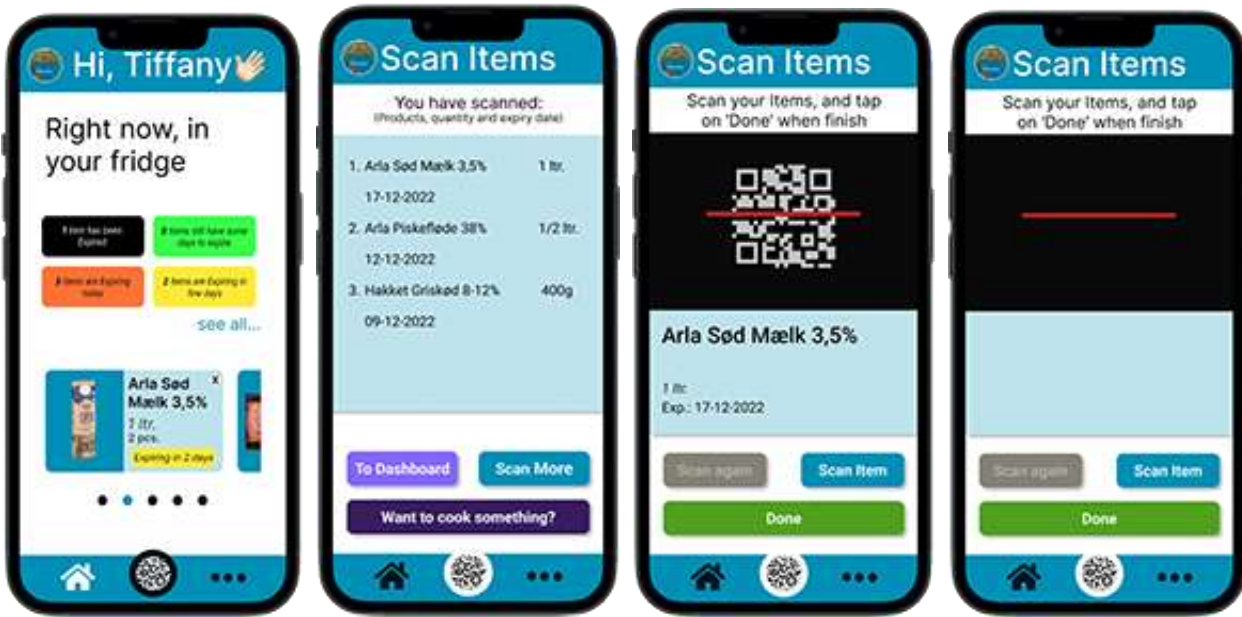
The User Interface includes basic features, like as: Buttons, brief title for every page, navigation bar and so on, as it is generic, and it can be recognized also from other mobile and tablet apps. The use of colour on buttons also matches with the real-world colour, like as red for 'Stop', 'Cancel' or 'No', green for ingredients should be included, and so on.

There were some features added to the system so the user can feel some control and freedom on the system, like as, the user can add his/her goal for the month, share the achievements on social media, choose what to include and what not to include as ingredients, etc. Moreover, the design has consistency and standards which is followed throughout the whole system.

As shown on the figure at right, the input field has option to choose from the list of ingredients as to prevent misspelling the name of the ingredients. The icons of bottom bar were easily recognizable as they aren't fundamentally unique design for this system. These are only some examples, how I used Heuristic Principles in the designing of the UI.



Moreover, here are some of the screenshots of final design, when you open the app on mobile device:



### 3.5 TESTING

For testing, I used high-fidelity prototype testing, which was prepared in Figma and had app-like animation while interacting with it. I involved 2 potential users (n = 2), who were 13 and 15 years old, and were male and female respectively.

Prior the test, the users were informed that:

- What is the primary goal of the app?
- About the Prototype Design - It is just to see how it will look and work.
- Interactions are added in the buttons, and they may click to see if it does the same thing as the instruction is given.

From the test, I got some suggestions which are listed below:

- Take picture of prepared meal and post on social media, directly from app.
- The user can give some comment also for the recipe.
- Able to see how many votes the recipe has gotten, beside the rating.

These suggestion can be implemented in next version of the app after doing research.

## 4 FURTHER WORK

I personally believe, to improve the quality of this project and achieve the intended goal, there are some challenges which must be considered as the Further work:

- I have discussed about the feature in the app where it scans the barcode and find the date of expiry of the product. But the data for the bar code is provided by GS1 Organization, which provides its service with certain payment. If this purposed app is launched in the market, someone must pay for the service from GS1 or find a way to earn enough for expenses.
- The primary users of this system are children, so experts on Child Psychology, should be included in research group to find if the design and system will do as intended and without harming them, psychologically.
- There should be a team behind this project for improvements and maintenance.



- The idea behind this system is, somehow, combination of features from NoWaste and Plantjammer and they are already available, so the question is, 'if the system contradicts with any copyright rule?'

The study has not finished, yet. The system must be tested with more users. I strongly believe that to measure the accuracy of the effectiveness of this system, the close study must be done and observe how the children's mindset has changed towards the food waste.